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NATIONAL GEOGRAPHIC

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THE JOURNAL OF THE NATIONAL GEOGRAPHIC SOCIETY WASHINGTON, D. C.

NATIONAL GEOGRAPHIC Society

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National Geographic Magazine

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COVER: *Gardenia-crowned Tahitian finds fun even in cleaning fish (page 6).*

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Angel Arch stands guard in Utah's Canyonlands

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These primitive peoples probably knew this strange land better than we do now. But if Canyonlands is added to the National Park System, the thousands who visit nearby Arches National Monument can also see these marvels. Conservationists hope so, for as our population grows, *more of our scenic heritage should be preserved*...to give all Americans, for all time, the spiritual refreshment of Nature's spectacular wonders.

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The Schreiders survived hidden shoals, swollen rivers, shattered bridges, and deadly sea snakes. At Nova Ourém, high in the coffee lands of Portuguese Timor, they admired the horsemanship of fierce tribal cavalrymen, here shown dismounted after a review.

In earlier issues of NATIONAL GEOGRAPHIC, you have jeeped down the Ganges and visited Indonesia's major islands with the Schreiders. The August issue will bring you the story of their Nusa Tenggara travels.

Timor Island warriors wearing silver breastplates crowd around Frank Schreider to see his camera

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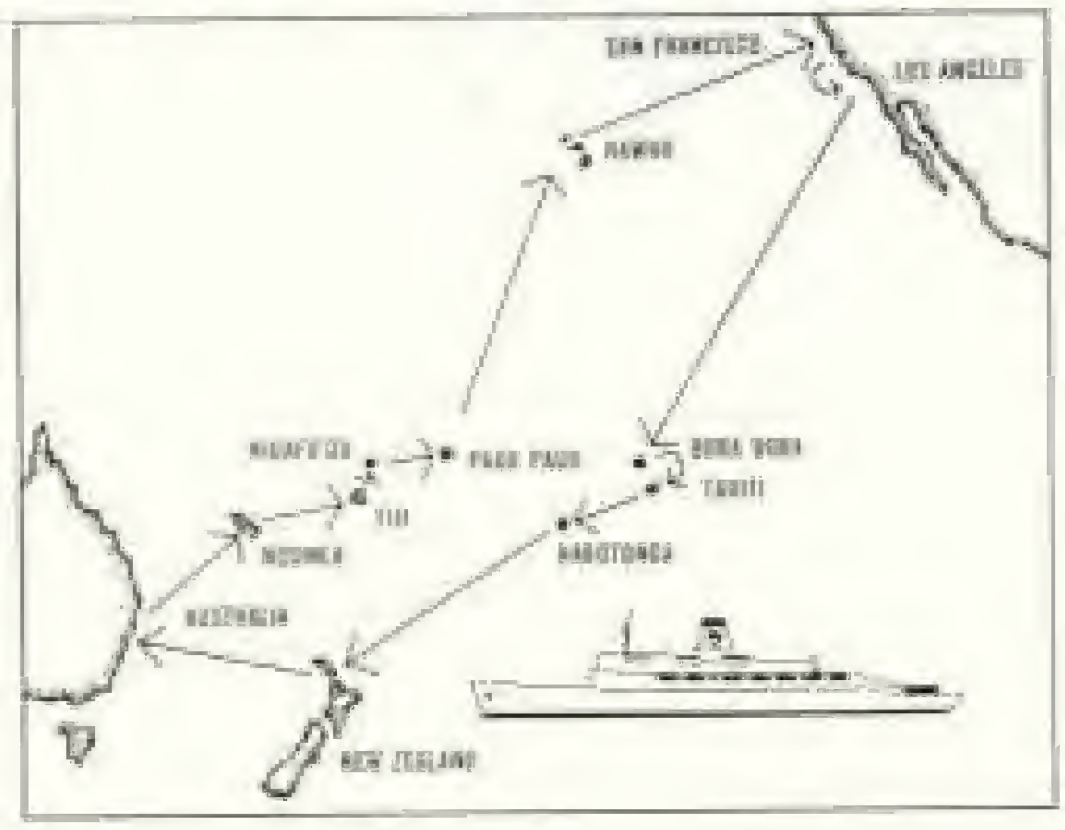

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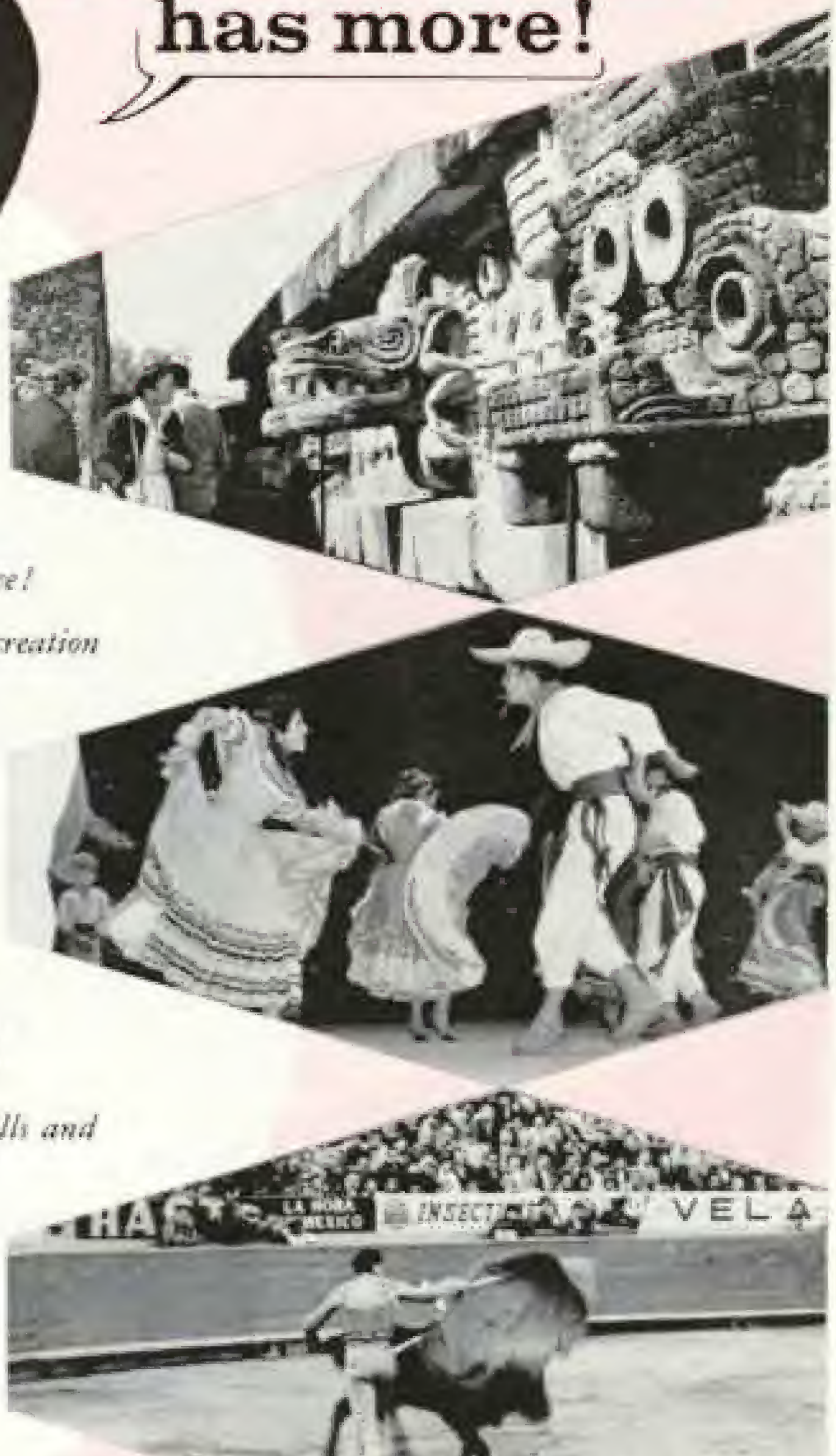

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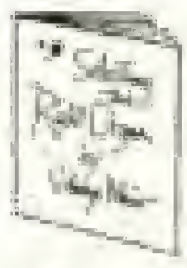

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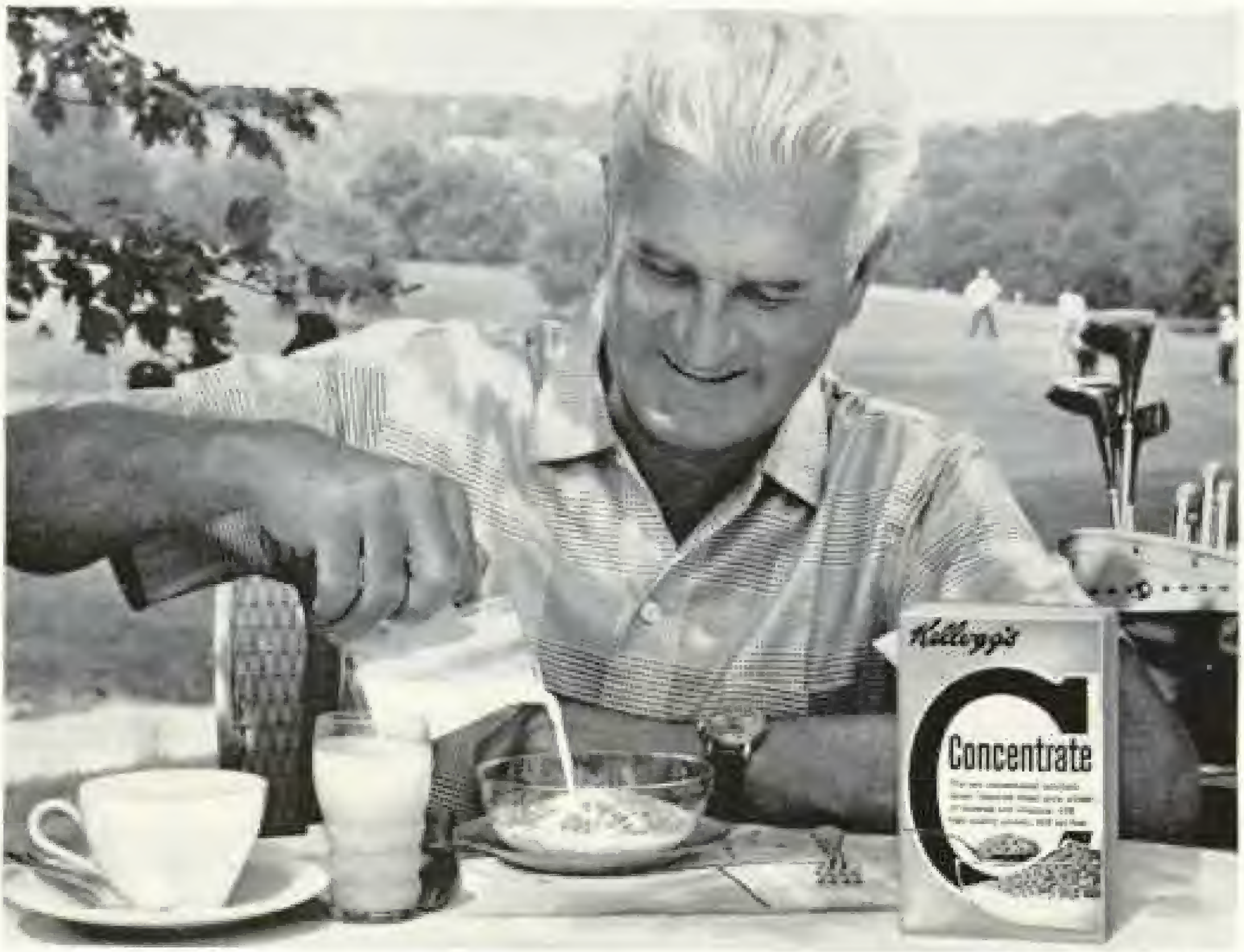

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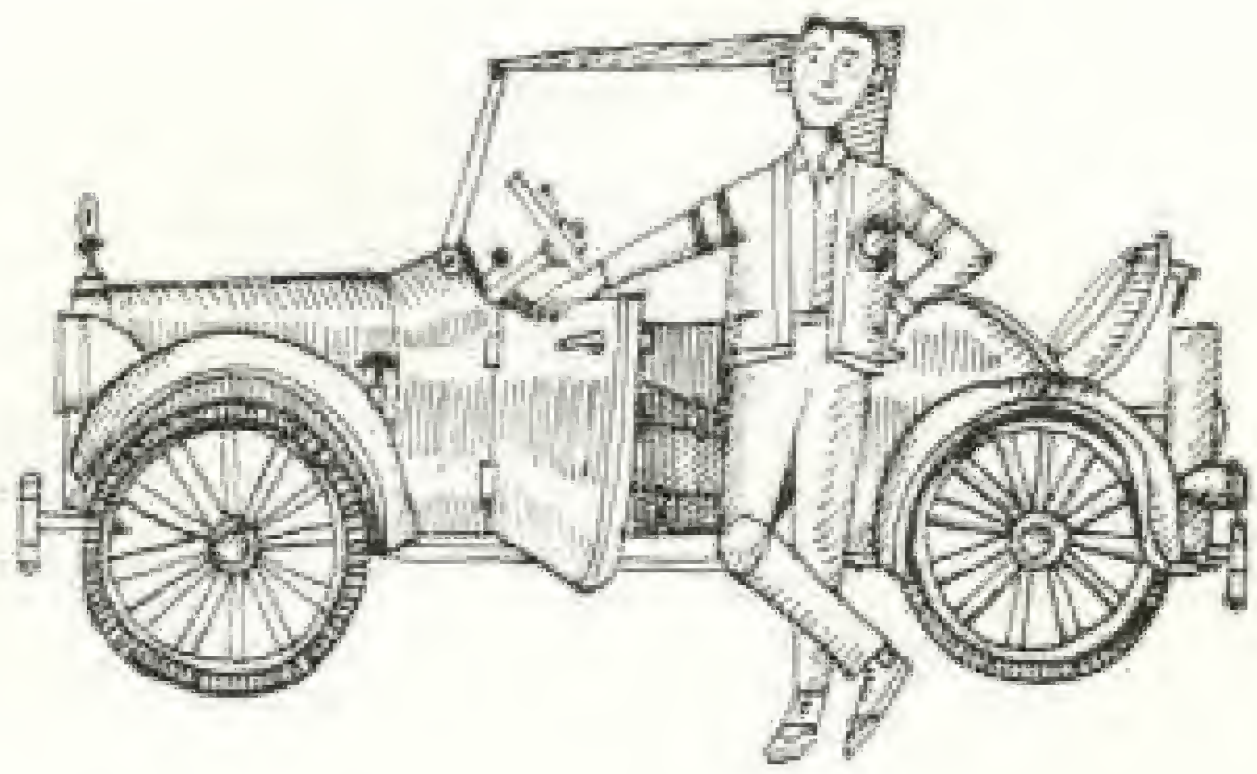

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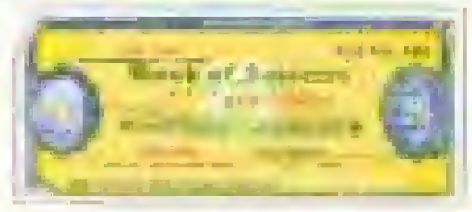

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THE NATIONAL GEOGRAPHIC MAGAZINE

VOL. 122, NO. 1 JULY, 1962

Tahiti, "Finest Island in the World"

Today's jet travelers echo Captain Bligh's superlative when they behold the South Pacific isle that embodies every man's vision of delight

Article and photographs by LUIS MARDEN
National Geographic Senior Editorial Staff

"AT 3 P M WE SAW the Land bearing W. ½ S., it appeared to be a great high mountain covered with clouds on the tope. . . . This made us all rejoice and fild us with the greatest hopes Imaginable, we now lookt upon our selves as relived from all our distresses as we was almost Certain of finding all sorts of refreshments on this great Body of Land. . . ."

George Robertson, master of the British *Dolphin* frigate under Capt. Samuel Wallis, wrote this in his journal on the 19th of June, 1767. They had discovered Tahiti, and sailormen have been finding "all sorts of refreshments" on that lovely island ever since.

Hard on the heels of Wallis came other navigators: Frenchmen, Spaniards, and more Englishmen. Not far behind were the missionaries, and later there began the long pilgrimage of litterateurs, painters, and escapists to whom Tahiti was the earthly paradise, the Great Good Place, the home of the Noble Savage. Tahiti thrust her green breast up through the mists of the Great South Sea and discoverers, men of God, poets, and adventurers all came to drink, and in drinking, breathed nepenthe. No matter if one never set out for Tahiti, the Isle of Illusion was always there, somewhere beyond the horizon, far away and approachable only by sea, the golden dream of everyman.

Air Age Brings Change to Eden

The dream lasted exactly 193 years, three months, and 27 days. It came to an end the 16th of October, 1960, when a four-engined passenger aircraft turned into the wind and touched its wheels down on Tahiti's new two-mile-long runway.

Tahiti is still there. The sea still breaks in growling thunder on the encircling reef; the white-plumed waterfalls continue to course

The Author: Luis Marden, who has sailed many tropic seas, endorses Captain Bligh's description of Tahiti (see title). For an account of the author's voyage to the island aboard a modern-day *Bounty*, see "Huzza for Otaheite!" in the April, 1962, NATIONAL GEOGRAPHIC.

down the verdant mountainsides; the brown girls smile as invitingly and laugh as happily as ever. But it is not quite the same. The reason is simple: Tahiti is no longer remote, a misty isle of legend, a place untouched by the niggling realities of the outside world. Now it is as near as your airport.

Let me make myself clear: I do not say that Tahiti is "finished"; far from it. On the contrary, a new era is beginning for the island. I say only that the state of mind that was Tahiti, that drew Melville, Loti, Stevenson, and Gauguin to the island, has vanished, merely because the place is no longer far away, and no writer, painter, or plain escapist can any longer "get away from it all" there.

I witnessed the metamorphosis of Tahiti. I was there when the first jet arrived and the green island of dreams took on the sharply etched outlines of a spectacular vacation island. I had come to Tahiti by sea, as third mate of the new *Bounty*, a copy of the original mutiny ship, which had been built by Metro-Goldwyn-Mayer for a filming of Nordhoff and Hall's book *Mutiny on the Bounty*.

We had sighted the lighthouse on Point Venus at night. At first light we worked into Matavai Bay, and instantly we were surrounded by a fleet of outrigger canoes. For me the scene had a dreamlike quality. We were anchored in the exact spot where Wallis, Cook, and Bligh had dropped their hooks, and I had become so steeped in the old accounts and had seen so many engravings of the scene, that the feeling of having been through it all before was overpowering.

World's First Tattooed Sailors

No longer, however, did the Tahitians shout *taio! taio!* (friend! friend!); the word, as well as the custom of blood brotherhood, has passed out of the language and life of the island. But the brown-skinned laughing girls clambered aboard as of old, and hung garlands of *tiare Tahiti*, the sweet-scented single gardenia, around our necks. They did not rub noses; instead, they cried "*Ia ora na!*" (Health to you!) and kissed us on both cheeks.

I watched a girl in a red-and-white *pareu* —a brightly printed cotton cloth wrapped round the body from breast to knees—trace with her finger the tattooed blue anchor on the sunburned arm of one of our seamen. The cycle was complete: When the first Europeans came to Tahiti, they found both men and women decorated with indelible designs. "Tattow as it is called in their language," wrote Captain Cook. It was done by pricking the skin with a sharpened bone dipped in soot and coconut oil.

Sydney Parkinson, artist on Cook's ship lying in Matavai Bay in 1769, recorded: "Mr. Stainsby, myself, and some others of our company, underwent the operation, and had our arms marked." Doubtless these were the first seamen in history to wear what later became the traditional badge of the sailor.

We lay in the lee of the long finger of Point Venus, northernmost point of Tahiti (page 4). Beneath coconut palms and feathery casuarinas, a steep black beach trembled under the hammer blows of green combers that broke in hissing foam on the lava sand.

Crewmen Lured by Island Charms

On this spit of land Capt. James Cook set up his telescopes to observe the transit of Venus, and Tahitians have been observing the transients of Venus ever since. For these are the Amorous Isles, sailor's dream of Elysium.

Near me at the port gangway a small girl in a blue-and-white pareu, with a mane of glistening hair like a dark cloud, hooked arms with an able seaman and smiled up at him.

"You like Tahiti? You stay?" she asked.

With a dazed look my shipmate swallowed and nodded vigorously. Forgotten were the words of Tahitian earnestly practiced in the watches of the night. "Yes," he managed to croak. "Me like, me stay."

The first navigators to touch these enchanted shores faced a problem that has become classic: how to keep their crews from deserting, or, at least, how to keep the men's minds on their work. Bougainville, the French circumnavigator who reached Tahiti only a few months after Wallis, wrote plaintively:

"I ask, how is one to keep at their work, in the midst of such a spectacle, four hundred young Frenchmen, sailors who for six months had not laid eyes on a single woman? Despite all our precautions, a young girl climbed on

"They are in generall handsom and engaging, their Eyes full and sparkling"

Hibiscus thrust into the dark cloud of her hair, Tati with liquid eyes and coconut-frond fan embodies the dream of a South Seas paradise. Until recently her island home, Tahiti, stood isolated beyond Pacific swells, a lodestone to writers, painters, and escapists. Airplanes now give fast access to its legendary allure.

board and went to stand on the grating over the capstan . . . She had a heavenly figure. The sailors and marines rushed to reach the gratings, and never was a capstan turned with such celerity."

Inland from Matavai the mountains rise steeply, fold upon fold, the hills near at hand a fecund yellow-green, the singularly shaped mountains beyond smoke blue. In plane after receding plane, they rise to the highest peak of all—"shaped like a cocked hat"—Orohena, 7,352 feet high (page 42).

Such a cloud of legend, illusion, and history surrounds Tahiti that it seems bigger than it is, but actually the island is only 37 miles long. It was born when two volcanoes emerged from the abyss of the Pacific, touched at their periphery, and then cooled in a figure 8, with one large and one small lobe. Most Tahitians live, as they always have, on the narrow strip of flat land—nowhere more than a mile and a half wide—that runs round most of the island.

Like her namesake, our *Bounty* stayed several months at "the finest island in the world," as Bligh called it. I went ashore to live in a small thatch-roofed house behind a gardenia hedge three winding miles east of Papeete in the District of Pirae.

"There is a magic about these islands that is time-defying" [illegible]

In 1767, "with the greatest hopes Imaginable," British Capt. Samuel Wallis sailed his frigate *Dolphin* into this "fine smooth bay," Matavai, and discovered Tahiti and Moorea (background). Papeete lies within the sheltering reefs at upper left. Beyond, rock dumped into the sea made a runway for modern voyagers in the ocean of air. Point Venus extends to the right in the foreground and on the map below.

[illegible]

Anchorages of the discoverers can be plotted accurately from ships' logs (map). After seizing the *Bounty* from Captain Bligh in 1789, Fletcher Christian and the mutineers returned to Tahiti and anchored in Matavai Bay before fleeing to Pitcairn.

Matavai's Calm Ends Abruptly

The first navigators came upon Tahiti in the winter months, when the southeasterly trades blew almost constantly. Then Matavai, its waters sheltered by the steep backbone of Tahiti itself, is a safe haven. But during the summer months the wind sometimes blows from the northwest, and then a dangerous swell sets into the bay.

Captain Bligh, who came here to load breadfruit trees for the West Indies in 1788, had to move his ship in early December (Tahiti is south of the Equator, and of course the seasons are reversed). In his log he wrote:

"... I had considered Matavai a secure place. In this I am very much mistaken, and recommend it to future Navigators not to lie here towards the Southern Solstice."

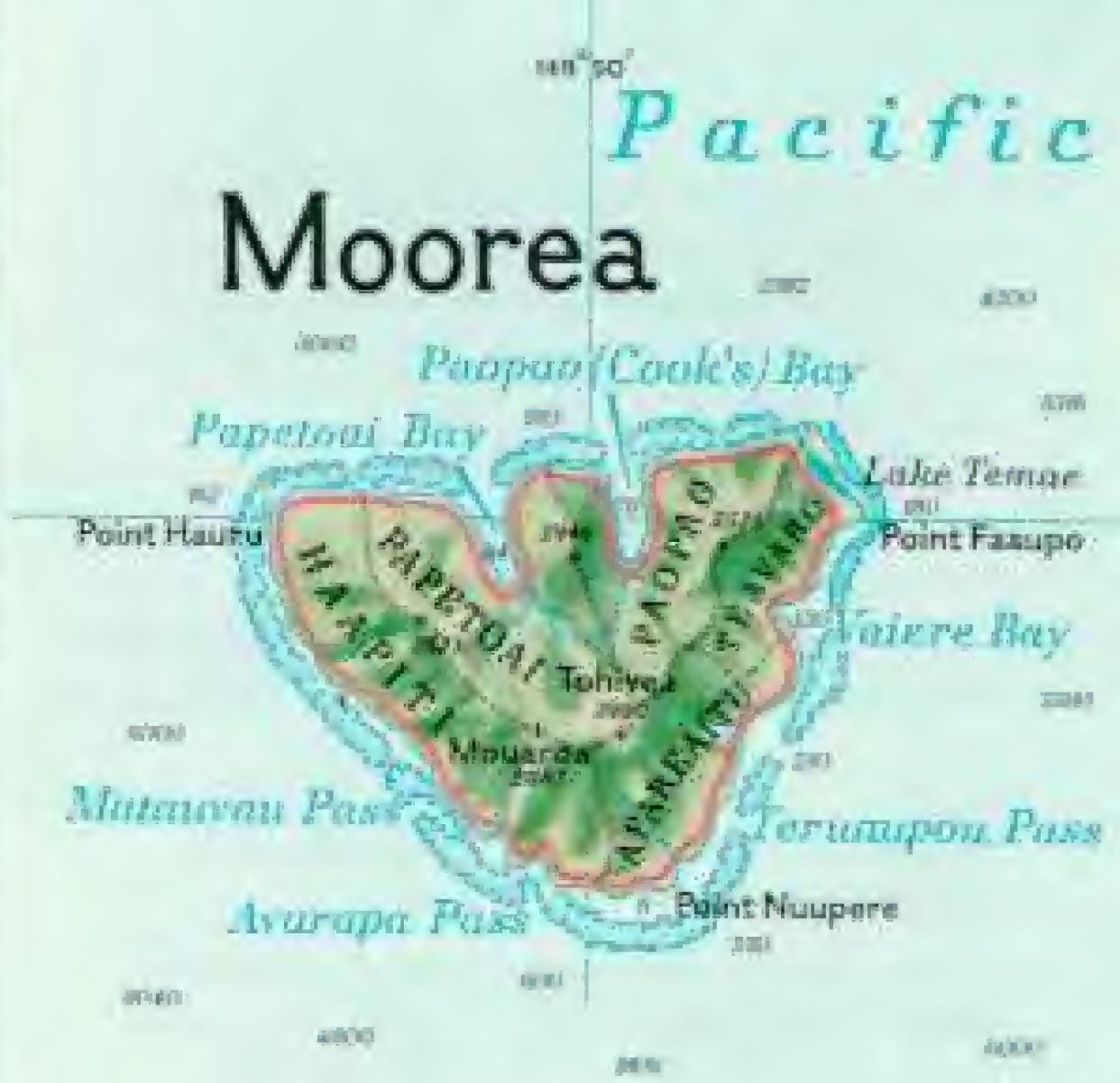
One of the safer anchorages marked on charts by Cook and others was the site of present-day Papeete, five miles southwest of Point Venus, but it was not until about 1830 that the port was established. The barrier reef that runs nearly continuously around Tahiti has an opening, or pass, here. Vessels coming in make a sharp left turn and then moor or tie up safely under the lee of the reef and a small *motu*, or islet.

When the discoverers came to Tahiti, there was not a single village on the island. Houses were scattered in charming disarray along the coast. This remains true, and Papeete—pronounced Papayay-tay—is still Tahiti's only town.

The little port is the capital of French Polynesia, four major

"The Weomen are finely Shaped" WOMEN

Artists in the enjoyment of living, Tahitians find pleasure in everything they do. This gardenia-crowned girl laughs even while cleaning squirrelfish for a feast.



groups of islands scattered over a vast area of the South Pacific. Half of their entire population is concentrated on Tahiti, a French territory, and nearly half of Tahiti's people live in Papeete, a town of about 18,000.

Yachts Tie Up to Old Cannon

Peaked red-roofed wooden buildings line the principal street, the *quais* along the waterfront (page 8). Here the yachts that started out to circle the world tie up stern first and swing their gangplanks ashore. Along the stone coping of the seawall, old cannon sunk into the ground serve as mooring bitts.

Our lines had been made fast to one of these guns when I first came to Tahiti in the brigantine *Yankee* three and a half years before.* Across the street from our old berth stands the town's principal cafe, the Vaima. The name means Pure Water, though doubtless that is the drink least called for there, as Tahiti is an island of beer-drinkers.

Most of Papeete's inhabitants are government-employed Frenchmen and their families, but you will see few of them at the Vaima. This is the hangout of Papeete's fixtures: The travelers who came for a week and stayed for a year, the round-the-world sailors whose cruise ended here, the journalists and film makers who have come to put Tahiti down on paper or film, and even the serious, bespectacled Frenchman, who at eight in the morning sits sipping coffee and reading a paper-bound book, *The Murderer in Room 21*.

Whenever I entered Vaima, someone would shout, *"E Rui e! Haere mai e inu latou!"*—"Hey, Louie! Come and drink with us!" The Tahitian language knows no L, so they called

*See "I Found the Bones of the *Bounty*," by Luis Marden, NATIONAL GEOGRAPHIC, December, 1957.

me Rui. Nor does it have a B. and William Bligh was called Pry.

Tahitians are as volatile as the mists of morning. Bougainville, the perceptive Frenchman, sensed this at once. He wrote: "Everything strikes them, but nothing bothers them ... we never succeeded in fixing the attention of any of them for two minutes on end. It appears that the slightest reflection becomes an unbearable task to them, and they flee even more the exhaustions of the spirit than those of the body."

When it comes to pleasure, Tahitians are all business. No one is more relentless in pursuit of a good time. To sing, to dance, to play the guitar, to love—these are life's aims, and no one works harder at them than the Tahitian. If you are a gay companion, you are accepted without reserve. Your social standing or the size of your pocketbook comes into it not at all. Not for the Tahitians the long face and the gloomy brow, the soul searching and the continual worrying about the psyche—these are *papaa* (European) things.

Everything is fun, an excuse for laughter. The girls who played in the *Bounty* film as extras, when on board the ship in rough weather, would be seasick almost to a girl. When they could no longer hold out, they would dash to the rail, then run back to continue the *tamure*, the wild hip-swinging dance of Tahiti, laughing like mad all the while. It was all fun, even being seasick.

Bamboo Teaches Lesson on Life

I discussed the Tahitian attitude toward life with Eddie Lund, an American who has made Tahitian music known round the world.

"Here I can learn more about life from a three-year-old child than I can from a forty-year-old back on the mainland. Tahitians lean with the wind, like bamboo," he said. "Life grows more beautiful the older I get. I learned it from the Tahitians, I guess."

Lund calls himself "a frustrated composer of popular music," and says, "If I have been

"the village of Papeetee struck us all very pleasantly" [illegible]

Built here about 1830 to escape dangerous summer winds in Matavai Bay, Papeete still preserves the charm of another era. Red roofs cap wooden

buildings from the turn of the century. Yachts, steamers, and trading schooners tie up to the main thoroughfare. In front of the spire of Papeete Cathedral, the sign "Donald-Tahiti" marks a long-established trading firm. Clouds wreathe the island's mountainous, uninhabited heart.

"instead of kissing . . . they Join Noses," wrote Morrison in 1789. But customs change; today Tahitians kiss one another on both cheeks when meeting or parting.

"the crowd that throngs the wharf . . . is gay and debonair" JAMES A. MICHENER

All Papeete waves farewell as the *Tahitien*, a French liner, sets sail for Marseille. Passengers drop flower crowns into the sea to assure a return to Tahiti.

successful in Tahiti, it was because I had no competition."

But he does himself an injustice. So steeped is he in the language and music of the island that the Tahitians accept him as one of themselves, and his music as an authentic expression of their way of life.

It is not easy to remain here for many years, as Lund has done, if one is not a Frenchman. Long ago the administration found it must either impose rigid curbs on entry permits and the length of time visitors might stay, or have all the world's dreamers and beachcombers on their hands.

One must have a round-trip ticket to get a visa, which is good for three months. One may not engage in any gainful employment on the island. But even in the most stringent of regulations, there is always a little stretch, and if one has been around for a while and is *sympathique*—perhaps a way can be found.

As recently as 1954 only 500 tourists came to Tahiti in the entire year. In 1960, the Year of the Airplane, more than 6,000 came. And that was before jets began nonstop service from the United States, from which come more than 70 percent of the island's visitors.

Until recently, the government was reluctant to do anything that would bring too many tourists. Then the *Métropole* (central government) decided something would have to be done about the economy of the island, which had only copra and a little coffee and vanilla to export. Hence the airstrip and the encouragement of tourism.

Language is the mirror of a people. The Polynesian dialects have always fallen sweetly on my ear, and Tahitian, which suppresses

most of the hard consonants, is the most musical. James Morrison, one of the *Bounty* mutineers who remained on Tahiti and left the best account of the daily life of the pre-European Tahitians, wrote: "Their Language is Soft and Melodious, abounding in vowels; they have only seventeen [actually 13] letters, yet they can express any thing with ease, tho for want of the others which Compose our Alphabet they never could pronounce any English word which Contains them."

Twenty Words for Coconut

Because they live for the moment, and had no written language (even today there is almost nothing in print in Tahitian, save the Bible and other religious works), Tahitians have a tongue rich in tactual, sensuous, and material words, but poor in abstractions. The common fish the jack is called by seven distinct names, according to size, yet they are all the same fish. Tahitians have more than 20 words for the coconut in all its phases, and at least 30 words to describe the eyes, the face, and its expressions.

When I expressed a wish to learn some Tahitian, my friends sent me to M. Martial Teraipuni Iorss. On his mother's side, M. Iorss is a descendant of the ancient chiefly families, and like them he is big, broad-shouldered, and handsome. From his German father he inherited gray eyes that look on the world with appreciation and kindly amusement. During my stay on the island, I recorded on tape an entire Tahitian grammar, spoken by M. Iorss in the sonorous accents of the Tahitian orator.

M. Iorss bears a Tahitian as well as a

"To sing, to dance, to play the guitar, to love—these are life's aims," says author Marden of the Tahitian philosophy. This barbershop provides customers with guitars rather than magazines; they play while waiting.

Baby rides a bike behind a young mother. To Tahitians, children always come as a blessing, and all are welcome. Youngsters often grow up with relatives or friends so that they may have two or three "mothers."

Le truck **hustles** with passengers. Cargo rides the roof and fish hang from the back. Bearing names such as Tickle! Tickle! and Wink-the-Eye Flower, the jitneys load in Papeete's central market and fan out to points all around the island. In town they compete with hundreds of bicycles and motorcycles.

Tahitian Christmas tree, a feathery-branched *aito*, or ironwood, once furnished wood for war clubs. Europeans introduced the Christmas tree to the island in recent years.

Trilingual blackboard on a Papeete shop advertises canned foods in French, English, and Chinese. Most Tahiti merchants are Chinese who sell a wide variety of goods. This shop, like many others, specializes in tailoring.

Cook Street honors the navigator, who called here on three voyages. Cinema bills in French list films of spies, science fiction, human torpedoes, and a Laurel and Hardy comedy.

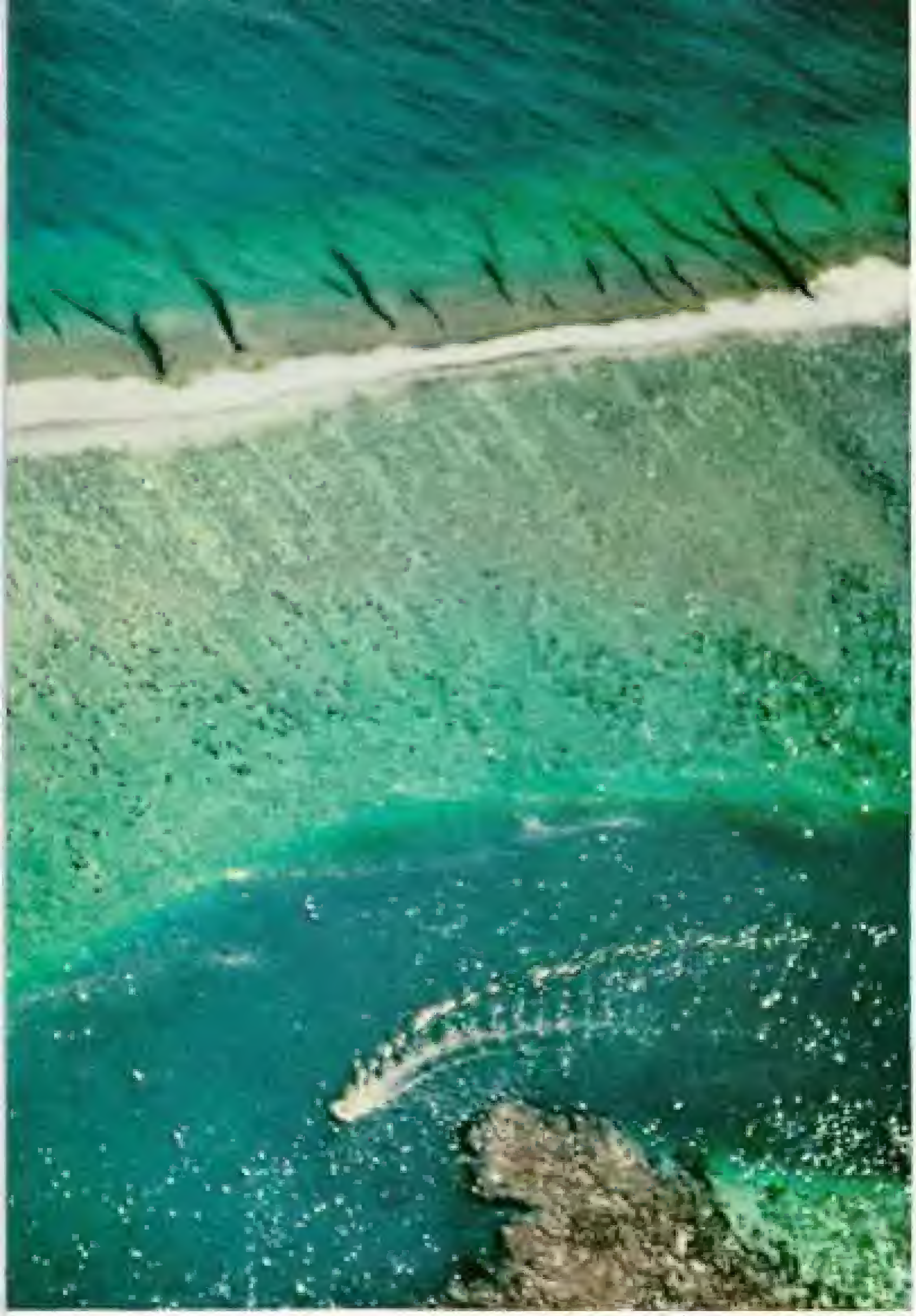
"When they move, they flow," says Marden of the Tahitian girls. Lolo arrives in town carrying her crown of flowers and a bundle of clothes.

Christian name. He was born on Nuku Hiva in the Marquesas, where Herman Melville jumped ship in 1842. His parents named him Teikipahatoua i Nuku Hiva—The King of Nuku Hiva Who Fears Not War. Why, then, I asked, was he now called Tuteraipuni?

"That is my wedding name," said M. Iorss, and proceeded to explain something that had baffled Cook and Bligh. A chief they had known by one name on one voyage would be called something else by the time they returned, and if they came back a third time, the chief might have still a different name.

"When I was married," said M. Iorss, "I was given the name Tuteraipuni, He Who Stands Upright in the Overcast Sky. A name was always chosen for a child before birth. At adolescence, the child exchanged names with a close friend. When the men who went out to the ships of Wallis and Cook cried 'taio!' they wished to become blood brothers of the seamen. If accepted, they took the sailor's name and gave theirs in return, and they exchanged gifts—tapa cloth, breadfruit, pigs, and coconuts on the Tahitian's part, and beads, shirts, and iron nails on the part of the pale strangers whom they called *papaa*, meaning 'sunburned shoulder blades.' Iron was prized by the Tahitians, who lived literally in an Age of Stone.

"When a man married—ah, here it grows complicated. All the relations chose a name for the bridegroom; then his parents gave him still another, while the bride's mother and father bestowed a third. When someone in the immediate family died, on his death-



White-fringed wall of coral protects most of the island from the ceaseless blows of Pacific rollers. Small boats and canoes ply the smooth waters of the lagoon between reef and shore (foreground). Inner edge of the reef slopes gently to moderate depths. Fissured outer face tilts sharply into the cobalt of the deep sea.

"Sky and sea immoderately blue, and the great breakers . . . on a barrier-reef"

ROBERT LOUIS STEVENSON

Stevenson's "roaring coast, where the ring of the reef is broke and the trades run riot the most." Gaps in reef give access to the lagoon.

Planing over an oily sea off Moorea, a motor launch takes Nancy and Nicholas Rutgers, Jr., to fishing grounds off Tahiti's northwestern shores. Sawtooth profile of Moorea pierces the horizon.

bed he bequeathed his name to the new husband. And when *he* finally died, his survivors referred to him by yet another name."

This custom made a shambles of Tahitian genealogy as recorded in early accounts.

Language Shows English Legacy

Tahitian friends, who knew I was studying their language, in their innocence said, "You should have no trouble; a lot of our words are very much like English." That is true; for example, *moni* for money, *faraoa* for flour, *puta* for butter. The truth is, of course, that these words *are* English, modified according to the Tahitian alphabet.

Englishmen were the first to stay and make their influence felt in the islands. It was from England that the missionaries came to translate the Bible into Tahitian. And so, with few exceptions, the names of things that did not exist before the coming of the European are all of English origin.

When the Tahitians do coin their own name for a new thing, it is invariably poetic, as when they call the airplane *manureva*—the Bird of Heaven.

"*Cher ami*," lamented M. Iorss, "today the rich and harmonious tongue of my ancestors has fallen upon hard times. The Chinese merchants, who speak a kind of pidgin Tahitian, are much to blame, but I should tell you also that it is not taught in our schools. All classes are held in French, and the child hears Tahitian spoken only at home and in the streets."

SEE PAGE BEGINS AT LIVE MARKET, NATIONAL GEOGRAPHIC STAFF

"They Eat Fish of all kinds"

School of skipjack tuna hangs on racks in Papeete's central market. Leaving port before dawn, fishing launches troll for tuna and dolphin. The catch comes to market in late afternoon and disappears from the stands in less than an hour

"Fish . . . is the principal food of the Women . . ."

In ancient Tahiti, flesh was forbidden to women. These girls ride a motor bicycle home from market with two fish.

The Chinese, mostly Hakkas from Hong Kong, run most of the shops and businesses of Tahiti. They are tailors, grocers, wine merchants, copra dealers, pearl shell middlemen, restaurateurs, and barbers.

The wave of hotel building has washed up entrepreneurs with startling ideas on the shores of Tahiti. People who live among coconut palms do not dwell in their shade, or tarry long there— it is too dangerous, because at any moment a heavy nut may come crashing down with skull-cracking momentum. But nothing so trivial as a fact of nature will stop the hotel man who wants to set his thatched bungalows under the palms. One told me with much pride, "I am bringing in a special hormone from Hawaii; I'll spray all the palm trees on my place, and they will bear no coconuts!"

Faintly in the background, I seemed to hear the lament of the last High Priest of Tahiti, who exclaimed to the trader Jacques Antoine Moerenhout

in 1831. "O my friend! To what estate has my country fallen! O Tahiti! *Aue! aue! aue!*"

There is really only one road on Tahiti. It encircles the main part of the island and extends arms like clasping pincers part way round both sides of the smaller peninsula. It runs for 75 miles, a leisurely half-day drive, around Tahiti Nui, Big Tahiti. It is best to start west—counterclockwise—from Papeete in the morning, in order not to have the sun in your eyes going or returning (map, page 77).

Whole Island Takes to Wheels

I drove a French-made station wagon, but most of the traffic was two-wheeled. There were girls on bicycles, girls on Solexes—bicycles with small one-cylinder motors attached to the front wheel—girls on Vespas. Bikes, motorcars, pedestrians, and trucks tangle in the square before the cathedral.

Nowadays nearly everyone in Papeete seems to be motorized, as the French put it. Motorbicycles and motor scooters snarl up and down the waterfront, and there are even parking problems. By the time I left Tahiti, there were 3,000 cars circulating in the streets of Papeete and on the single circumferential road, and more than 14,000 bicycles and motor-driven two-wheeled vehicles. This on an island with 100 miles of road. All Papeete closes shop from 11:30 until 2 in the afternoon, and at noon the homeward-bound traffic comes to a boil.

The great British racing driver Stirling Moss visited Tahiti during my stay. A reporter for the island's little lithographed news sheet asked him, "What do you consider your greatest achievement, the one that has given you most emotion, of your career as an Ace of the Steering Wheel?" Replied Moss, "To have traversed Papeete on a Vespa at the stroke of noon at six miles an hour."

As you drive west, you have the sea on your right hand. Beyond the smoking reef the outline of Moorea rises, blue in the soft morning light, gray and unsubstantial in the heat of the day, and outlined in fiery gold against the caldron of the setting sun.

Only about one-eighth the size of Tahiti, the island has almost no roads, and only a half dozen Jeeps and trucks. Its somnolent, tranquil life of fishing and copra and vanilla growing is like the Tahiti of 30 years ago (pages 37 and 47).

As I drove, I passed jitneys jammed to the gunwales with laughing men and women, pigs, pandanus thatch, strings of fish, bales, bunches of breadfruit, coconuts, bananas,

"Sucking the . . . fish & repeatedly dipping it in the sauce," wrote a *Bounty* mutineer of a Tahitian diner. In like manner, this man at a wedding feast eats raw fish marinated in lime juice and coconut milk.

Saturday night at the Bar Lafayette:

sacks of live crabs, brightly colored *otau*—bundles wrapped in pareu cloth—and, always, a guitar. Clinging to a step at the back rode the two *matelots*—sailors—who pass bundles up to the roof and help passengers disembark. No one ever is in a hurry; the driver stops wherever he sees a freshly cut green coconut frond placed across the road.

The jitneys have blue-and-orange wooden bodies, and bear wonderful names: Tickle! Tickle!, The Thing Which Passes, Wink-the-Eye Flower, and The Shadow (page 13).

Modern Chiefs Chosen at Polls

Back from the sea toward the mountains run the valleys, deep-fissured, umbrageous, separated one from the other by ridges like the buttresses of a giant fig tree (page 43).

Down the valleys rush clear, cold rivers, fed by plumed waterfalls that hang on the blue-green flanks of the mountains like single brush strokes of white mist. The high ridges usually mark the limit of a district, of which there are fourteen on Tahiti Nui and six on Taiarapu Peninsula, with a total population of about 45,000. A chief still governs each district, no longer by inheritance but—*liberté, égalité, fraternité*—by election.

Tahiti has few beaches, and most of these are of black lava sand. Between shore and reef the lagoon affords a smooth-water passage to outrigger canoes and small boats.

All along the coast I saw dugout canoes drawn up on shore or perched high and dry on two forked branches. The pirogues are hewn from a single log of wood, preferably breadfruit because this reddish wood resists better than any other the rotting action of sea water (page 24). An outrigger log of hibiscus wood is connected to the canoe by two arms, a rigid shaft near the bow for support and an upcurving, flexible branch near the stern to absorb shock of waves and swell.

The thing that most impressed the early Tahitians about the discoverers' ships was not their great size or tall masts, but the fact that they stayed upright without a balancing pole. They called these ships the "Canoes Without Outriggers," and marveled.

So many wonders did the strangers bring—sticks that belched fire and killed at a distance, tubes that made far objects seem close, something called iron that cut better than stone—that the Tahitian became blasé, and ever after remained unimpressed by the most intricate and wonderful devices of the European. After experiencing the first shock, he came to expect anything from these

Tahitians, French marines, and Canadian seamen dance the fast, hip-shaking *tamure*

people, to whom everything was possible.

One thing about the white man that Tahitians could not understand (they still do not) was his exaggerated—to them—sense of property. The Polynesian shares willingly anything he has. He gives freely and generously, and cannot understand therefore why something he admires should not be given to him in return. So he considers Europeans *rima pau*—tightfisted. He has little sense of ownership—except that of land. The latter is a very real source of pride, and ignorance of this basic fact led to trouble for Fletcher Christian and his fellow-mutineers when they divided the scant land of Pitcairn among themselves and left nothing for the Tahitians.

The language reflects the nature of its people. Says Morrison: "They never return thanks, but by deed, having no Word in their language expressive of it. . . ." Today, influenced by Europeans, Tahitians say for "thanks" *maururu;* literally, "I am in a transport," or "I am carried away."

Jet Roar Gives Way to Silence

Three miles southwest of Papeete the new airstrip draws a straight black line two miles long on the blue-gray waters of the lagoon. Using rock and gravel from the Punaruu River valley, the builders filled in the lagoon near an islet. Now the isle's coconut palms rise forlornly from black macadam.

Five times a week the Tahitians pause on a promontory above the airstrip to watch the Bird of Heaven arrive and depart. Minutes after the great noise has sent white terns exploding into the air to circle in bewilderment, the envelope of silence heals again over Tahiti. Then the mutter of the reef, the voice of the island, seems subdued against the susurrus of the trade wind among the feathery branches of the ironwood trees that grow along the shore.

The road curves round the island so gradually that I was not aware of the change of direction until Moorea was no longer visible, and the mountains moved so far away at one or two places that they were hazy with distance. The flat fields are planted to taro, the tuber that grows with its feet in mud and water, like rice, or to coconuts that stand erect and gray-boled in orderly rows, each tree wearing a circlet of shining tin to frustrate the rats and crabs that like to climb the trees and eat the tender nuts.

Party Hunts for Eared Eels

In Mataiea, 30 miles from Papeete, I was told of a curious lake, high in the mountains of the district. A hunter of wild pigs described a strange creature, a big eel with *ears*, which he said lived in the lake. I had heard of these improbable creatures on my previous visit to Tahiti.

One morning at dawn, I accompanied some of my *Bounty* shipmates on an excursion up the Vaihiria River valley to the lake. I wanted to dive in Lake Vaihiria, to see, and possibly to photograph, the eels. We had a guide and three porters, who insisted they could carry eighty pounds, so I took along my Aqua-Lung tanks and heavy underwater camera.

We struck across a field toward the river's embrasure in the hills, splashing ankle deep through mud and water. It was still the rainy season, from October through April, and the sodden trees dripped ceaselessly.

The guide told us that the trail would cross the river innumerable times (page 32). He was right. One of my shipmates cut a notch in his walking stick every time we forded the river, and when we got to the top, we found we had waded it 67 times.

I have the fisherman's habit, before disturbing the water, I always peered into the clear green depths. I could usually see the dark mottled shadows of small fish that hung over the golden gravel. They were *nato*, a kind of perch that lives in nearly every Tahitian river (page 35). Occasionally a darting black crayfish flipped itself under a stone.

As we climbed higher, the trees grew thicker and bigger. Giant *mape*, the Tahitian chestnut, leaned over the foaming river and sent their gnarled buttress roots down to the water's edge. The fallen fruits are gathered by women and girls, who boil them and then string them on the midrib of a coconut frond to sell. Eaten cold they are excellent, tasting much like our boiled chestnuts.

"I thought I was transported to the Garden of Eden" [illegible]

In a fern-shrouded glen, a girl bathes beneath a waterfall. Glossy elephant-ear fern and wild chestnut flourish in the damp, shady grove. Countless waterfalls cascade in misty plumes and broken curtains down every mountainside. Tahitians like to bathe in fresh water two and three times a day.

[illegible]

"**Their Canoes** . . . are built all of them very narrow," reported Captain Cook. With an adz, a master builder hollows out a log of breadfruit.

Triton shell trumpet sounds a two-toned blast to call fishermen from the sea. Tahitians once used the horns in war.

"**They have Shell Fish** with which the reefs abound," wrote Morrison. Mantis shrimp inhabit holes in a sandy bottom.

Seine made from coconut fronds, which Cook

We wore wreaths of fern to keep the sweat from running down into our eyes. As we went higher, the ferns grew bigger and became literally trees, with tightly curled fronds at their tips like the scroll on a violin.

Vengeful Skipper Introduced Mosquitoes

I have seldom encountered rougher going than the trail to Lake Vaihiria. At every step we sank into black muck, sometimes nearly knee deep. Fallen trees lay across the track, and lantana tore at our bare legs and arms.

Mosquitoes in clouds hung over the stream and sank their lances into our necks and legs. As I slapped and muttered, I thought of Herman Melville's account of how the mosquito, which did not exist in Tahiti before the coming of the white man, was introduced. In *Omoo*, the book based on his stay in Tahiti in 1842, he wrote:

"Some years previous, a whaling captain, touching at an adjoining bay, got into difficulty with its inhabitants . . . deeming himself aggrieved, he resolved upon taking signal revenge. One night, he towed a rotten old water-cask ashore, and left it in a neglected *Taro* patch, where the ground was warm and moist. Hence the musquitoes.

"I tried my best to learn the name of this man: and hereby do what I can to hand it down to posterity. It was Coleman—Nathan Coleman. The ship belonged to Nantucket.

"When tormented by the musquitoes, I found much relief in coupling the word 'Coleman' with another of one syllable, and pronouncing them together energetically."

I must say I found satisfaction in doing the same thing, but little actual relief.

I stopped frequently to take pictures, and as the day wore on, the guide and my shipmates drew farther ahead, until they were out of sight. The heavily laden porters fell

mistook for "coarse broad grass," dredges small fish from shallow water

behind, and at twilight I found myself alone at a deep and swift ford. Leaning on my ironwood stick, I breasted the waist-deep cold current, but on the other side I could not pick up the trail again. I made casts to right and left, like a dog seeking the scent, but thick underbrush and the tangle of wild banana and lantana showed untrodden green everywhere.

Chilly Nap Athwart Mountain Trail

There is little twilight in the tropics; swiftly it was dark. I doubled back on my tracks to an open grassy slope and lay down across the trail, so that anyone coming up or down would have to step over—or on—me. I had nothing in my pack but cameras; waterproofs, blankets, food, and wine were all in the porters' loads somewhere behind me.

The night wind, the *hupe*, whistled down the pass. I lay on my back and watched Orion wheel slowly—all too slowly—across the narrow strip of sky until he disappeared behind a high shoulder of mountain. Clouds obscured the stars and a cold rain began to fall. In my wet shorts and short-sleeved shirt I shivered and dozed fitfully.

Around midnight a brilliant light shone in my face. In the glare of gasoline pressure lamps two crayfish fishermen stared at me. They knew where the porters had made camp, and in the circle of white light thrown by their lanterns we recrossed my hard-won fords and walked half a mile downstream.

The "Cocoa Nut is . . . a Very Serviceable tree"

Split ripe coconuts dry in the sun to make copra, chief export of Tahiti. After sunning, the white meat is cut out of the shell and spread on a metal rack (background) to dry more thoroughly over a coconut-husk fire. Oil extracted from copra goes into soaps, cosmetics, and glycerine for explosives.

The word *Oui*—yes—chalked on the drying rack refers to a French referendum on the question of Algerian independence.

"I have taken some small breadfruit trees"

When author Marden sailed to Tahiti, he took with him a young breadfruit flower, grown from the rootstock of a tree transported to Jamaica by Captain Bligh.

Planted in Arue, the district from which it came 168 years before, the tree grew to seven feet within a year (right). Nancy Hall Rutgers, daughter of James Norman Hall, co-author of *Mutiny on the Bounty*, stands beside it.

"The landscape with its violent, pure colors dazzled and blinded me"

PAUL GAUGUIN

Leaving his position as a stockbroker for a simple existence as a painter, Paul Gauguin abandoned Paris for Tahiti in 1891 and became known to the islanders as "the man who makes human beings." Like a Tahitian, he lived in a thatched house, since torn down. Here, he wrote, "All the joys—animal and human—of a free life are mine. I have escaped everything that is artificial, conventional, customary. I am entering into the truth, into nature."

Sold at auction after his death in the Marquesas, Gauguin's paintings brought only a few dollars each. Today his masterpieces of Tahitian life are priceless.

One of the artist's best-known works, "*Nafea faaipoipo*"—"When are you going to be married?"—(above), might have been painted from the models at right.

Gauguin's son, Emile Aimi, whose mother was Tahitian, makes miniature fish cages for sale to tourists. Born in 1900, he was only three at the time of his father's death.

The *chevrette* fishermen had square gasoline tins of water strapped to their backs for carrying their catch. They carried long spears with diverging prongs at the tip, with which they speared the black crayfish revealed in the glare of their lights.

The porters had prudently made camp on a rise of ground beside the stream. During the wet season, heavy rain upstream may produce a roaring flood that comes down like a tidal bore, sweeping everything before it.

The porters made room for me in their snug lean-to and I stripped, wrapped myself in a wool blanket, and downed half a bottle of red Algerian wine to stop my shaking.

At dawn we resumed our climb and in three hours reached an escarpment. We climbed a narrow trail up the face of the wall, plunged over the top down through a forest of drip-

ping trees, and at last saw the gleam of water.

Lake Vaihiria, when I saw it, was a somber disk of water, round and leaden, in the cup of an old crater. It lies at 1,852 feet above sea level, with mountains rising nearly sheer on all sides. Heavy rains had raised the water level almost to the entrance of the shelter for overnight climbers.

Free Divers Explore Murky Lake

A shipmate and I strapped on our Aqua-Lungs and lowered ourselves into the cold water. Doubtless we were the first divers with air tanks ever to plunge into the somber lake.

When the water, stained by nearly continuous rain, closed over us, it was as if twilight had fallen. We could not see more than three feet in any direction. The bottom of black ooze, strewn with sunken trees and boulders, sloped gently into midnight. We cruised over the bottom at depths down to 60 feet, several times a crooked black branch gave me a start, but we saw not a sign of life.

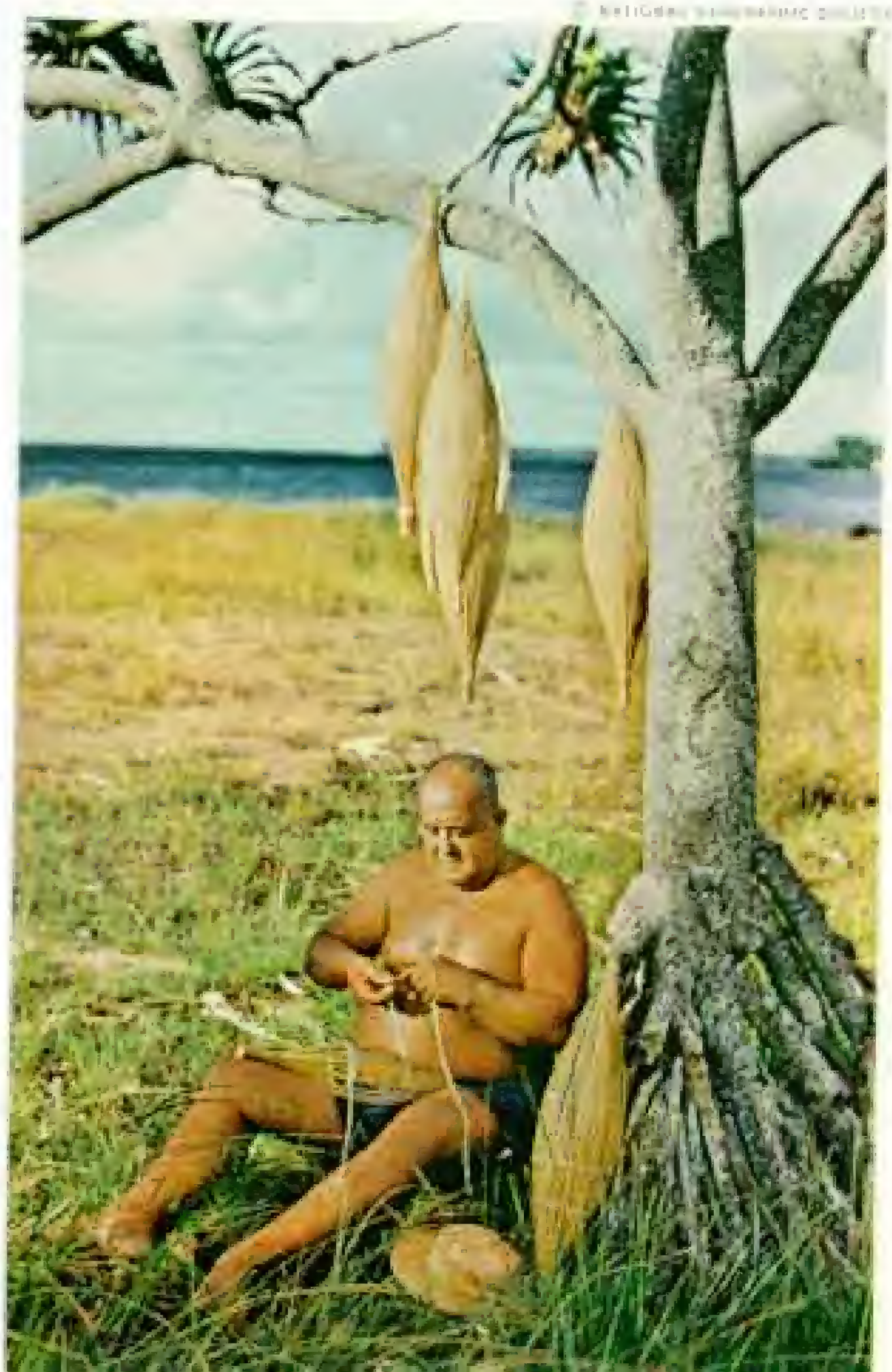
Later I did see some eared eels which were kept as a curiosity in a clear spring at the far end of the island. They were about four feet long and big around as a man's leg. The "ears" were actually overdeveloped pectoral fins, set close behind the small eyes and spoon shaped. They did indeed resemble ears as they fanned the water (page 32).

The circumferential road reaches the narrow waist of Tahiti at Kilometer 60—37 miles from Papeete. Here, at the junction of the two ancient volcanoes, the island constricts to a low isthmus less than two miles wide (map, page 71). The great bay formed by the inward curve of the island is Port Phaëton, Tahiti's biggest and best natural harbor.

European settlers gave some thought to establishing the principal port and town of the island here, but it rained so much that ships' standing rigging and sails rotted. When winds blow from the southeast, as they do here during much of the year, their warm, moisture-laden air strikes the mountains of the southeast corner of the island and moisture condenses as heavy rain.

From Taravao, Tahiti's wasp waist, reach two arms of road that do not quite clasp the peninsula in their embrace. The main reason they do not is the Pari, a coast of steep cliffs at the tip of the peninsula that makes road building almost impossible.

Taravao is the half-way house for people making the tour of the island. Everyone stops for a lunch at a Chinese restaurant there, which is run by an old friend named W.K.S. Wong Hen, but called by everyone Atchoun. He specializes in crustaceans: fresh-water crayfish, crabs, spiny lobsters, and on red-letter days, *uro*, the squilla, or mantis shrimp, a hard-shelled creature with praying-mantis arms that looks like a small lobster but is even more delicious (page 24).



A Girl, Gauguin, and Yellow

At Atchoun's restaurant there waits on table a girl who walked straight out of a Gauguin canvas. Her name is Norine, or Tetuanui in Tahitian, and she has the oval face, large dark eyes, full upper lip, and petal-soft skin of the Polynesian. I photographed her so many times and talked of the painter so much, that the Chinese youth who managed the place always made out my chits for food and drink to "Monsieur Gauguin."

"Speaking of Gauguin," Atchoun said to me one afternoon, "I could never understand why he painted the ground under a tree bright

yellow, until one day, at about five or six in the evening, I saw the ground around a big tree covered with a solid carpet of yellow. When I went to see, I found they were flowers of the mape, the Tahitian chestnut. When they first fall they are white, but after a few days they turn vivid yellow. *Voilà*, I say, the yellow shadows of Gauguin!"

Since there are no villages, each district on Tahiti has its general store, always run by a Chinese. Atchoun's restaurant carries general merchandise, and on his shelves I saw tinned salmon, corned beef, Sloan's liniment, Terramycin and sulfanilamide tablets, tinned pears and bamboo shoots, cough syrup, paregoric, and outboard-motor oil.

Best Canoes Come From Tautira

The northern prong of the peninsular road runs from Taravao to end at the headland of Tautira. Robert Louis Stevenson lived at Tautira, and here the best canoe builders of Tahiti still practice their skill. In big outriggers excursionists run to the small islets near the Pari, the precipitous tip of the peninsula, to dive for *iihi*—red squirrelfish—which taste best when broiled over a bed of embers.

The sight of the nato in the mountain pools had made me want to cast a fly over them, and so I gladly accepted the invitation of M. Gallois, the best fly-fisherman in Tahiti, to fish a river in the District of Faaone. M. Gallois is a solidly built businessman of deliberate movements who, like most Frenchmen, seems made of spring steel. He led me a hard pace, wading for miles upstream.

The gnats and mosquitoes were a plague, singing round our heads in clouds, and getting in our eyes, nostrils, and mouth. I intoned Herman Melville's formula under my breath, but its efficacy seems to have waned with the passing of the years.

We fished the fast gravelly runs and the transparent green pools as one would for trout, using a split-bamboo rod and a No. 12 or 14 Olive Quill (page 351). The nato readily took a sunk fly, fished on a short line and retrieved in short jerks across the current. I managed to hook two or three on a floating fly, but they took it without enthusiasm.

Most of our fish were small, about six inches long, but we managed to catch fifty between us, most of them falling to M. Gallois's rod. Out of the water the sides of the perchlike nato shone like quicksilver. They

"Golden figures in the streams . . . enchanted me"

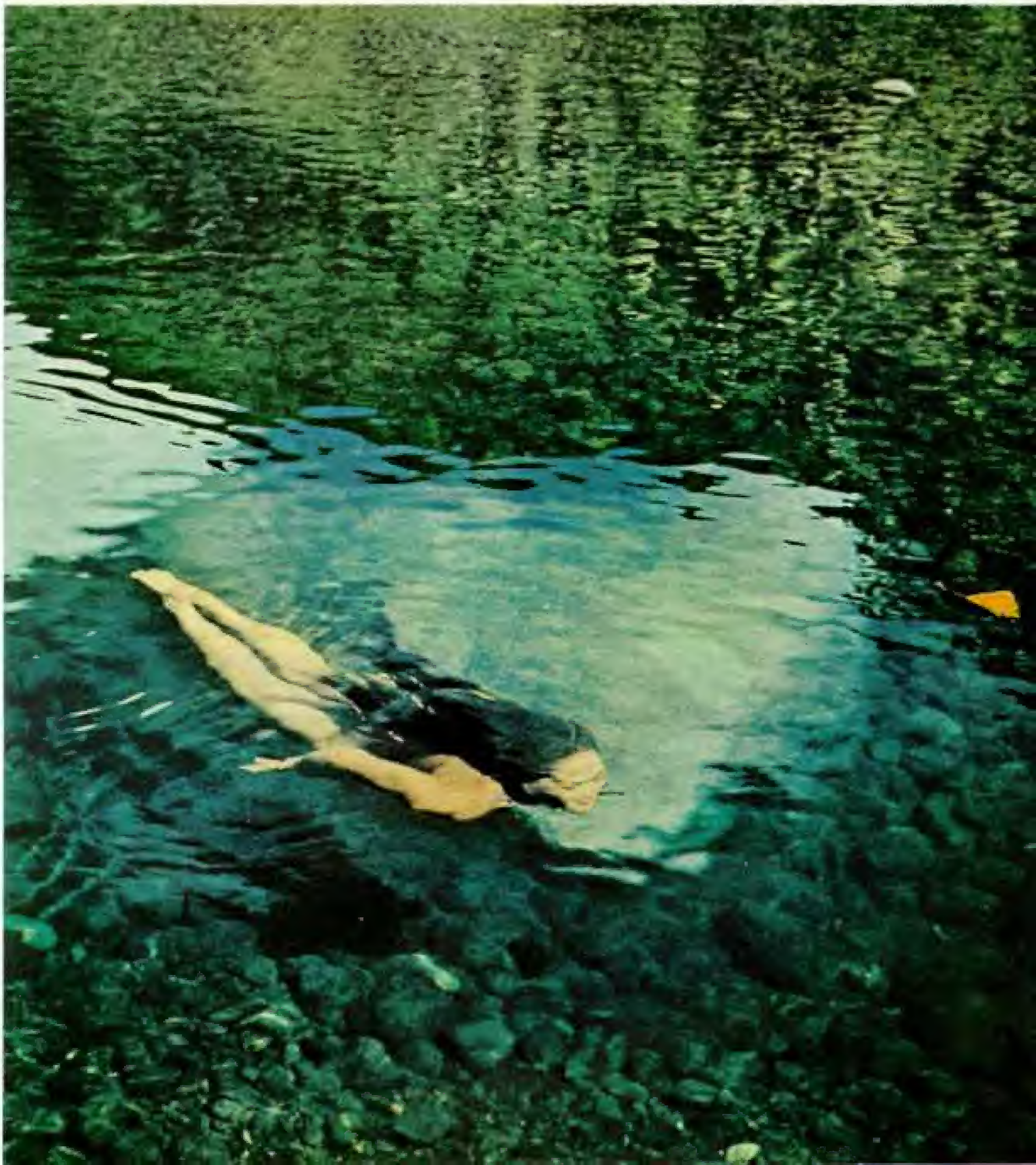
Tahitians are amphibious and live in the water as much as possible. After a swim in the sea, they like to wash off the salt in the clear, cold mountain rivers. This girl dives in a transparent pool of the Vaitepiha River.

had a spiny-rayed dorsal fin, spines on the opercula, and a mottled back.

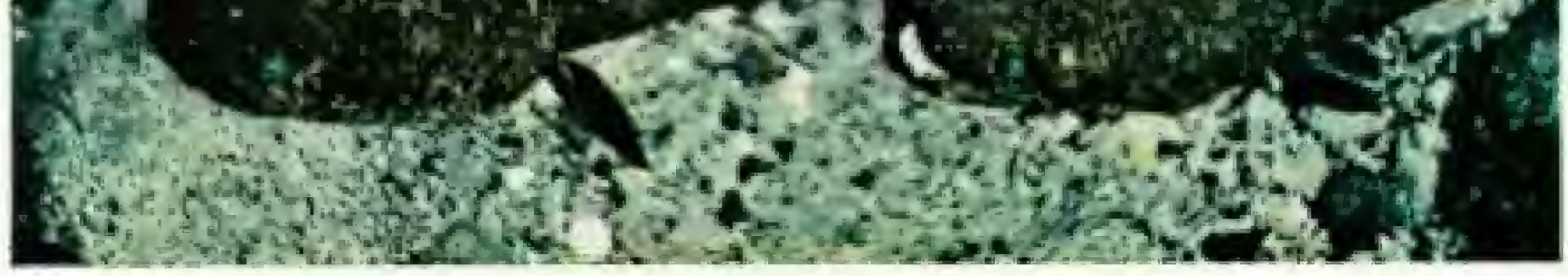
Once I hooked a fish that pulled hard, shaking its head like a bulldog in the draw of the current. When I netted him, I was astonished to see a small jack, an exact miniature of the big fast swimmers of the open sea. "We often take these *carangues* as much as three miles upstream," M. Gallois said, "particularly in times of low water."

As we worked higher up the valley, we passed through a wood of the biggest mape trees I had seen on Tahiti. Their buttress roots clutched stones so tightly in a gnarled embrace that I could not even lever them free with my ironwood wading staff.

We passed lime trees laden with hundreds of yellow-green fruit. Scores more lay on the ground. No one—except us—bothered to gather them. Here nature is too prodigal, and



"I set out on an excursion . . . to see the more interior parts of the Island," wrote Captain Bligh. The author's party here crosses the Vaihiria River on the way to Lake Vaihiria, where they searched in vain for an "eared" eel. The ones below, their "ears" formed by large pectoral fins, live as captives in a spring.



"in this season . . . the rain falls in deluges, swelling the rivers"

Using an elephant-ear leaf for an umbrella, a porter on the Lake Vaihiria excursion wades through a torrent fed by summer rains. To reach the lake, 1,552 feet above sea level, the party forded the Vaihiria River 67 times.

there is always a great plenty of everything. Morrison says:

". . . evry part of the Island produces food without the help of Man, it may of this Country be said that the Curse of Eden has not reachd it, no man having his bread to get by the Sweat of his Brow. . . ."

Island Coffee Delights the Tongue

Red *fei*, the mountain banana that sends its stem of fruit straight up in the air and was a symbol of courage and virility to the ancient Tahitians, flickered like flames in the mottled light under the trees. Glossy-leaved coffee bushes bent under the weight of ungathered berries. Someone would come along to pick them, perhaps; if not, there were other bushes and another crop.

Tahitian coffee is of superlative quality, but since little is systematically cultivated, even less remains for export after local consumption. Of an annual production of about 60 tons, only a fourth is exported. The aromatic Tahitian coffee brings a high price in France, so it is mixed with cheaper African beans for the market.

On the slopes farther from the river grew thickets of vanilla, a climbing orchid that clings to stakes like beanstalks (page 44). Tahiti grows some 35 tons of the green vanilla beans annually, but after drying in the sun for many weeks to acquire the heavy scent and aroma used for flavoring, they shrink to about 25 percent of original weight.

When Tahitians fish for nato, they use hook and line, or a spear. They slice open their catch, squeeze lime juice on them, and eat them raw. M. Gallois was too much of a gourmet for that. We "broke the crust," as the French say, with Strasbourg pâté, excel-

lent Roquefort, fresh crusty bread (long French loaves baked by Chinese), and two wines, a rosé from Provence and a red Pommard.

The coast on the northeast side of Big Tahiti drops sharply into the sea, and there is barely room for the narrow road. It winds within reach of spray from the crashing surf that pounds a shore of coral rock or coarse black shingle. An occasional *fare*—native house—breaks the splendid solitude of reef, sea, and rocky headland. Almost at the middle of the north coast, the Papenoo, the biggest river in Tahiti, flows to the sea in two wide arms, and not far beyond, the long finger of Mahina—Cook's Point Venus—thrusts out to sea to form the eastern arm of Matavai Bay.

Visitors Besiege Writer's Widow

Matavai itself lies in the present District of Arue. Here lived James Norman Hall, who with his collaborator Charles Nordhoff wrote a trilogy on the *Bounty* mutiny, the books which really brought the Bligh story to the attention of the world. In their cool book-lined house, surrounded by flowers and bread-fruit trees, lives Sarah Hall, the vivacious gray-eyed widow of the writer.

Mrs. Hall's cross is the fame of her husband. Not a traveler comes to Tahiti who does not want to see her. Lala—as her friends call her—has implored the taxi drivers of Papeete to leave her in peace, but still they come.

"They drive up and point to my house, then the tourists walk right in. Once an American publisher and his wife drove in. I was hot, tired, and doing housework. I said, 'I'm getting enough of this, people dropping in without warning and without invitation. I know why you came; you simply wanted to see what kind of a woman Jimmie Hall married. Well, what do you think? Not bad, eh?' Replied the publisher, 'Mrs. Hall, you are charming.'"

Hall had two children, Conrad Lafcadio Hall, who is a motion-picture cameraman in California, and Nancy, now married to Nicholas Rutgers, Jr. The Rutgerses live in a magnificent house, high on a hill behind the old Hall homestead, overlooking Matavai Bay and Moorea. I call it "the most beautiful house, in the most beautiful situation, on the finest island in the world."

The roof is pandanus thatch, and the house rambles along a ridge on several levels. Cool breezes sweep through from the sea during the day and down from the mountains at night. From a terrace on the seaward side I looked down a slope planted with pink and

"It is a mad vegetation," said Gauguin. Buttress roots of *mape*, the Tahitian chestnut, hold the banks of a mountain stream in a gnarled embrace. Bromeliads and orchids cling to the branches. Bamboo, hibiscus, and wild banana thrive in the luxuriant forest. A fly-fisherman casts an Olive Quill for *nato*, a perchlike fish.

Anglers' lunch: Fish and limes serve as a streamside repast for native fishermen. They eat silvery nato raw, adding lime juice to sharpen flavor. Jacks dwell in the ocean, but occasionally miniature specimens (upper two fish) run up the rivers. The nato, of the genus *Kuhlia*, rises to a fly like a trout. It prefers a sunken lure.

"**When night fell** . . . the fast beat of the drum summoned them to the dance. . . ." wrote novelist Pierre Loti. Born dancers, Tahitians need only the thump of a drum, clapping, and chanting to start a wild bacchanal. Islanders undulate and vibrate as though boneless. This couple dances the tamure by the light of bamboo torches.

"**Paddle! Paddle** the canoe Porua through the Pass of Avaroa!" chant dancers of Moorea as they enact an old Polynesian migration. Seated, they go through the motions of paddling a double canoe. Man standing in the rear steers with a sweep.

white frangipani, pandanus, mango, and breadfruit to the blue sweep of Matavai Bay and the curved arm of Point Venus, with the white lighthouse at its green tip. On the left, beyond the reef, the scalloped outline of Moorea rests on a cobalt sea.

On the slope below the house, overlooking the view he loved best, lies James Norman Hall. A bronze plaque bears this adaptation of verses he wrote as a boy of 12 in Iowa:

Look to the Northward, stranger,
Just over the hillside there,
Have you in your travels seen
A land more passing fair?

Nick Rutgers and I took his motor launch one day to examine the anchorages of Bligh and his contemporaries. As we drove along the coast west from Point Venus, a squall darkened the horizon. Against the blue-black sky a swelling lenticular green wave, fringed with livid white, curled in slow motion along the reef, hung motionless for a fraction, then shattered itself to death on the coral wall.

Using the navigators' logs, Captain Donald MacIntyre of the Royal Navy had plotted on my chart of Matavai the anchorages of Wallis, Cook, and Bligh (chart, page 50). When the squall passed, we raced in Nick's white Glasspar boat past the headland of Taharau, the One Tree Hill of Cook, and toward Point Venus. A peculiar recurrent hump in the smooth water of the bay marked Dolphin Bank, where Wallis had run aground in 1767.

I dived with an Aqua-Lung on the bank and near the shore, but found nothing. Anything that fell or was jettisoned from the ships, if it is still there, must be buried under a thick layer of sand and silt.

What had brought the 18th-century explorers here principally was the search for *Terra Australis Incognita*, the Unknown Southern Land. As far back as the time of the ancient Greeks, some thinkers, at least, knew that the world was round; they had even measured its diameter. Down through the

"When they Make an Oven they Make a hole in the Earth"

Tahitian feast day begins with a fire in the pit. As it burns, men pile stones on it. When "the wood is all burnt to Coals and the stones red hot," the oven is ready. Here ingredients of the feast go into a bamboo rack: whole pig, pieces of tuna, red mountain bananas, taro, breadfruit, and sweet puddings wrapped in leaves. In the fish's mouth: a banana.

Two hours later, the food is cooked. Men pull off the oven's cover and serve the banquet. Preparation takes so long that Tahitian-style cooking today usually is reserved for Sundays.

Coconut and banana fronds cover the rack in the pit. Next a layer of earth shoveled over the fronds will seal in the heat like the door of an oven.

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Middle Ages scholars preserved the concept of a globular world, but no one could agree, even in speculation, on what lay beneath them: a waste of water or a vast continent, or a combination of both.

A natural desire, particularly on the part of the philosophical mind, for symmetry, led most thinkers to imagine the existence of a vast southern continent. Such an equivalent of the great land mass of the Northern Hemisphere had to exist, the cosmographers argued, to "balance" the spinning globe.

The belief in this great continent preoccupied the minds of geographers and cartographers for centuries. Sir John Mandeville, that writer of travelers' marvels, even asserted with confidence born of his own logic "... we and they that dwell under us be feet against feet"—the original meaning of the word antipodes.

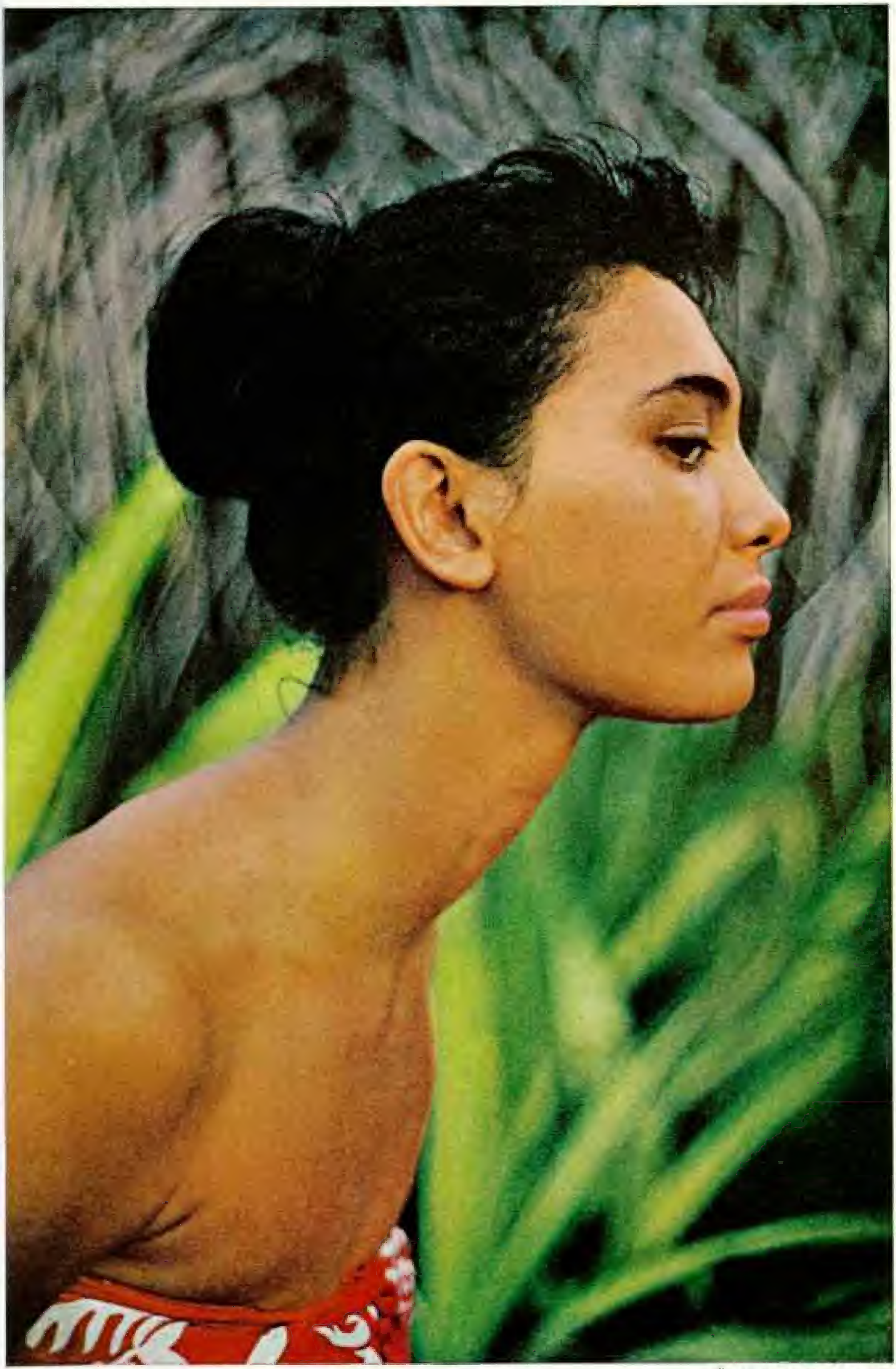
King George the Third sent Capt. Samuel Wallis to "... obtain a complete knowledge of the Land or Islands supposed to be situated in the Southern Hemisphere. . . ." When, on the 19th of June, 1767, Captain Wallis discovered Tahiti, his master wrote: "... we now supposed we saw the long wishd for Southern Continent, which has been often talkd of, but neaver before seen by any Europeans."

The discoverers soon learned from the "Indians" that Tahiti was an island. When Wallis asked its name, they replied "*O Tahiti*" —"It is Tahiti," and Otaheite it became to the English for the next hundred years.

Instead of Land, Cook Finds Ice Field

James Cook, shortly after Wallis's return to England, sailed for Tahiti to observe the transit of Venus on the 3rd of June, 1769, but he also carried secret instructions to search for the continent which Wallis "had actually in view." Cook in his *Resolution* ranged farther to the southward than anyone had before him. He came to the edge of an "immence Icefield," then turned north and sailed

(Continued on page 45)



"Their physical beauty and amiable dispositions harmonized completely with the softness of their clime" ——

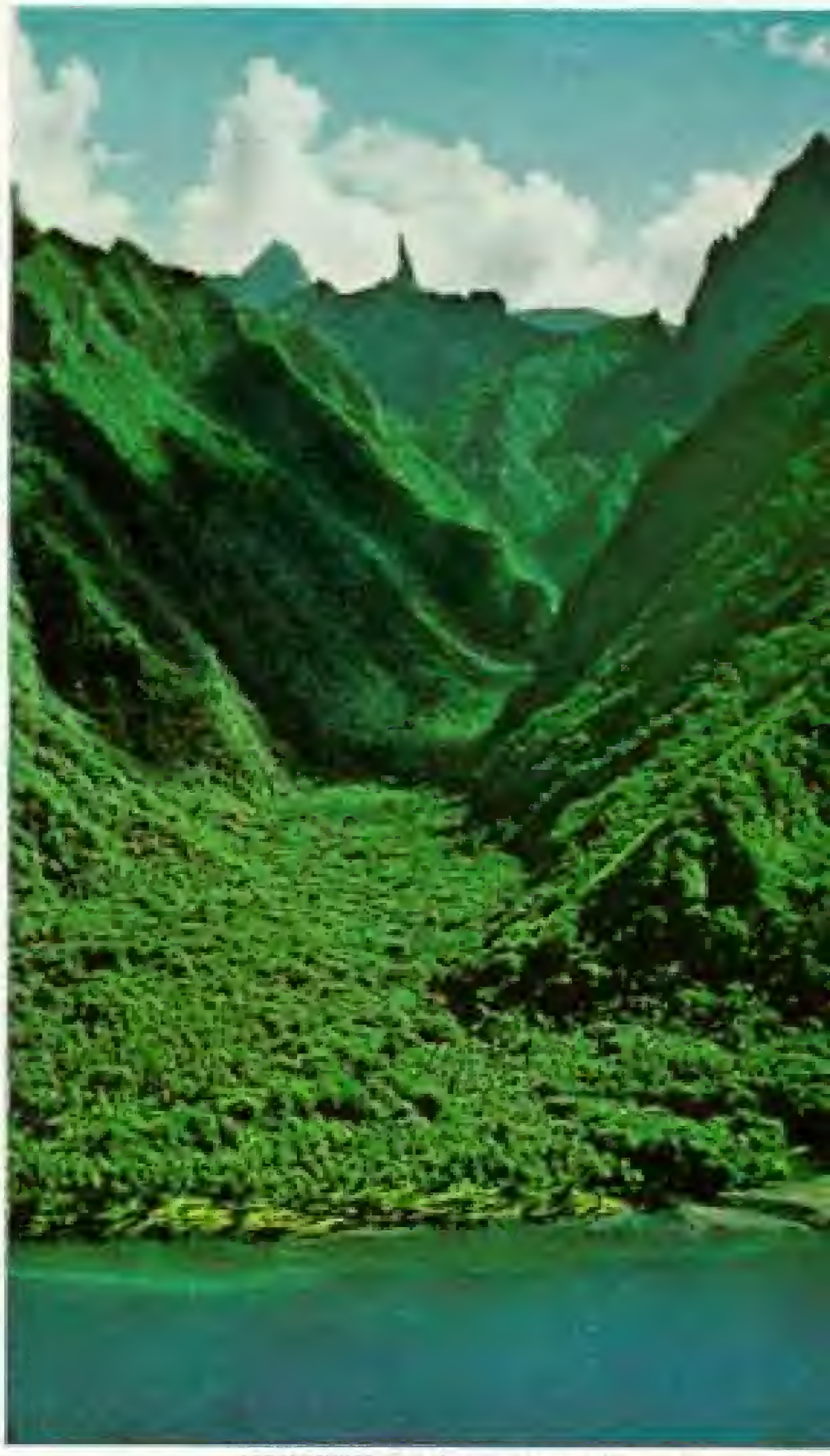
Arriving at Tahiti, Wallis's men "swore they neaver saw handsomer made women in their lives." Generations of navigators and travelers have agreed with them.

Of the girls pictured here, Vaitea (opposite), with her swan neck, finely penciled eyebrows, and lustrous eyes, resembles the Egyptian queen Nefertiti.

Tarita (right), a native of Bora Bora, won the leading part in the film *Mutiny on the Bounty*, playing opposite Marlon Brando.

Tetuanui at lower right displays classic Polynesian features. Girl at lower center is pure Chinese. Ine (below) wears a crown of *tiare Tahiti*, a species of gardenia.

Volcanic needle pierces the clouds in the wilderness of Tahiti's interior. Molten lava, hardening in the mountain's throat, formed the basalt column. Wind and water weathered away loose ash of the cone and left the stark pinnacle. Dozens like it poke weird shapes skyward on Tahiti and Moorea.



PHOTOGRAPHS © NATIONAL GEOGRAPHIC SOCIETY

"**Formidable walls** of basalt descended from the central crater and fanned out to lose themselves on the beaches," wrote Pierre Loti. Although Tahitians prefer to live on the coast, they penetrate lush river valleys to fish for nato, spear crayfish, and gather bananas, limes, breadfruit, and firewood.

This valley runs to the sea on the north coast of the Taiarapu Peninsula.

"Lofty precipices festooned with the silvery smoke of waterfalls" said Morrison counted 30 cascades pouring from Mount Orohena, Tahiti's highest peak (map, page 71. About 10 are visible in this aerial view.

Beans of Vanilla, a Type of Orchid, Pile Up at a Weighing Station

Wallis and his men found no flavorings growing on Tahiti despite "a fine agreeable smell, which made . . . us supose their was spiceerys. . . ." In 1848 a Frenchman introduced the vanilla orchid. Green pods have no scent or flavor until they have been processed.

"Marrying the vanilla," a field worker pollinates each flower by hand.

Orchid flowers adorn vanilla plants which cling to poles like beanstalks.

over what had been thought to be solid land, and so in time came to Tahiti.

On Cook's first voyage, the crew had been divided into two camps, the "continents" and the "no continents." Joseph Banks, one of the "Experimental Gentlemen" aboard, was a "continent," yet he preserved the properly skeptical scientific approach. He said: "Until we know how the globe was fixed in the position assigned to it since creation, we need not be overanxious about its balance."

Cook exploded for all time the myth of a southern continent that would compare in size with the Euro-Asian and North American land masses. He made three voyages round the world, discovering and charting as he went, and fixing with a theretofore unknown accuracy the position of islands, coasts, and harbors. In the shining light of Cook there grew up a whole school of scientific navigators, who swept the seas for England, not with guns and boarding cutlasses, but with ebony octants, accurate chronometers, and searching telescopes.

Love Makes No Omelettes

Quickening every man's dream of Tahiti are the island's women. As I watched the twittering and laughing girls pass, I tried to pin down their celebrated charm.

They are handsome rather than pretty, but their appeal, it seems to me, lies largely in the fact that they seem utterly incapable of making an awkward movement or of singing an off-pitch note. When they move they flow, and when they sing their voices blend in natural and effortless harmony.

The long black hair of the Tahitian *vahine* falls almost to her waist in a cascade so intensely black that little glints of blue light are thrown off like sparks. Usually she tops her cloud of hair with an encircling crown of white tiare that looks like a ring of stars surrounding a dark nebula. It comes as a shock to read that when Tahiti was discovered, the women wore their hair cropped short about their ears. The men let their hair grow long, or tied it in a knot on top of the head.

The Tahitian girl is eager to please her man. I was talking one day with a Frenchman whom I had known from my previous voyage. His bride joined us, and after kissing us each on both cheeks, she banteringly reproached my friend.

"Today I cooked your eggs so carefully, but you shouted, 'Do you call these eggs?' And I had cooked them for you with so much love."

"My dear," replied my friend, a Frenchman to the end, "eggs are to be cooked with talent, not love."

Tahitian girls wear the sophistication of innocence. They may be country girls who have come to Papeete only a few times in *le truck*, the jitney built on an old truck chassis. Yet no *grande dame* could have more poise or elegance of manner than this little country girl seated at a restaurant table, using a knife and fork as if she ate with them every day of her life (she does not; she uses her fingers), and sipping wine with a knowledgeable and critical air.

Breadfruit Tree Becomes a Monument

There is in Papeete a Wallis Street and a Cook Street, and on the *quais* there stands a shaft bearing a bust of the Sieur de Bougainville. But in all this lovely island I found no memorial to William Bligh.

I had brought with me to Tahiti on the new *Bounty* a young breadfruit plant which had been grown from rootstock of one of the original trees planted by Bligh in Jamaica. It had thrived in the humid warm climate of its native land, and one rainy afternoon in March we planted it in the soil of Arue, the district from which the parent tree had come more than 168 years before.

His Excellency, M. Aimé Grimald, Governor of Tahiti and of French Polynesia, kindly consented to accept and plant the breadfruit in the name of the Tahitian people. Madame Rosa Raoulx, Chiefess of Arue and the only female chief on the island, rallied her people by sending a crier abroad to blow blasts on the *pu*, the triton shell trumpet (page 24).

In the courtyard of the district schoolhouse a troupe of young girls in bright pareus printed with a breadfruit design gathered with the guests around a square trench.

A tall Tahitian in a red *maro*, or loincloth, placed the plant in the ground. The Governor tossed a spadeful of black earth around the roots. The Chiefess took the spade next, then Madame Hall, and myself. The girls clapped their hands in rhythm and danced round the plant, chanting the Song of the Uru (breadfruit). Before I left Tahiti, the plant was, like the ones Bligh had taken away, in a state of "charming forwardness."

A few days ago I received a photograph of the tree (page 27). It is already seven feet tall, and with luck, it will reach forty feet, to form

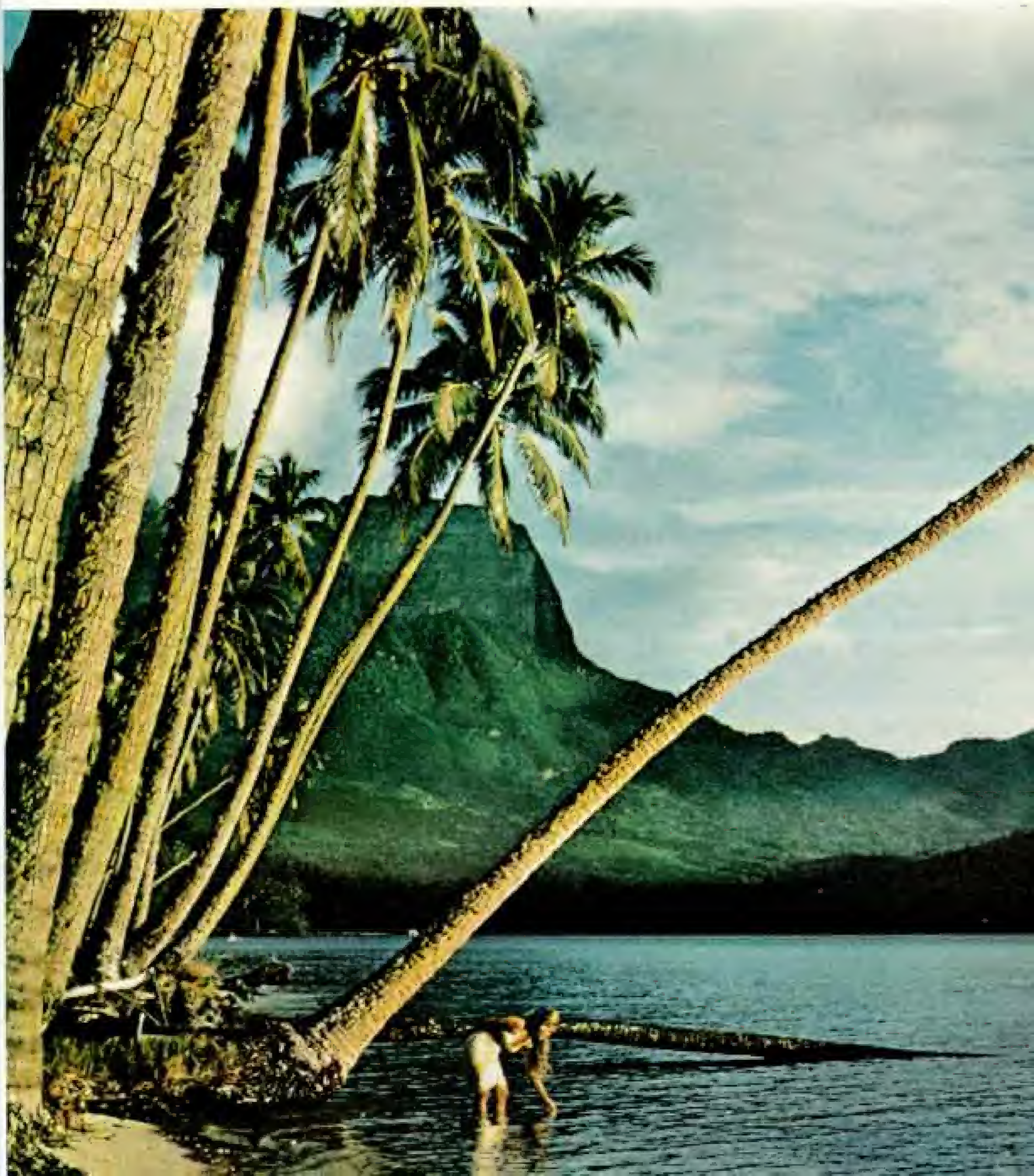
a living green memorial to William Bligh. A bronze plaque to be placed at the tree's base bears the inscription:

CAPTAIN BLIGH'S BREADFRUIT TREE

In the year 1792 Captain William Bligh of England's Royal Navy came to Tahiti to take on a cargo of breadfruit plants for transplanting to the West Indies. His previous voyage of 1787 had ended in disaster when mutiny broke out in his ship *Bounty*. The second voyage was successful, and in 1793 Bligh landed his plants in the West Indies.

This tree was grown from rootstock of one of three trees surviving in Jamaica from Bligh's original importation. From these trees sprang all the breadfruit which now flourishes throughout tropical America.

After an absence of 168 years, a replica of the original *Bounty* brought back this tree to its native land. It was planted in this District of Arue, from which Bligh obtained most of his plants, by the National Geograph-



ic Society of the United States of America
In Memorial to
a Great Discoverer and Navigator
4 March 1961

If Bligh were alive, he probably would have something to say, and he would say it tartly. But I like to think he would be pleased.

Tahiti i te vai iriirau ma rau te ato o te mamo—Tahiti of the Many Colored Waters and the Sweetly Singing Birds—the finest island in the world, is still there, somewhere beyond the horizon. But the horizon, to a man standing on the deck of a sailing vessel, was only five miles away. Now the passenger in a jet aircraft can see 250 miles over the shoulder of the earth, and the book of matches which I have just used to light my pipe bears the legend "Be in Tahiti tomorrow."

Traveler, go to Tahiti, but remember Melville, and Pierre Loti, and Gauguin, and Stevenson, and treat her gently. Now she belongs to all of us. THE END

"Great black pinnacles fantastic in aspect . . . coconut palms that lean over the tranquil water"

Cook, on his third voyage in 1777, visited this deeply indented bay of Paopao on Moorea; some charts still call it by his name.

ROBERT HINE © N.G.S.

"Such is the best account that I have been able to Collect of these Islands and their Inhabitants who are without doubt the Happiest on the Face of the Globe. . . ."

JAMES MORRISON, THE MUTINEER

Wing-borne Lamps of the Summer Night

Article and photographs
by PAUL A. ZAHL, Ph.D.
National Geographic Senior Editorial Staff

IT WAS WELL AFTER MIDNIGHT when I awoke with a start and sat up in bed. The ceiling of my room was atwinkle with tiny blinking lights.

For a few confused moments my eyes blinked too. Then I realized that one of my specimen containers must have been left ajar, freeing the hundred or so fireflies I had placed in it earlier in the evening. Now, perched or crawling, *they* were the twinklings of this starry sky; a few in flight streaked across the ceiling heaven like minuscule comets.

I leaped out of bed and snapped on the overhead light. Instantly the planetarium effect vanished, and in its place was only a rather prosaic peppering of little tan insects, each about the length of a salted peanut.

I was in Jamaica, a Caribbean island beloved by tourists as a tropical paradise, but entomologically renowned for the diversity of its luminous night-flyers, more than fifty firefly species are native. I had come here to observe these intriguing insects and record their flashing lights on color film.

On arrival in Kingston, I had talked with my friend Dr. Thomas H. Farr, entomologist at the Science Museum, Institute of Jamaica.

"It's been dry," Tom said a bit apologetically, thinking perhaps that I had expected

Flickering Jamaican fireflies trace constellations on window and wall. Each flash of the luminous insects burns a starlike golden image on this time exposure. The inset shows one of Dr. Zahl's red-bottomed plastic bottles from which the living dots and dashes escaped.

Shown actual size, two Jamaican fireflies of the species *Photinus pallens* rest in a leafy retreat by day.

Feeling its way with sensitive antennae, a firefly climbs a blossom in the author's laboratory. Hatlike pronotum shields the insect's bulging eyes. *Photinus pallens*, here magnified ten times, is one of Jamaica's most plentiful luminous insects.

Despite their name, fireflies are actually beetles. They spend as much as two years in or on the ground as larvae, pupating and emerging only to mate, lay eggs, and die. Though they have mouths, adults of some species are believed never to eat.

to see fireflies twinkling from every twig and leaf the minute I arrived. "We've got to have more rain or night humidity before you'll see them out en masse."

Why do fireflies fill the summer evenings with their myriad bursts of light? The flashes, I knew, are simply courtship signals, a means of finding a mate in the darkness. Adult fireflies live only a few days, or at the most a few weeks, their sole function being to propagate. Adults of most species, it is believed, eat no food at all.

Once mating is done and a new generation of eggs has been deposited in moist crannies, nature has no further need for her bits of wing-borne star dust, and they die.

Tom advised that flying adults would probably best be found this time of year—early summer—in Jamaica's wetter highlands. Accordingly, my sights narrowed on the Blue Mountains northeast of Kingston.

From coastal lowlands I drove up increasingly steep slopes and crept around hairpin turns to the cliffside home of Doris and Inez Sibley, daughters of a missionary and students of Jamaica's flora and fauna. There, amid a mist-nurtured forest, 22 miles by road from the sea, I rented a combination workroom-bedroom to serve as center of my operations. My window looked out on crags that rose nearly a mile above the coastal plain, their rugged sides blanketed with jungle and interlaced with streams (page 52).

Each evening shortly after sundown I would station myself at the edge of a ravine not far from the Sibley place. As night closed in, the performance would begin—a hesitant flash here, an emphatic one there, then a few more, building gradually, especially when the sky was moonless and the stars were hidden by overcast, to a brilliance that filled the air and spangled the foliage. One almost expected to hear muted strains from Mendelssohn's *A Midsummer Night's Dream* overture wafting through the curtain of darkness.

But here, accompanying nature's pyrotechnics, were no sounds—only stillness, a stillness from which struggle and death were never far removed.

Silken Thread Binds Doomed Firefly

Once, as I waited, my eyes perceived a curiously unwavering point of light somewhere in the gloom ahead. Flashlight in hand, I investigated. I found a firefly, its lamp continuously aglow, entangled in the web of a yellow-and-black spider the size of an almond.

Six of the spider's feet clung to the web while its other two legs rotated the hapless firefly. Simultaneously, the captor emitted a silken thread that bound the spinning victim in an ever-tightening coil. Even when enshroudment was nearly complete, the firefly's lantern still gleamed brightly—as if hopeful, to the end, of attracting a rescuer (page 56).

The firefly species most prevalent in these jungle-girt mountains this time of year is *Photinus pallens* (pale shining light). Similar species of *Photinus* are seen on summer nights in the eastern United States.

Scientists have given us the answers to many questions about Jamaican fireflies—their classification, anatomy, flash patterns. But as to details of their life cycle, the record is nearly blank.

Based on what we know about related fireflies of the northern Temperate Zone, however, we can make some good guesses. It is likely that eggs of the tropical species are laid in moist humus and hatch in about three weeks. The larvae remain in the forest duff for up to two years, it is believed, feeding on slugs that are larger than themselves, on snails, and on the larvae of other insects, before they pupate and emerge as adults.

The male *Photinus pallens* exhibits two types of light: a bright though not intense flash usually produced when the insect is stationary and repeated at quarter- to half-second intervals, and a brilliant one produced at irregular intervals in flight. So intense is the latter flash that if one's eyes are near, the effect may be momentarily blinding, as if a miniature flashbulb had gone off.

Female Responds to Male's Signal

The female does little flying; in some species, none at all. She selects a prominent position on a blade of grass or twig; then merely sits and waits. If a flying male flashes nearby, she responds with her own light. The

Fireflies in a Box Provide All the Light Needed to Take Their Picture

First, author Zahl made a flash photograph (left) of about 100 Jamaican fireflies in a plastic box with transparent lid, surrounded by hydrangeas, marigolds, and nasturtiums. Then, in total darkness, he made a 20-second time exposure with the striking result at right. Though fireflies provide the only light, the flowers still show clearly.

Illuminated by the glow of a single firefly, a Jamaica road map shows the Blue Mountains' Hardwar Gap section, where the author studied the insects. Photograph below, taken in the same mountains, reveals the ruggedness of the area.

Smaller than Connecticut, Jamaica records more than fifty species of fireflies. A British colony since 1655, the Caribbean island becomes an independent member of the British Commonwealth on August 6 of this year.

Mist shrouds wrinkled peaks of the Blue Mountains. Columbus described Jamaica's terrain by crumpling a piece of paper and tossing it on a table.

Two luminous segments mark the male *Photinus pallens*, enlarged six times at right. Though bigger, the female (left) has smaller eyes and only one lighted segment. Adrenalin, given for study purposes, makes the lamps glow continuously.

To find a mate, the male flashes a courting code as he wings through the night. The female, who rarely flies, blinks her response while remaining at rest.

male may repeat his signal several times, the female reacting each time with her own; thus he establishes range and closes in. Finally he finds her perch and courtship begins.

The capture of living specimens was simplicity itself. One had merely to hold a jar or widemouthed bottle under the light of any perched firefly, then with a quick brush of the hand sweep the insect or mating pair into the container.

Once in the lidded container, the captives would flash frantically and try to get out. Before long, the crowded bottle would be giving off nearly as much light as an old-fashioned kerosene lantern (page 51).

A screen-topped terrarium on the desk of my room temporarily lodged two small *Anolis* lizards I had caught in the Sibley rock garden. One night I dumped a bottle full of fireflies in the terrarium to observe how the insects and the reptiles got along. Half an hour later I noticed that one of the lizards had snapped up a firefly and was holding it high, half swallowed (page 55). The firefly's lantern end, protruding from the reptile's mouth, glowed continuously, exactly like the insect I saw snagged in a spider's web on an earlier evening.

Light Without Fire or Heat

On another occasion I injected several fireflies with a tiny drop of adrenalin, using a fine-gauge hypodermic needle. Adrenalin has long been known to stimulate the chemistry of firefly luminescence. Almost immediately the lamps of the injected fireflies flamed up, maintaining a steady brilliance for an hour or more until, apparently, the drug's effect wore off.

With a 20-power magnifier I examined the light organ of one of these specimens. The outer layer was transparent. I looked deeper within, at the layer of cells that comprised the generator where biochemical materials reacted to produce light. There I saw microscopic eddies of churning radiance and whorls of brilliant incandescence, suggestive of the shimmering surface of a white-hot coal. Yet here was no fire and virtually no heat, only intense radiance—the phenomenon of bioluminescence.*

This strange cold light, produced not only by fireflies but also by many bacteria, protozoa, fungi, coelenterates, crustacea, and fish, is at present the subject of research in at least half a dozen major laboratories. Its duplication for man's use might someday lead to the development of a light-emitting bulb or wall panel in which no precious energy would be wasted as heat.

Being so readily available for study, fireflies, or lightning bugs, and glowworms (actually neither flies, bugs, nor worms but beetles of the families Lampyridae and Elateridae) have supplied much of our understanding of biologically produced light.

We know, for example, that a firefly's lantern is fueled by a substance called luciferin (from Latin meaning "light bearing") that oxidizes in reaction to luciferase, an enzyme produced in the insect's body. Both of these

*The author, long interested in the subject, has written other articles on bioluminescence for the NATIONAL GEOGRAPHIC: "Puerto Rico's Bay of Fire," July, 1960; "Night Life in the Gulf Stream," March, 1954; and "Fishing in the Whirlpool of Charybdis," November, 1953.

Dual tracks of light from luminous spots, one on each side of the thorax, chronicle the movements of a click beetle. Unlike the hovering, twinkling firefly, *Pyrophorus* glows for several seconds and flies like a comet. To make the photograph, the author followerd a time exposure with a flash

Daylight picture below, magnified six times, shows resemblance of the luminous spots to headlights and explains a nickname—automobile bug.

chemicals are produced by tissues in the abdomen of the insect, with oxygenating air fed in through a system of microscopic breathing ducts.

We know, too, that an energy-bearing chemical, adenosine triphosphate, is also essential in producing the firefly's glow. Called ATP for short, it is a high-energy compound vital to muscle movement, and it is found in all living creatures, including man. Scientists have isolated ATP from the muscles of animals and used it to rekindle the light-producing portions of long-dead fireflies again and again.*

But the glow itself results from a complex and delicate chemistry yet to be fully understood. There is no agreement as to how the flash is triggered and controlled.

Each species has its own peculiar flash intensity, duration, pattern, and sometimes even its own hue. Moreover, the male and female usually differ in their signals, so that each flicker proclaims not only the sender's species but also its sex (the latter being a somewhat

*See "Torchbearers of the Twilight," by Frederick G. Vosburgh, National Geographic, May, 1951

critical matter when it comes to locating a mate in total darkness).

Fireflies are rarely seen during daylight hours; they hide themselves, neither moving nor flashing, on the undersides of leaves, in soil, or in bark crevices. Repeatedly I noted that on a night streaming with moonlight firefly play was minimal or absent. Celestial and artificial light is something fireflies apparently wish to avoid; perhaps it jams their signals.

Red Glimmer: A New Species?

Late in the evening I sometimes set out by car and followed a winding cliffside road in quest of new areas of firefly abundance. Some nights, when the moon shone too brightly or the air was too dry, I stopped to visit the mountainfolk in their roadside dwellings.

To these people, in whose jungled backyards I often probed, flashlight and collecting bottle in hand, I was known as the "blinkie man," and after initial suspicions had been allayed, my relations with them were extremely cordial. Many a barefoot boy, and adult, too, joined me in the dark as an eager accomplice, always ready to carry equipment or show me the way to this or that dark grove where the night before "plenty blinkies" had been seen.

I remember one drizzly night when, except for the intrusion of my car headlights, the world was ink black. As I slowly second-geared around a narrow turn, a patch of twinklings in a clearing suddenly caught my eyes. I stopped and snapped off the car lights. As my eyes became dark-adapted, the myriad flashes seemed to grow stronger. Some blinked on and off, like fixed stars; some hovered in mid-air, then angled away; others streaked through the void like satellites.

But I had witnessed this spectacle before. What held my attention on that lonely mountain road was a single point of glow in the gloom ahead which, unlike that of a web-trapped firefly, pulsed in a slow, strangely irregular manner—and it was red!

I knew of only one genus of luminous insect—*Phrixothrix*, a native of South America—that produces red light. To discover a specimen of that bizarre insect in Jamaica would be of major scientific interest.

I reached for my flashlight and a collecting bottle, then stepped out of the car and stealthily made my way down the road to where, in the gloom of dense foliage and no higher than eye level, the red light continued its slow on-off rhythm. I was just at the point of moving in for the capture when the glow spoke up:

"Good evening, sir."

I sprang back and snapped on my flashlight. Half obscured under dripping branches, where he had sought shelter from the drizzle, stood a man with a black face and friendly, alert eyes. He removed a cigarette from his lips and, referring to the flickerings all around, added: "Very pretty, isn't it?"

Then he tossed the cigarette down on the wet roadway, where it sputtered to extinc-

As if smoking a cigar, an *Anolis* lizard clamps a half-swallowed firefly in its mouth. The author, who placed the insects in the reptile's box as part of his study of fireflies, says the sight "suggested an evil-faced man smoking a king-size cigar." Finally, he adds, the lizard spat out its luminous mouthful.

In extreme stress, a firefly's beacon burns continuously.

tion, taking with it my hopes of making entomological history.

I asked this farmer, who had lived all his life in these mountains, how many kinds of fireflies he was familiar with. He laughed. As far as he knew, there were only two sorts: "blinkies," the small ones; and "peeneewallies," the large ones.

My new acquaintance revealed that he, too, was a collector of glowing insects: he had several in a matchbox. "Watch," he said, taking an inch-long specimen from the box and squeezing it a bit. Instantly, two lighted patches on its thorax and another on its underside brightened. This was a peeneewallie he said. To me, it was *Pyrophorus*, a genus of click beetle, family Elateridae (page 54).

The click beetle, also found in Temperate Zones, is so named because it clicks when it is overturned or picked up. The noise results from a sudden jerk to right itself. Its larva is called the wireworm, some species of which are ruinous to crops.

I told the farmer of my interest in finding a "fire tree." The American biologist Dr. John B. Buck, visiting Jamaica in the summer of 1936, had described fireflies swarming in trees in such prodigious numbers that their "nebulous glow was visible half a mile away." He wrote of trees converted to "seething flame." I had read elsewhere about trees in the Orient which, with thousands of fireflies settled in them, flashed on and off as if synchronized.

I made no mention of these facts to my roadside companion. I merely asked him, as I had many others, whether he had ever seen a tree full of blinkies.

My ears pricked up when he replied: "Yes, mon. Last night, walking home late from the shop to go to my yard, I see a big tree full of blinkie fire."

It was about a mile down the road from where we stood, he added.

Without further palaver, the transfer of a five-shilling note put the man on my payroll. Jumping into the car, we were off.

We passed a few huts, darkened now because it was nearly midnight. At length my friend cautioned me to go very slow, then to pull up. We stepped out into the black. The drizzle had abated; the air was now quite clear. For a few moments, we stood peering. Then I slowly became aware of a great, diffuse luminosity in the darkness.

As my eyes became more sensitized, I perceived thousands of stars whose galactic

Spots before his eyes led the author to a firefly-decorated tree. His workday began at dusk when insects first lit their lamps and began their mating flights.

Doomed Firefly Glows Unblinkingly as a Spider Spins a Silken Shroud

Attracted by the pinpoint of light, the author found a real-life drama, here enlarged five times. Winging through the gloom, the unlucky firefly blundered into an *Araneid* spider's web. The victim's struggle to escape only entangled it the more. As the hungry predator wrapped its prey in a homespun straitjacket, the firefly proclaimed its plight with an unwavering flare.

Ablaze With Lights, Kingston Twinkles Like a Field of Fireflies

With a population of 380,000, the Jamaican capital ranks as the Western Hemisphere's largest English-speaking city south of Miami, Florida. Palisadoes Peninsula, agleam with the evenly spaced lamps of a jet runway, shelters the harbor from Caribbean storms. At the peninsula's tip (upper right) lie the remains of Port Royal, a buccaneer haven before an earthquake plunged much of it beneath the sea in 1692. An article and artist's depiction in the February, 1960, GEOGRAPHIC describe the catastrophe.

Flashing furiously, scrambling fireflies suggest an aerial view of a metropolis at night. The author slumped the insects on a table, and a time exposure recorded each flash.

twinklings were creating exactly what Dr. Buck had described. The flashes were random, rather than synchronous like the Oriental fire tree, producing the effect of a gigantic sparkler.

Lights Create Moment of Enchantment

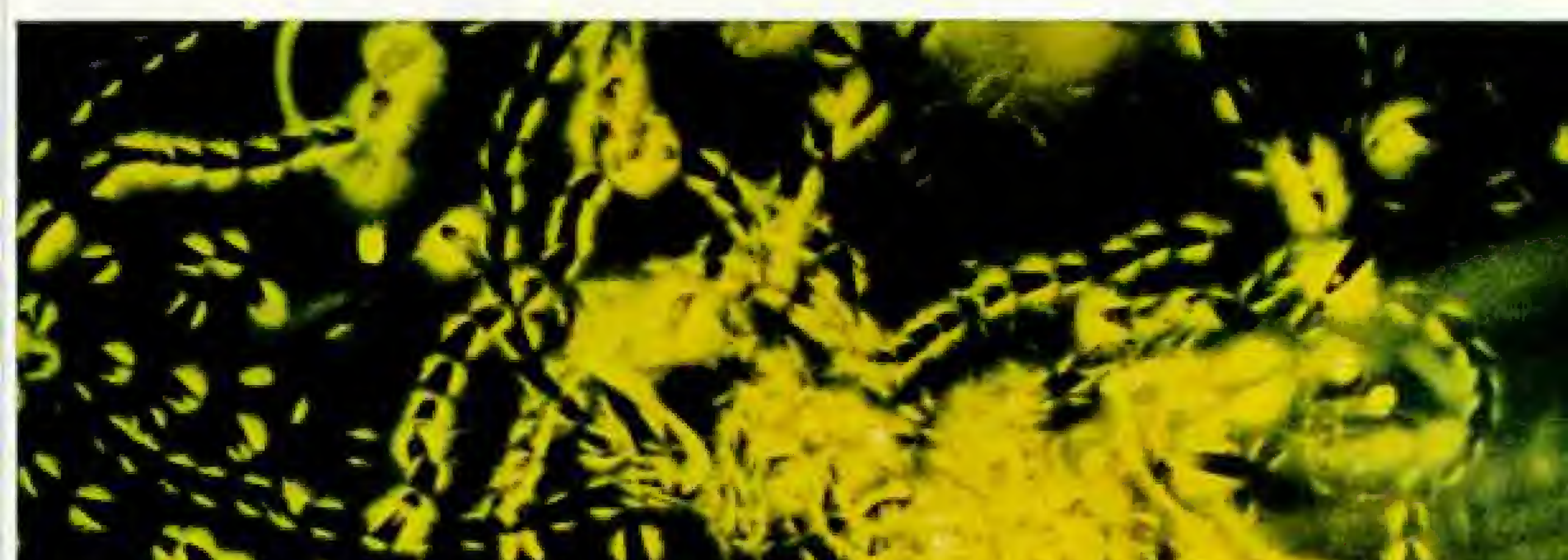
For a few moments I was mesmerized by the sheer wonder of the sight. I might have been in a bathysphere deep in the ocean's black abyss, watching the lights of a school of luminescent fishes, or in an airplane night-flying over a light-bejeweled city.

But it wasn't long before I was brushing foliage aside to get at this June "Christmas tree." Soon I was under it, looking up as though at a magnified portion of the Milky Way. From the lower branches I collected several dozen specimens; they were *Photinus pallens*. Many were mating; this glittering tree was a huge breeding arena.

The rain now suddenly came down in torrents, driving us back to the shelter of the car. It showed no signs of lessening, so at last we went home.

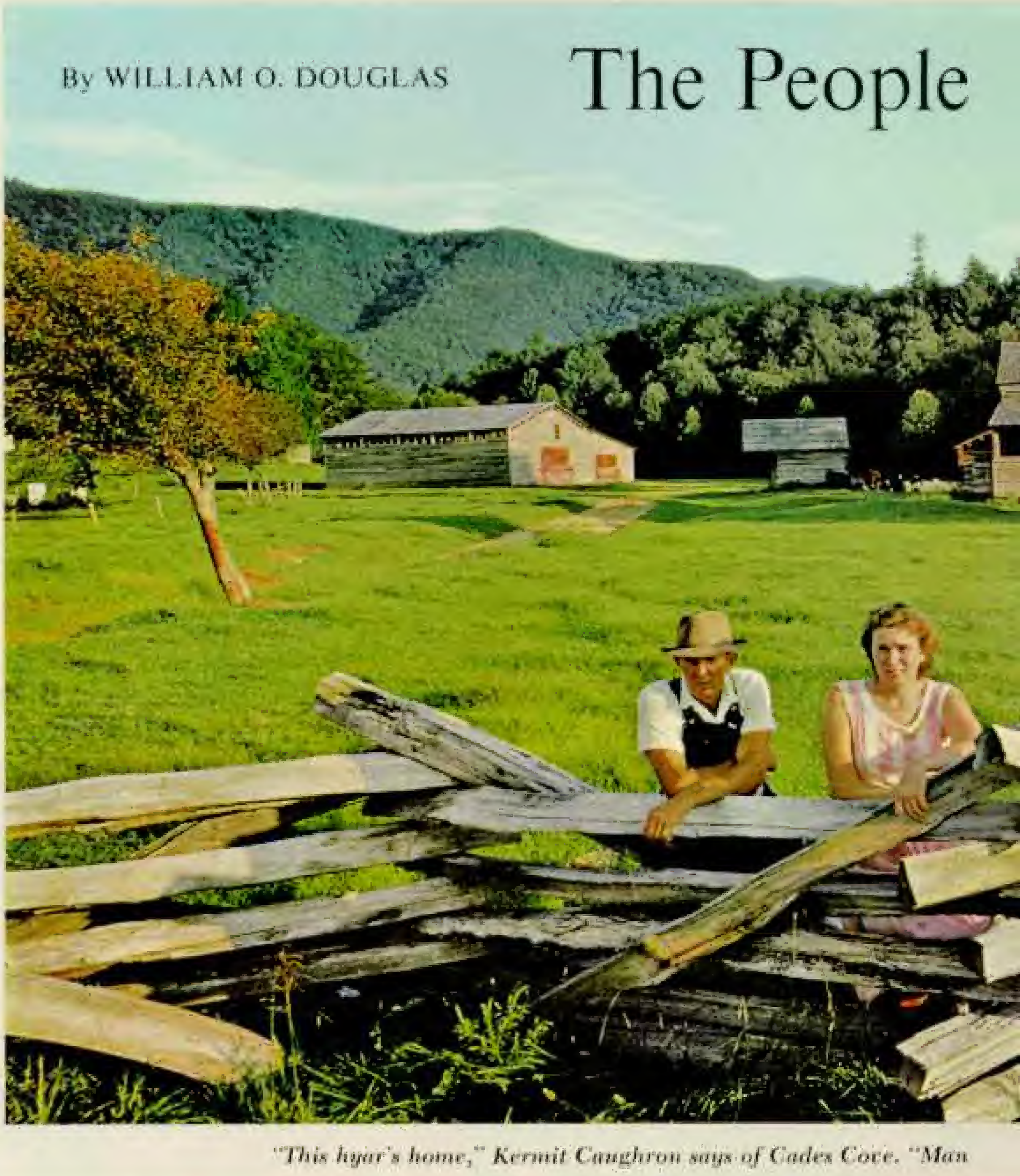
Every night for the following week I returned—each time to find the tree entirely bare of blinkies. Nature had apparently accomplished her mission. And although subsequently I saw other bushes and trees bearing many firefly lights, never again during my Jamaican visit did I stand under a full-dress fire tree. Nor did I ever find another red firefly.

THE END



By WILLIAM O. DOUGLAS

The People

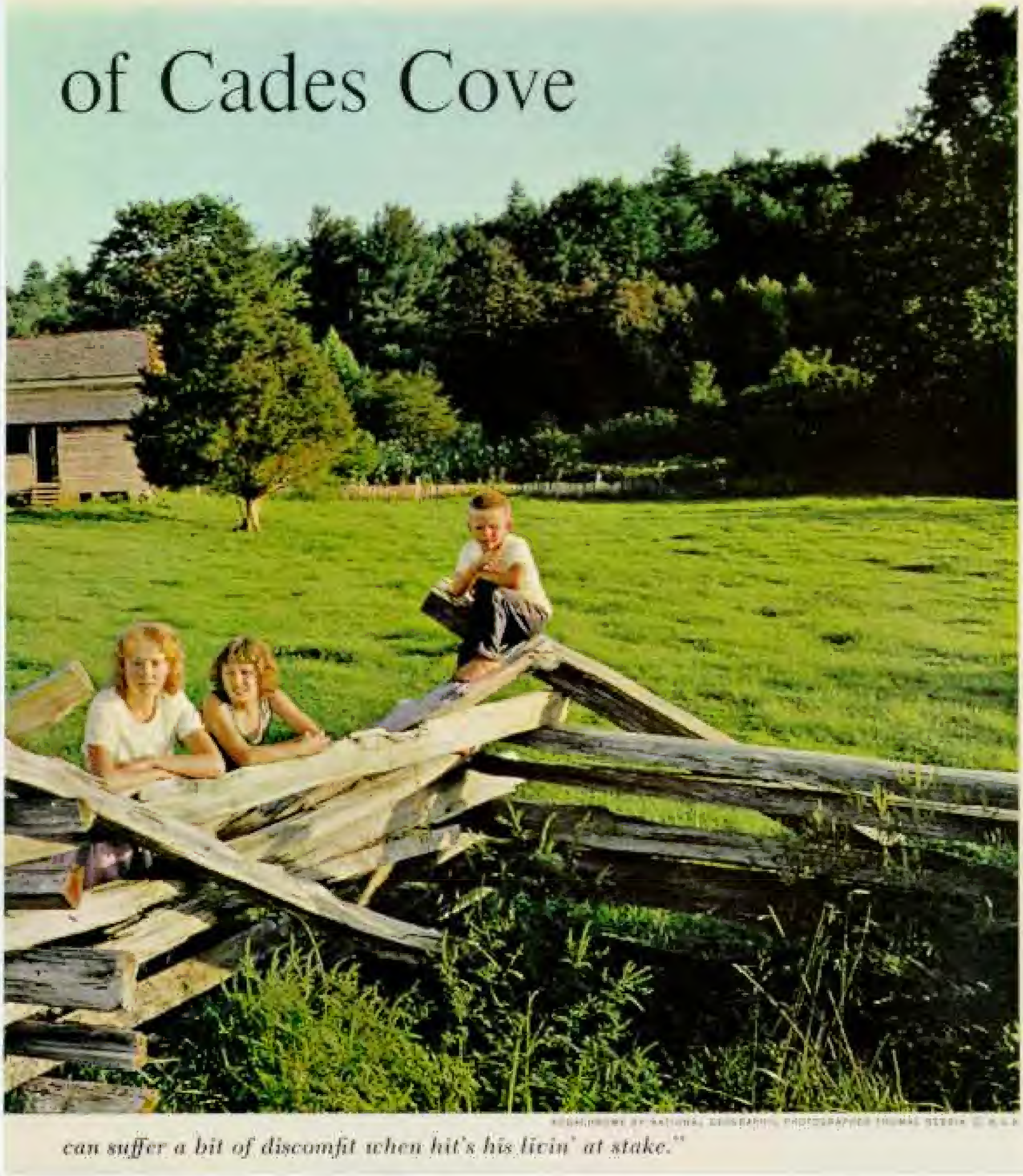


"This hyar's home," Kermit Caughron says of Cades Cove. "Man

Deep in the Great Smoky Mountains, a rustic valley cups a remnant of pioneer America. Here Justice Douglas of the United States Supreme Court reports on a way of life that has almost vanished

KERMIT CAUGHRON's house sits by the side of a sourwood tree overlooking Cades Cove. His front yard is filled with beehives or, as they say in the Cove, "bee gums." For in the early days of this eastern Tennessee land, the settlers made hives by cutting sections from hollow gum trees and dressing them out with chisels.

It was a warm May morning, and the mist that followed a three-day downpour was rising off the Great Smoky Mountains. Kermit



can suffer a bit of discomfit when hit's his livin' at stake."

—a kindly, sharp-featured man in his late forties—leaned against the fence explaining to me the problems of the bee gums.

"I've shore had more trouble with b'ars and bees than any livin' man," he said.

"First, I used to put the bee gums back in the woods. But the b'ars got 'em even when I fenced the bee gums in."

"What happened?" I asked.

"A b'ar knocked the fence down."

After a pause he went on to say:

"I built a 'lectric fence. Know what the b'ar did? Hit knowed if hit tetched the fence when hits feet were on the ground, hit would get shook up. Know what hit did? That b'ar came running, cotched the 'lectric fence with hits feet off the ground, knocked hit down, and got my honey."

Kermit took off his hat and wiped his brow.

"I built a new 'lectric fence. 'Nother b'ar dug under hit. I should hev giv up then and brung my bee gums home. But I fixed to out-

smart the b'ar. Got me some nine-foot lengths of pipe, built a platform, and put my bee gums up thar.

"Then to fix the b'ar I got some scythin' blades, sharpened 'em real good, and set 'em between my bee gums, figurin' if the b'ar got up thar, he'd cut hisself to pieces."

"Did it work?" I asked.

Kermit gave me a knowing look. "That b'ar knowed how to take keer."

"What happened?"

"Hit got up thar—how, I don't know," Kermit said perplexedly. "But he done hit."

"Did he climb up?"

"When a b'ar stands on hits hind legs, hit can reach jist about seven feet, mebbe more."

Kermit, assuming the posture of a bear on its hind legs, jumped up.

"If hit tuk a big jump like that, hit could reach my platform. Anyway, next day nary a bit of my honey was left, and my bee gums was tore to bits."

"Any blood on the blades of the scythes?"

"Nary a bit. Why, I don't know."

He mused, "That b'ar did everything to contrary me. So I moved my bee gums hyar."

"Bears bother you here?" I asked Kermit.

"Got me a b'ar dog. Hit tuks up after any b'ar. But I can't give the dog all the credit."

"Who else?"

"Park Service and tourists. Them garbage cans pleasure b'ars as much as bee gums."

Here were words used with the verve and flair of Elizabethan England, and with a pronunciation we have mostly lost.

CADES COVE, a meadowland about five miles long and two miles wide, nestles between mountains and low ridges in the Great Smoky Mountains National Park (map, page 92). Kermit Caughron holds one of five permits for farming there. The Park Service wisely encourages this farming to prevent the area, which is rich in American history, from returning to woodland.

Kermit, like the others, has a short-term lease. He pays a dollar-a-year rent for each acre of arable land that he uses. He must mow, keep down brush, fertilize meadows, and maintain fences. His acreage has several weathered old buildings—a house,

granary, and smokehouse—that the Park Service preserves for historic value. Kermit and his family live in a more modern house.

I was there on a warm spring day as the poplar honey was coming to an end. With Kermit, I sat under a "green shadder gum tree," watching queen bees high in flight with drones in fast pursuit.

I hated to leave the idyllic spot, not only because of its beauty and serenity but also because of the music of Kermit's talk.

"Next we'll have basswood honey. Last'll be sourwood. Hit's lemon color. Never seed bees go crazy like they do on sourwood. By early August hit's all gone."

Rhododendron, which the mountain people call laurel, and laurel, which they call ivy, also produce honey. Rhododendron honey is poisonous to humans, and some people say laurel honey is, too. "But bees won't work on laurel or ivy when t'other honey-crop blossoms are in bloom," said Kermit.

Kermit keeps jars of honey out by the road. A sign requests the purchaser to put a dollar into a box Kermit has fixed there.

"Does everyone pay a dollar?" I asked.

"Don't lose but a smidgen," Kermit replied.

"It proves people *are* honest," I ventured.

"Not so sartin," Kermit said knowingly. "Show ye whut I mean."

It then appeared that the bee gum closest to the honey stand was a hollow dummy. Kermit slipped inside it easily.

"Naow, pick up a bottle and I'll tell the hand ye use."

He followed my every movement through the peephole. Then he rejoined me by the road and told me how the previous Sunday he had caught two boys taking two jars for two pennies, and one distinguished-looking man who pretended to put a dollar into the box but palmed it instead.

"I cotched you, I cotched you," hollered Kermit, as he rose out of the box.

"Never seed a man so shook up," he laughed.

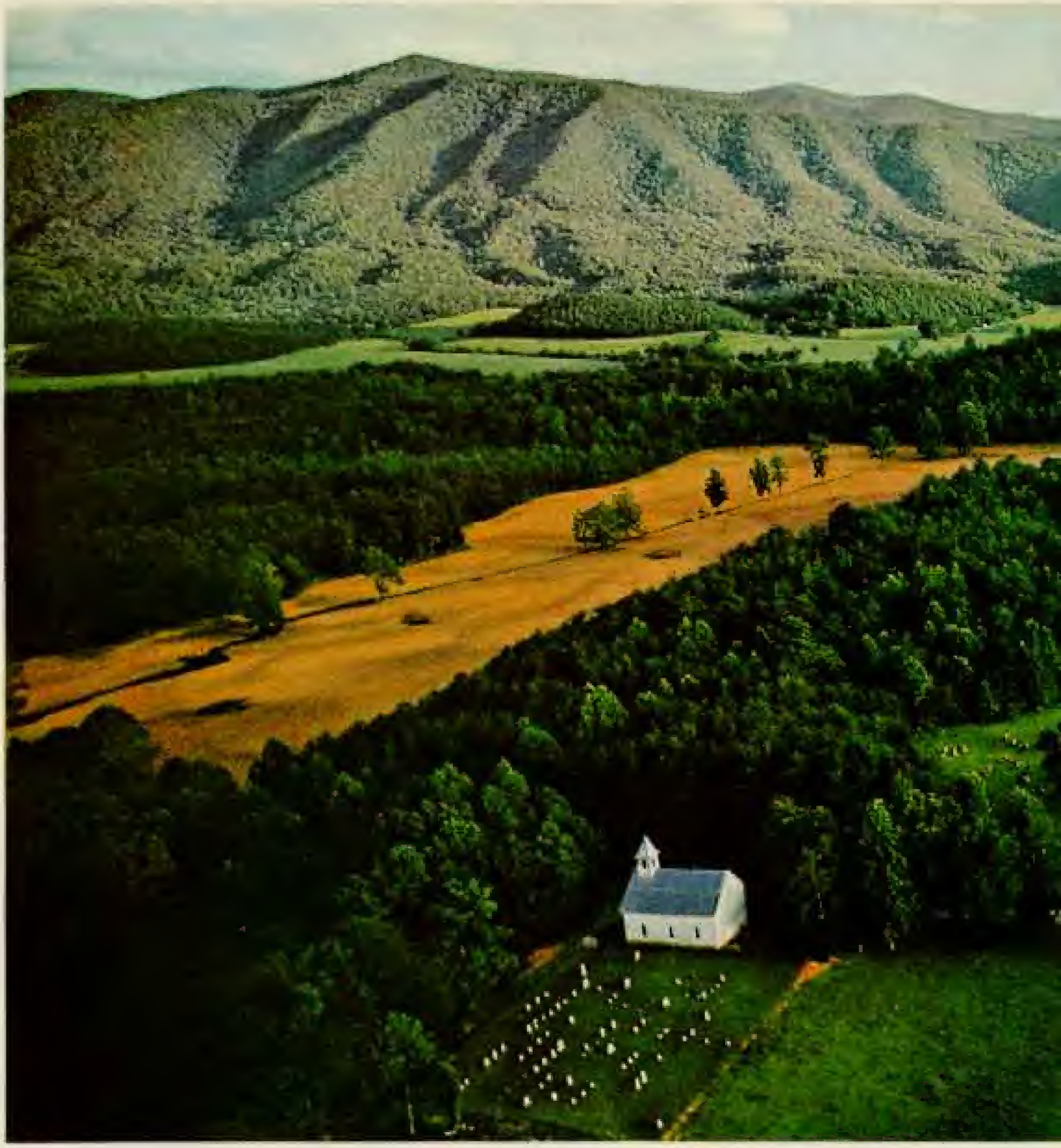
"That dummy beehive must be an uncomfortable place to spend Sunday," I observed.

"Me and the kids, we take turns. Man can suffer a hit of discomfit when hit's his livin' at stake."

Kermit and his wife Lois have four chil-

"I've shore had more trouble with b'ars and bees than any livin' man." Kermit Caughron, helmeted with a veil, carries a smoke gun to stupefy his bees.

Beehives fill Kermit's front yard. He leaned against the fence, explaining to me the problems of the bee gums: "That b'ar did everything to contrary me. So I moved my bee gums hyar."



He loved with all his being those precincts almost sacred to him.

dren, two girls and two boys. They ride a bus to school at Townsend, some 12 miles distant. Lois Caughron told me she often wished she lived in town.

"Not many folks in the Cove," Lois said. "In the old days mebbe a hundred families lived here. Then lots of things went on."

"She don't like snakes," Kermit shouted.

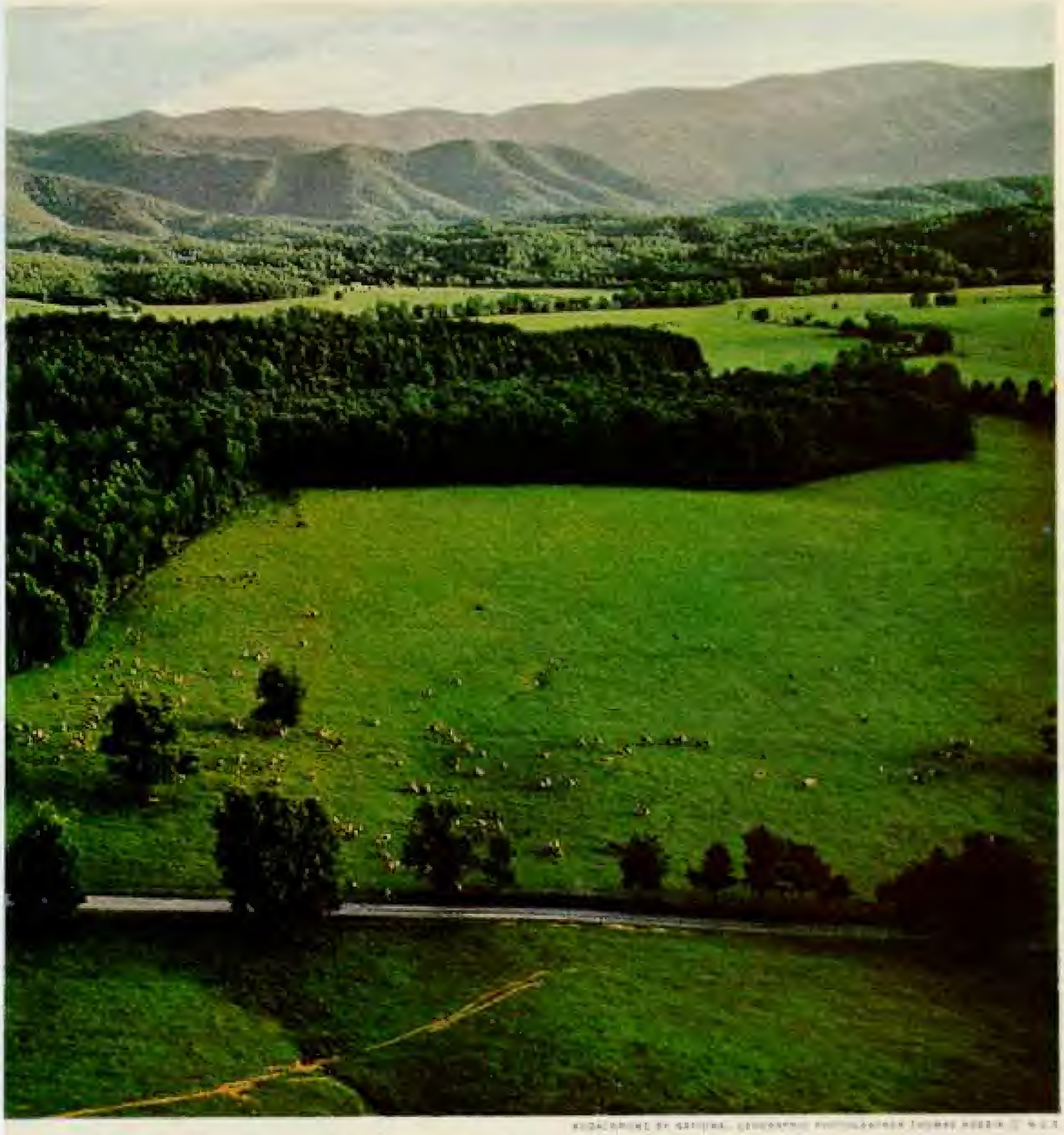
"Shore don't. T'other day the dog was barkin' real loud by the corner over thar. I tuk a look, and shore nuf hit was a big rattler."

She said rattlers were not as bad as copperheads. She told how, just a few weeks earlier, she and daughter Joyce Kay were walking from the house to the vegetable garden, a hundred yards away. Joyce Kay, who was barefoot, took a shortcut through tall grass.

Suddenly Joyce Kay called out, "Mom, I got copperhead-bit."

"Bit her right on the big toe," Lois said.

Lois sucked the toe, put a tourniquet on the girl's leg, and took off to Townsend, where a doctor gave the girl an antivenin.



"It's a mite lonesome in the Cove nowadays. Only five families left."

SNAKES OR NO SNAKES, Cades Cove is an exquisite creation, whose sights, sounds, and fragrance fill me with wonder. The Cove area, with its green meadows, pure cold streams, rugged mountains, hollows filled with hardwoods, crests covered with oak, beech, and pine, has a strong hold on all who have known its solitude and its glories.

"This hyar's home," says Kermit; Lois nods.

White people visited Cades Cove before 1800. There are indeed records of land transactions prior to that date, but the first permanent settler was John Oliver (1793-1864), who fought in the War of 1812. He came over the mountains on foot in 1818 with his wife Lucretia (whom their great-grandson calls "Lucreta") and a small child, following an old Indian trail across Rich Mountain.

The Cherokees were being pushed westward by successive treaties, and Cades Cove was a new frontier. It was rich in bear, deer, and wild turkey; there were trout in its creeks; chestnuts, hickory nuts, and walnuts were plentiful; blueberries, strawberries, rasp-

berries, and currants were thick. Early settlers found honeybees swarming, and bee gums became a permanent Cove feature.

John Oliver's great-grandson is still alive. He is John W. Oliver, now more than 83 years old, with soft gray hair and piercing blue eyes. He is six feet four, straight as a ramrod and trim as an athlete. I traveled the length and breadth of the Cove with him and listened to his stories of the old days.

He is so deeply attached to the Cove that he fought its inclusion in the park. It took court action to remove John W. Oliver. His resistance had nothing to do with dollars and cents. The Cove was his home and castle. He loved it with all his being. It hurt him to think that in those precincts, almost sacred to him, and in the churchyards where all his people were buried, curious tourists would intrude.

ONE WARM MAY DAY we stopped in front of an old log house. Cumulus clouds topped the ridge of the Great Smokies opposite us. Black Angus cattle grazed in the foreground. In front of the house a rail fence ran in a zigzag line, disappearing around a bend. A bed of blue phacelia followed its length. The fence rails were kept in place by upright posts, two at each end, and the rails protrud-

"A hog-eye rifle is what we called it." By the time John W. Oliver was born, an improved model of the Kentucky rifle, using percussion caps, was in style. The one that he carried as a boy is still in good working order. He shows it to his son Wayne and his grandson Michael.

Cabin logs were tulip poplar, the floors were pine, the shingles oak—chimney, roof, and end walls in perfect symmetry.

ed beyond the posts about eighteen inches.

John W. Oliver was educated outside the Cove, and so his speech today does not reflect the flavor of those who kept to the mountain fastness. Yet when he is in the Cove, the old expressions return to him. Pointing to the rails, he said:

"Folks don't know how to make a fence nowadays." He studied the fence a moment. "It's 'tarnal foolishness the way this one's done. In the old days we tuk chestnut and made rails. Chestnut's almost gone.

"They wasted wood." He pointed out the distance the rails protruded from the posts. "Man gettin' wood by hisself can't afford to waste so much. Look't how much farther this'n could go."

After a pause he added, "Rails too thick. We split thinner ones so we'd not have so many gettin's o' wood."

The fence was indeed a new one, built by the National Park Service and only an approximation of the old. We followed it to a gate that led to an old log house also maintained by the park. The logs were tulip poplar, the floors were pine, the shingles oak.

This cabin had interesting notched corners. They were so close-fitting they must have been pounded into place.

"They'll stay put so long as there's a log

A rail fence ran in a zigzag line, disappearing around a bend. "Folks don't know how

there," John W. Oliver said with certainty.

We stood on a porch of recent vintage. John Oliver pointed to what were once fields and now was a young forest.

"Here's where I learned plowing when I was ten," he said wistfully. John's father was William H. Oliver (1857-1940), an ordained preacher in the Primitive Baptist Church, founded by John Oliver in 1827. William was bedridden for three years with arthritis.

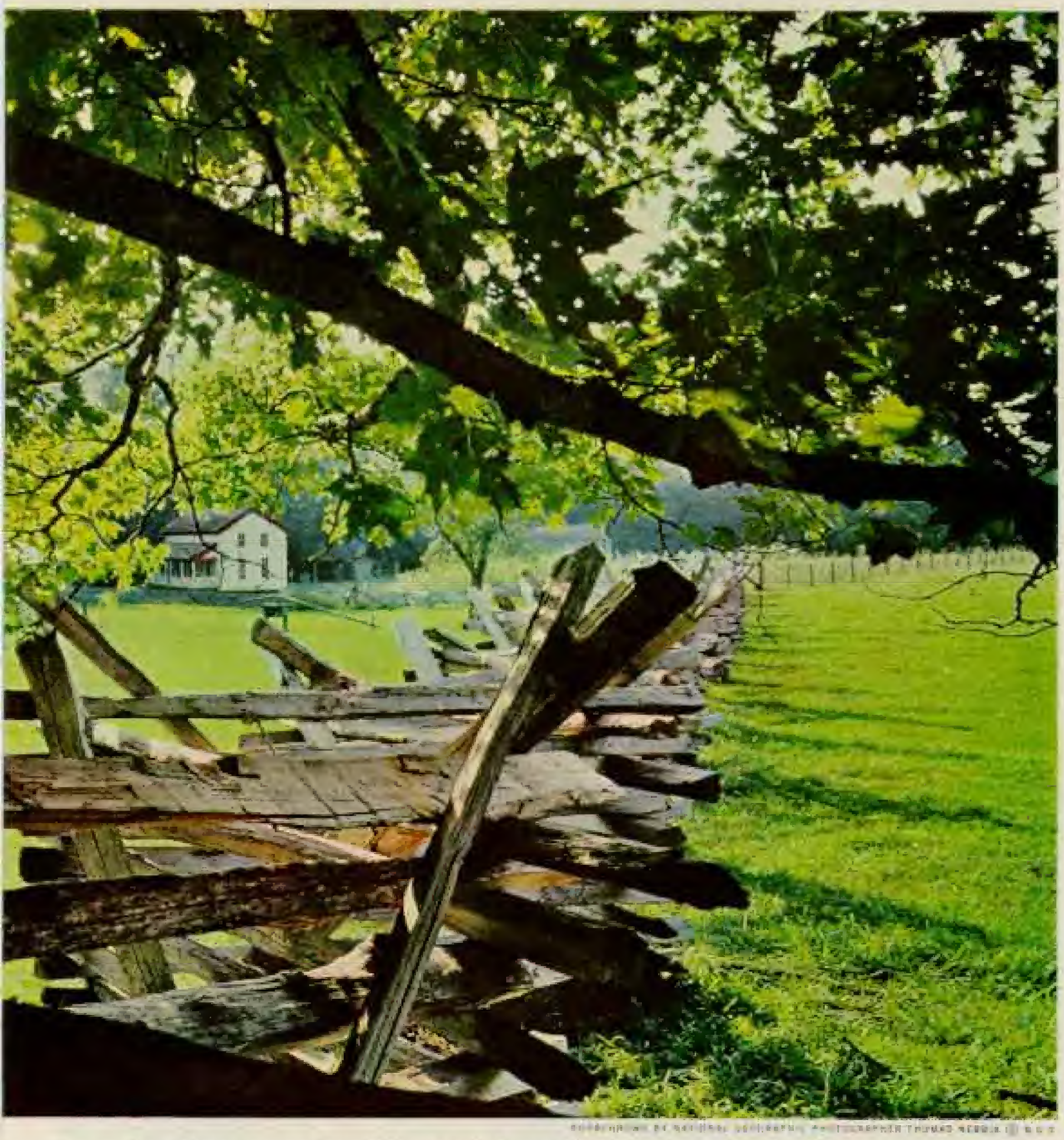
"Had to turn him in the feather bed real keerful." John W. Oliver remembered sadly.

"Did you all have feather beds?" I asked.

"My mattress was whut's called a straw mattress," he said with a grin. "There were corn husks in it, too."

The plows those days had wooden moldboards. Plowing was a man's job. But until John W. Oliver could plow, his mother did it. "I was mighty proud of her for her plowing."

Some settlers were "jist a-ground-hoggin' it"—just getting by. For though the Cove had rich land, it also had marginal land that produced a crop or two, then petered out.



to make a fence nowadays. Man gettin' wood by hisself can't afford to waste so much."

John W. Oliver waved his hand at the wooded area, once an open field.

"This was poor land—blueberry-pine land is always poor," he informed me. "Sandy an' thin. After a few crops it's not worth much. So we moved on."

He took me inside the house and showed me the fireplace. It once had been fitted with hooks from which pots hung for cooking. The Cades Cove people in the early days had no stoves. Dutch ovens on the hearth were used for baking.

THE NEXT permanent settlers in the Cove after the Olivers were the Joshua Jobes. They brought cattle with them. And when Lucretia Oliver, John's wife, told the Jobes that she and her husband were leaving the Cove, Jobe said he would give them two heifers if they stayed.

"Soon my great-gran'parents were having milk and butter," John W. Oliver told me, "and Lucreta was happy."

Lucretia was the first one in the Cove to use butter to make soap. She would boil it

Remnants of a sorghum mill: The horse went round and round as sorghum stalks were fed between two rollers. The juice was cooked in a long shallow pan, then strained.

with the drippings from wood ashes.

"People were plumb fools over that soap," he said, adding with a twinkle in his eye, "though 'twas able to take your hide off."

Cades Cove had quite a few settlers between 1818 and 1830. In the thirties many, including the Jobes, moved to Georgia. But the Olivers stayed, and more people came to take the place of the departed. They usually came by wagons pulled by three oxen, over an old Indian trail. They used "tar-pole" wagons—axles of hickory or locust and hubs of dogwood or white oak. A tar bucket swung underneath, filled with resin prepared from lengths of pine heated on end over a hot fire with a drain that caught the drippings. This tar greased the creaking wheels. They were also known as "jolt" wagons, for they had no springs.

One day John W. Oliver, his son Judge Wayne Oliver—who presides over the Fourth Judicial Circuit of Tennessee—and I entered the Cove over the present Rich Mountain road. I had hiked it one March day, just before the dogwood was out. The north slope of the mountain is forested with a rich mixture of hardwoods, and hemlock—called spruce pine—grows along the streams. Today's road does not follow the original one. Wayne Oliver, who was born in the Cove, pointed out pieces of it. In places it was so dim that imagination was needed to reconstruct it. The old one, all agree, was steep.

"If I left the Cove very early in the morning with a loaded wagon and a team of horses and went over Rich Mountain," Judge Oliver told me, "I could get to Townsend and back the same day."

"Mighty hard on wagon brakes," his father added.

"Going down the steepest places," the judge said, "I'd lock the two rear wheels, and we'd sort of slide down. On each trip I'd just about wear out a pair of brake blocks."

We stopped at the top of the mountain, where a distant view of the Cove could be had through trees not yet in full leaf.

"The birds is hollerin'."
"Yeah, they're hollerin' keen."

"I am God-proud to see you."

Cobwebs wadded on wounds stanched the blood. Early settlers were heavily dependent on homemade remedies.

"We love the Cove," the old man said.

There was a long silence, until I asked, "Why is this called Rich Mountain? Was there a settler by that name?"

"Because hit's rich," he answered.

"You see," said the judge, "there's a lot of limestone in this mountain and in the Cove. They burned it to get lime."

"And sometimes they put a bit of lime in every hill of corn for fertilizer," John W. Oliver added.

As we dropped down off the mountain, I learned that other sections of the Cove were known for their lime-rich soil. There were iron deposits, too, and John W. Oliver told me something about them.

Henry R. Duncan of Knoxville, now retired from the faculty of the University of Tennessee, has made a study of the old iron forges. They disappeared long ago. In fact, the manufacture of iron ended about 1845. Forge Creek flows past the place where ore was heated in a forge and pounded into iron by hammers weighing 400 to 500 pounds.

These huge hammers were operated by water power. Mr. Duncan has pictures of one of these old hammers from the nearby Abrams Creek forge. He sought in vain to have it preserved in a museum. But the historic aspects of the park were not as prominent then as now. As a result, the hammer lay gathering rust and finally disappeared.

The folklore of the Cove is filled with accounts of the noise of the hammer—a noise that could be heard from almost any point in the Cove. Iron was exported; and iron

utensils were made—kettles, plowpoints, wagon tires, bells and clappers, and hoes for weeding the corn hills.

THE OLD SETTLERS IMPROVISED. Kegs for corn were made by cutting a three- or four-foot section off a trunk of a hollow oak or chestnut and finishing it out as in the making of bee gums. The settlers found sourwood trees that were naturally curved so as to be good runners for the narrow sleds used summer and winter along the trails.

An oak log, split and hollowed out, made a feed trough for cattle. A flume for transporting water was made by cutting tree lengths, hollowing them out V-shaped, and hitching them together. Hinges were usually wooden.

Such relics are preserved at the home of Elijah Oliver (1829-1905), the grandfather of John W. Oliver. He brought cold water quite a distance down a hollow in a split-log flume. He ran the water into a springhouse that served as a refrigerator. Today the flume is moss-filled, but it functions well and the springhouse is refreshingly cool on a hot day.

Wooden pegs—not nails—were used in building. Shingles were made by riving with froe and maul. Drags were made of hemlock with teeth of the black locust, which is quite abundant in the Cove. The drags were pulled over plowed ground to make it smooth.

The women stood barefoot in the creeks to wash wool. They dried it in the sun, carded it, and spun it on a wheel. With homespun flax they made "britches that'd last

a man longer than those houghten pants."

Chestnut oak bark was ground and used to tan leather. Tanbark was a good source of cash income. The old-timers made shoes for their families. Wooden lasts were made for the family's shoes, but there were no rights and lefts—one last did for both feet. Many went barefoot in summer until they were grown. And Shade Tipton, who died in 1960, went without shoes one winter, so that his feet "got tough." They tell in the Cove of people whose feet were so tough they wore their shoes out from the inside.

"What did they use for shoe nails?" I asked John W. Oliver.

"Made the nails out of splinters of maple."

Remnants of a sorghum mill are extant. Two iron cylinders turned face to face, as horse or cow went round and round. Sorghum stalks were fed between the two rollers. The juice was carried off at the bottom. Then it was cooked over a flat open fireplace in a long, shallow copper pan until it had reached the right thickness.

"Sorghum, honey, and maple syrup—those were our sweets," John W. Oliver said. Mutton "taller" was used in making candles, though in time kerosene reached the Cove.

Chimneys were made of flat rock and were "mud daubed," as John put it. Some lovely

esthetic effects were achieved. Elijah's house, viewed from the end, shows chimney, roof, and end walls in perfect symmetry.

Water power was harnessed for sawmills and gristmills. First came the sash saw, called "slash" saw, then the circular saw. The sash saw went up and down, cutting on the down stroke. Floor boards of some buildings in the Cove still show sash saw marks.

The early gristmills were "tub" mills. The wheel—a cross section of a big poplar tree—lay flat. Cup-shaped slots were cut in the wood; the water hit the slots at an angle. The shaft stood erect, the grinding stones being above the wheel.

Later mills used the overshot wheel, which turned in a vertical plane.

John P. Cable built a mill run by an overshot wheel in 1868. Restored, it still functions. As a demonstration of pioneer industry for visitors, the Great Smoky Mountains Natural History Association grinds some 15 tons of corn each summer. These days the wheel grinds slowly. But if the millrace were allowed to run full, the Cable Mill could grind a bushel of corn about every ten minutes.

"Olivers never had a mill," John W. Oliver told me. "There were plenty without gurn. Four operated at one time: Cable, Burchfield, Shields. Cain't recall the fourth."

Each notch had a slight flange on the end. "They'll stay put so long as there's a log there."

John P. Cable built a mill run by an overshot wheel in 1868. These days the wheel grinds slowly.

Horseshoe hinges: The old settlers improvised.

Mountain people are apt to stand aloof until they know what the intentions of the "furriner" are. But once he is admitted to the inner circle, there is nothing the people of Cades Cove will not do for the visitor. All parade in memory as the kindest, most thoughtful, most generous people I have known. Mrs. Rena Ledbetter (right) and Mr. and Mrs. George Caughron (lower right).

Mrs. John Coada spends her time quilting. In the early days "only heat was from the fireplace. So cold in the bedroom, we'uns ran real fast to bed and piled on the kivvers."

"Was one better than another?"

"Some thought so. People went whar they got their full measure o' meal."

"Was the grinding fee the same everywhere?"

He nodded. "One-eighth, or a gallon out of a bushel. People had to wait their turn. If the miller warn't thar, thar was a toll dish to measure out the mill-owner's share."

These mills ground all the cereals. White flour, however, came from outside. Wagons of apples, cabbages, or logs went out, and white flour, "a race of ginger," baby's shoes, quinine, or dollars came back. Once in a while a peddler came through the Cove, but he sold mostly cloth.

JOHN P. CABLE built a frame house by his mill, and it still stands. It is now called the Becky Cable House. Mr. Cable operated a general store in one room, bringing in goods over the mountains with oxen.

His daughter, Becky Cable, is famous in Cove history as "Aunt Becky." She was as strong as a man, so strong she could hold "a bull by the tail." She could plow, cut wood, cook—any chore that was demanded. She never married. According to Mrs. John Coada, her niece who now lives near Maryville and makes attractive quilts, Aunt Becky "warn't much on sweethartin' except'n for one man." Her father did not approve, and by the time John P. Cable died, the man was dead.

"So Aunt Becky never did jump the broom," Mrs. Coada said.

Judge Oliver took me to a Cades Cove mill built by Frederick Shields, which the judge's father bought and moved outside the park.

"Daddy ran it with a belt from a farm tractor for a few years."

We found it to be in perfect running order. The judge said as we left, "From my early days in the Cove, I recall rye bread best. Rye bread made from rye ground at the old mill was the best bread in the world."

In the early days a man who harvested another's wheat got one-sixth of the crop for his labor. Wheat was placed on muslin, then beaten with a flail.

There were a few tenants in the old days. They kept two-thirds of the crop. Landlords had two cribs for corn. In one, the tenant's corn was kept. The other was known as the "rent crib," where corn paid by the tenant as rent was deposited.

THE SETTLERS who entered the Cove in the first half of the last century brought Kentucky rifles with them. They had the flintlock firing mechanism. One original flintlock, purchased years ago by John W. Oliver from an early settler, is still in the Oliver family. It is affectionately referred to as "Old Bean."

By the time John W. Oliver was born, an improved model of the Kentucky rifle, using percussion caps, was in style. The one that he used as a boy and handed on to his son Wayne is still in good working order.

"A hog-eye rifle is what we called it," John W. Oliver said.

George Caughron, father of Kermit, lives with his wife Delia above a rich hollow adorned with dogwood and mountain magnolia. There were pigs below their house; chickens ran loose; three dogs stood watch.

Delia, who descends from the Myerses, the Shieldses, and the Olivers, is spry and alert for her 70-odd years. She has unkind things to say about fox, skunk, and raccoon because they raid her chickens.

"I don't confidence them fox," Delia told me. "Hyar I was spadin' the garden. The chickens durin' the while were after me pickin' up worms. Then the fox up and done it."

"Done what?"

"Come right up to my skirts, tuk a chicken, and run off, with me hollerin'."

"What did you do?"

"Got me three dogs."

"Did hawks bother your chickens?" I asked.

"Some," she said. "But hit helped a bit if you put horseshoes in the fireplace. Horseshoes in the fire seemed to keep the hawks away."

George Caughron broke in to say that bears used to break down his apple trees in the fall, but the garbage cans attract them now. Before bears were protected—that is, in pre-park days—some people cured bear middlings (side meat) just as they cured hog middlings.

"A good b'ar would meat us for a month," he added.

JOHN W. OLIVER and Delia Caughron grew up and went to school together in the Cove.

There was a school in Cades Cove after the 1820's. At first it was a four-grade school, later developing into eight grades. The visiting teacher agreed to take students for a dollar a month each. If enough signed up, the

"Then the fox up and done it. Come right up to my skirts, tuk a chicken, and run off, with me hollerin'. I don't confidence them fox."

teacher kept school open sometimes one month, sometimes four months.

All the Olivers were literate. They taught themselves. There were two essential books in the Cove, one was the Bible, the other the Blue Back Speller. John W.'s father, William H. Oliver, was an outstanding speller. The Cove had a spelling bee last century that people still talk about. It was between William H. Oliver and Hannah Sparks. William H. finally "spelled her down" and challenged the teacher. Who won, I never learned.

When John W. Oliver was a young man, he taught school for three years. The bully of the Cove always seemed to be from one family—descendants of a Revolutionary soldier who bought land in the Cove in the 1820's. The folklore of the Cove, long before John W.'s time, was rich in tales of quarrels with the old soldier's rowdy progeny. The family would "fit [fight] a circle saw," it was said.

So John W. was quite concerned on his first day as teacher, when one of the clan came with three young sons.

"I feared a ruction," he told me. "But the father set thar all day with nary a word."

When John W. Oliver dismissed school that first day, the man came up to him and said, "I brung ye three of my brats. I want ye to put the red on 'em. They're survigrous and deserve it. I whup 'em a lot myself."

I asked John W. Oliver why he taught only three years.

"By then I knowed I didn't know enough to be a teacher."

THE OLIVERS are unusual people. William H. Oliver was among those who saw the need for higher education and sent his son, John W., to Maryville to school, then to Louisville to a business school for a year.

John returned to the Cove with ideas. He introduced a full-blooded black Angus bull to improve his stock, the first purebred poultry (Rhode Island Reds), Berkshire hogs, and Shropshire sheep. He studied bees and honey problems and decided that the Cove needed new queen bees. He introduced three-banded Italian queens and saw the productivity of the hives increase.

There were brook trout in the creeks running through the Cove, but John W. and others thought rainbow trout would be better. They brought in some fingerlings.

"Ain't that one more sight," people said. "They'll all go over Abrams Falls and be deader'n four o'clock."

But the rainbows lived and in a few years were "bigger'n people had drempt."

John W. Oliver was rural mail carrier in the Cove for 35 years. A courier brought mail over the mountain six days a week, and Mr. Oliver delivered it on horseback around the Cove. He traveled 20 miles a day.

"He was a mighty fine carrier," Mrs. Wayne Oliver said with a twinkle in her eye. "Sometimes he had to read the mail to the people who got it. He even had to kill snakes for the womenfolks."

Most Cove people were literate then.

"Only four couldn't read," John W. Oliver said. "They were Civil War pensioners who could only make an X."

One of those was Davis Potter, whose favorite expression was "By founds." Uncle Davis, as they called him, built his coffin and made it real comfortable. He liked to get into it and show his neighbors how well it fit.

"He also used to lay in it and drink his pop-skull [whisky]," John W. Oliver told me.

But Uncle Davis lost his coffin. One night his house caught fire, and the coffin burned with the rest.

"We saw the fire from across the Cove," Judge Oliver said. "Someone said, 'There goes Uncle Davis's coffin.'"

"He was a fine man," John W. Oliver said. "No one ever had any hardness to him."

John W. Oliver told me that in his day Witt Shields had "the biggest spread" in the Cove. The Shieldses of Cades Cove were descendants of Frederick (Fed) Shields and Henry H. Shields, who married daughters of the original John Oliver. Witt was a son of Henry H. Shields, who was quite a tinkerer. Among things he built were a hay baler and a hay loader. One day we stopped on a rise of land that overlooks the old Shields place, and Mr. Oliver reminisced.

"Witt was an inventor. He invented a washin' machine run by water power. His wife got caught in hit. Witt heered her hollerin' and hit a rag fer the house. Hit almost pounded her to pieces before he got her out."

When Uncle Davis Potter heard about the accident, he commented, "By founds, Witt's inventions will kill us all yet."

THESE MOUNTAIN PEOPLE usually lived up a "holler," so as to get protection from wind and storms. That is where John Oliver's original home was built.

Occasional apple trees mark old homesites. Jonquils bloom where foundations stood.

But the hollows were also the headquarters for illegal operations. There were moonshiners in the Cove from the early days. Brandy was made from apples; moonshine was made from corn. There must have been many stills, according to the number rounded up when the Cove became incorporated into the park.

"A few moonshiners had a Federal license," John W. Oliver commented. "But up the holler in a slick they also had a moonshine still. Reason was, they couldn't make money by meeting Federal specifications.

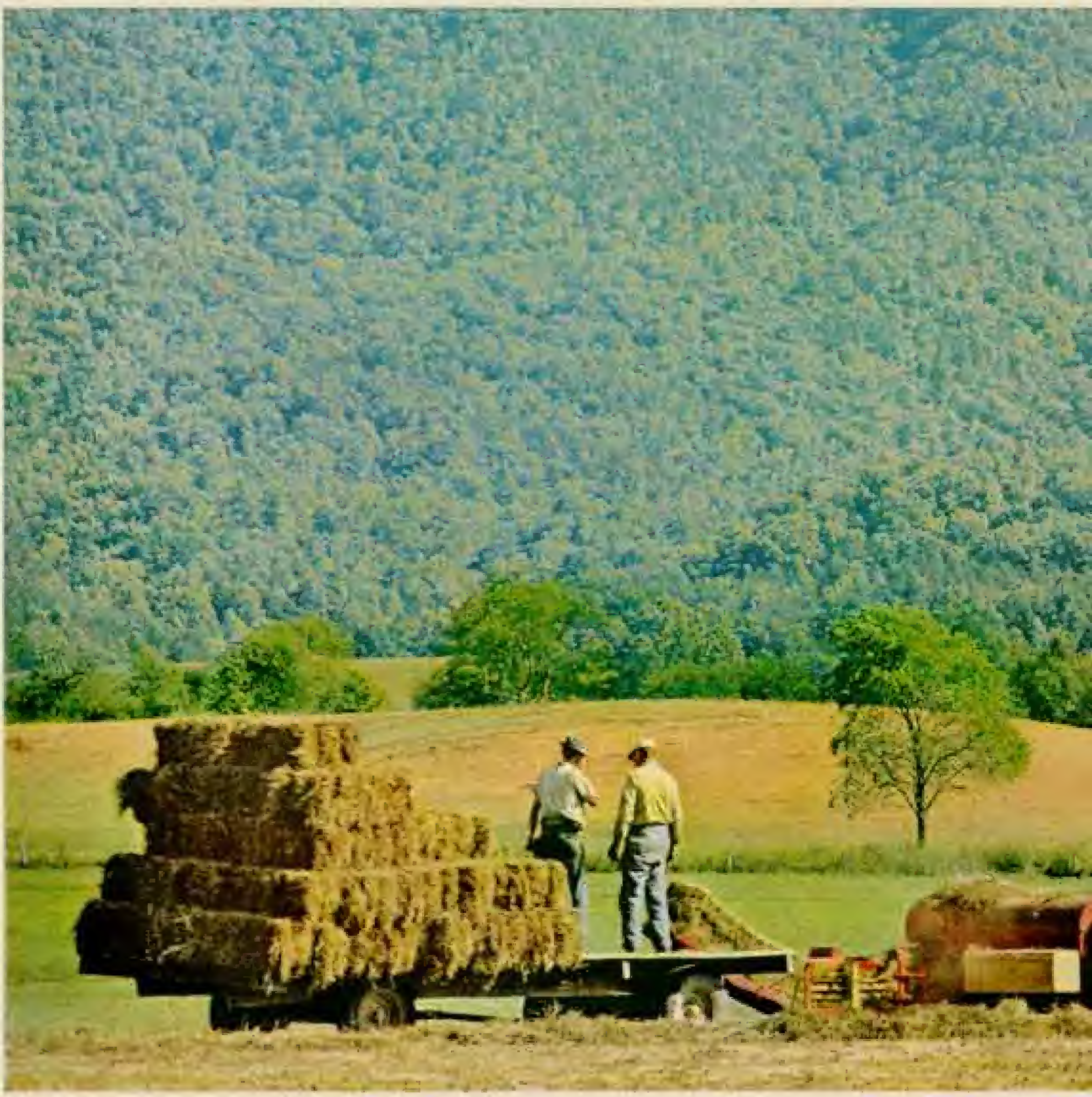
"People on the outside don't understand. Whisky in the early days meant more to these people than hit does to people in towns. Thar

war no doctors. Medicines needed a grain o' whisky, they believed. Then agin, whisky was a cash crop. Corn was hardly wuth sellin' at times. But a man could always raise some cash with whisky."

He talked on about moonshiners. The Olivers never ran a still and tried to avoid both moonshiners and liquor. But "revenooers" were always searching. And when two Cove moonshiners were caught, they blamed John and his father.

"That night both my barn and father's were set on fire," John W. Oliver said. "The Cove was lit up by the blaze.

"Know what?" he asked. "In a few weeks the two moonshiners fell out and quarreled.



and one of them came to me for help." He paused. "People are like that."

"What did you do?"

"I obliged."

In the early days revenuers were after manufacturers of pressed tobacco as well as moonshiners. There was an excise tax on pressed tobacco, too. People in Cades Cove grew tobacco and twisted it for family use.

Elijah Oliver sometimes pressed his tobacco, not to sell but to give as presents to friends. Someone informed on him, and he was summoned before the Federal court in faraway Knoxville. Elijah was "mighty shook up," his grandson told me, as he left the Cove for his trial. He was gone several days, and when he returned, he related how he had told the whole truth to the judge.

The judge said, "Elijah Oliver, I'm setting you free. Twist and press all you want. You're not the kind of man we're after."

THE MOUNTAIN PEOPLE made straight-backed chairs with seats of thin, narrow strips split out of white oak or hickory and dressed to a smooth finish. The posts were green; the rounds, or rungs, were seasoned. No nails or glue were used. Once seasoned, posts and rounds were inseparable.

These chairs, tilted so as to rest on the back posts, were used as rockers. They lasted for

"There was serenadin' on Christmas Eve. Men and boys would go from house to house." Charlie Myers recalls festive times now gone.

Without farming, much of the Cove would return to woodland.

Hugh and Vera Lee Myers still work the land. The secret of America's strength is in people like those in the Cove.

years, being handed down from one generation to another. The original John Oliver made the ones Elijah Oliver used. Years of rocking wore the back posts down so far that the front posts had to be sawed off. Thus, the lower rung of the chair was only a few inches from the floor.

John W. Oliver has such a chair in his home in Townsend. Chuckling, he pointed at it to say, "My gran'father Elijah would rock back and forth in the cheer. Then he'd come down real quick. There was usually a cat under the cheer, and it wud git caught under the rung. Never heerd such squallin'."

He paused. "My gran'mother wud then shout, 'Elijah has killed another cat.'"

In Elijah's day, deer and wild turkey were plentiful. Raccoon, whose lard was considered choice, abounded. So did bear, mink, squirrel, and rabbit. There were also some cougars, or "painters," and wolves in the Cove.

A man would be reprimanded if he shot a squirrel on a hunt.

"Who wud spile a chance fer a deer by shootin' a squirrel?"

In Elijah's days, the people started hunting with dogs. "When the hounds came on, the game didn't last long."

There are endless stories about hunting.

Allen Ledbetter, hunting with dogs, treed some coons in a huge tulip poplar. About dusk he started to chop the tree down, and he chopped until dawn the following day. Finally the huge tree crashed, and he found only one baby coon for all his trouble.

He was "as mad as whiz," Kermit Caughron told me. And the people of the Cove chuckled for years over the episode. "Hit was the best tickled we ever was."

There are many tall tales about hunting painters. "Fed" Shields lost a colt to a painter and went after the varmint with dogs. They treed the painter before the light was strong. Fed aimed his flintlock rifle. "'Old Clucker' is what he called hit," John W. Oliver said. In the dim light his aim was off, and the painter was only wounded. Down from the tree it came and fought the dogs. Fed, "afeard" to shoot lest he kill a dog, pulled out his hunting knife, dashed into the fray, and "driv" the knife into the painter's heart.

"The last known painter in the Cove," John W. Oliver said.

The Cades Cove people enjoyed tall tales, especially the one of the b'ar hunter who brought one back alive, meaning that the b'ar chased him all the way to the Cove.

There is also the story of the man who, being in the woods without a gun, came across wild turkeys. He managed to catch one by the legs, but it was so strong it "riz" into the sky, flew over the mountains, and dropped him in another cove.

The late Sherman Myers, a storyteller of note, liked to tell of the settler who prayed for rain. The Cove averages 50 inches a year, but one year it was dry. The old-timer prayed, "Lord, all I ask fer is .25 cents' worth of rain." An overnight downpour brought landslides and flash floods. Viewing the destruction, he said, "If I'd knowed it was that cheap, I'd axed fer only a nickel's worth."

Mrs. John Coada grew up in the Cove with her aunt, Becky Cable. A warm, pleasant woman now confined to a wheel chair by arthritis, she once did every kind of farm work—inside and out—except plowing.

"That two-bladed plow was too strong fer me," she explained.

She remembers best the two-man crosscut saw she and her sister used to saw wood.

"Only heat was from the fireplace. So cold in the bedroom, we'uns ran real fust to bed and piled on the kivvers."

Their beds were feather beds. "The feather bed was made of duck feathers and put on top of the straw bed," Mrs. Coada said.

Hash meat was made by cooking, until very tender, the head, feet, and liver of a hog. The bones were removed and the meat ground. "Add ground red peppers, ground sage, and salt," advised Mrs. Coada.

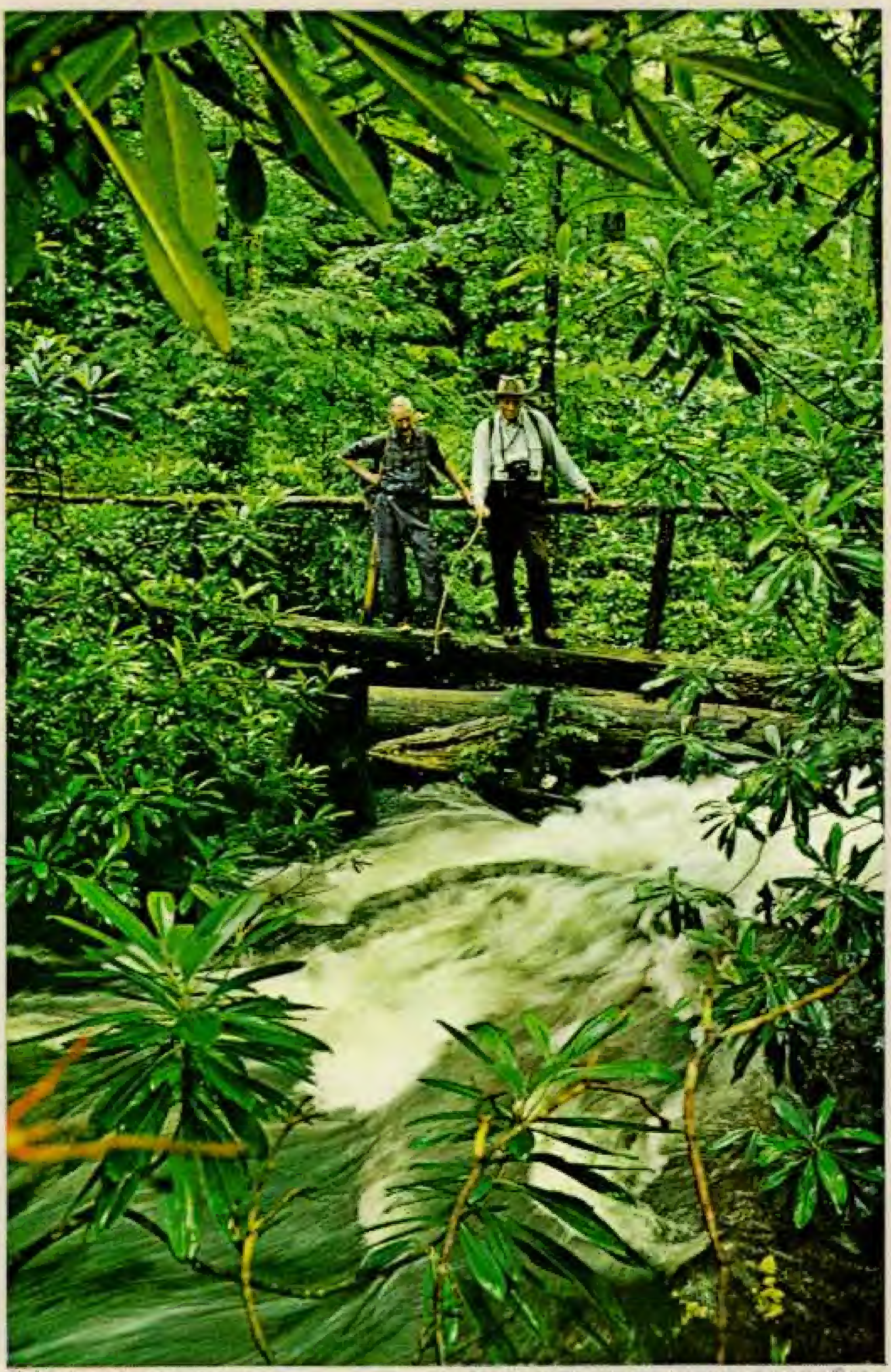
The Cove women put up vegetables, fruits, and sometimes fowl. Green beans were strung in the hull to dry and cooked with pork. Such beans were called "leatherbritches."

Hoecake, so named because it was baked on the blade of a hoe, was made of cornmeal, water, and salt.

"We had an old cast-iron baker at the fireplace," Mrs. Coada said. "We liked hot oak coals burned from oak bark best.

"We used soda, salt, and buttermilk to make cornbread. Hit was the best. Cornbread and sweet milk was our supper.

"We made light bread one't in a while. We would take hit in the bedroom we didn't use, only when company came, and put hit under



Rhododendron maximum IN GREAT SMOKY MTNS. NAT'L PARK

AUTOCHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER WILLIS PEARSON © N.G.S.

Cades Cove sights, sounds, and fragrance fill me with constant wonder.

the bed to rise overnight. Next day we worked hit down and let hit rise agin before bakin'."

Grated corn was baked into "grittedbread."

"Take two-and-a-half cups gritted corn," said Mrs. Coada. "Add a pinch of soda, one teaspoon baking powder, one-half teaspoon salt. Use only buttermilk to moisten."

White gravy made with unbrowned flour was "white sop." "Red-eye gravy" was ham or sausage juice and water.

"When we ran out of milk," Mrs. Coada said, "we drank sassafras. Never thought of it as a tonic, though I guess some folks did.

"Want to know about Aunt Becky's apple pie? Make plain biscuit dough. Take a small piece, roll it out to fit a square bread pan, place it in a greased pan, have apples cooked and mashed and sweetened, put in on the dough, roll out another piece, place on top of the apples, bake until done. Then, cut in squares, lift out on platter, and eat with lots of good butter.

"All our food came from the Cove," she added. "We raised wheat, tuk it to Townsend, and had it ground into white flour. That was the only outside food we ever did encounter."

THE EARLY SETTLERS in the Cove had stock medicines such as quinine, camphor, turpentine, and liniments which were brought in. But they were heavily dependent on homemade remedies.

Buds of the balm of Gilead tree made a salve for muscular soreness and aches.

Onion poultices for pneumonia, chest colds, and croup.

Tea from rue leaves for stomach worms.

Crushed jewelweed (touch-me-not) or crushed nightshade with milk added for poison ivy.

Honey and alum for sore throat.

Ragweed for stings.

Dried calamus (sweet flag) roots to "dry up the blood" and cure high blood pressure.

Cornmeal poultice, heavily salted, for sprains.

Sweet-gum bark and melted mutton tallow for diarrhea, or the "flux."

Bleeding for fevers, high blood pressure, general debility.

Tea made of ground ivy for the croup.

Tea made of Sampson's snakeroot (any of genus *Gentiana*) for colic.

Spigelia marilandica, Indian pink

Rhododendron calendulaceum (flame azalea)

Spring creeps up the Smokies

Catnip tea or mustard poultice for colds.

Wet tobacco for bee stings.

Wads of cobweb on wounds to stanch blood.

Some home remedies, many using herbs, came directly from the Cherokee Indians:

Tea from spikenard roots for backaches.

Tea from the bark of the wild cherry for measles and colds.

Peach leaves and cornmeal poultice for boils and risings.

Tea made of roots of the yellowroot for sore throat and stomach disorders.

Ginseng (*Panax quinquefolium*), an herb whose roots have long been used in the Orient for medicinal purposes, is found in the Smokies. The folklore in America, Europe, and Asia was that in brewing medicines, one looked for an herb that resembled the part of the body to be cured. Since ginseng root had a man's shape, it cured all man's ills.

There were "sang diggers" in the Cove who dried the roots and sold them on the market.

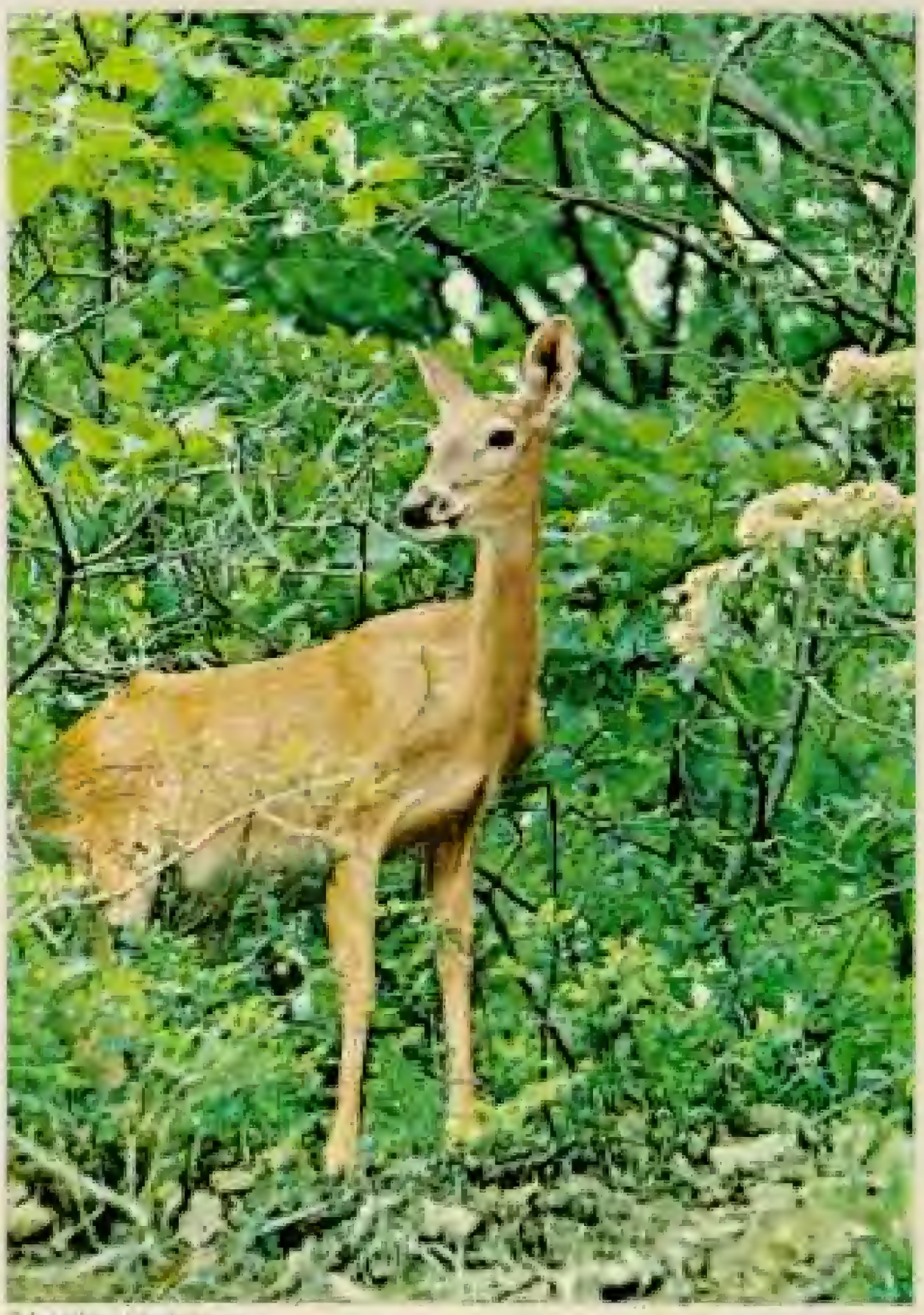
"Every whipstitch, there was someone digging sang," John W. Oliver told me. "I had quite a patch growing near my house. Someone came and dug it up while I was away."

While there was the herb school in the Smokies, there was also the alcohol school. The latter said herbs "hain't a bit of use without jist a grain of whisky."

Typhoid fever often struck. Once it reached epidemic proportions, and John W. Oliver told me of the panic that possessed the people then. Everyone had a different theory. One group thought it was due to the sawdust the mills were dumping in the creeks. Since the typhoid started when logging started, that theory gathered support. Others thought that the stumps of trees "soured," giving off a poisonous vapor. Gradually suspicion settled on the woods, and the community decided to fire them, which they did.

Most childbirths in the Cove were not attended by a doctor. Mrs. Coada, who had seven children, all born in the Cove, was attended by a midwife. Doctors from the outside were sometimes sent for. Only one doctor ever remained in the Cove. He was a Dr. Saltz who came to deliver a child of John W. Oliver's wife. He took sick on arrival and died in the Oliver home.

about a hundred feet a day



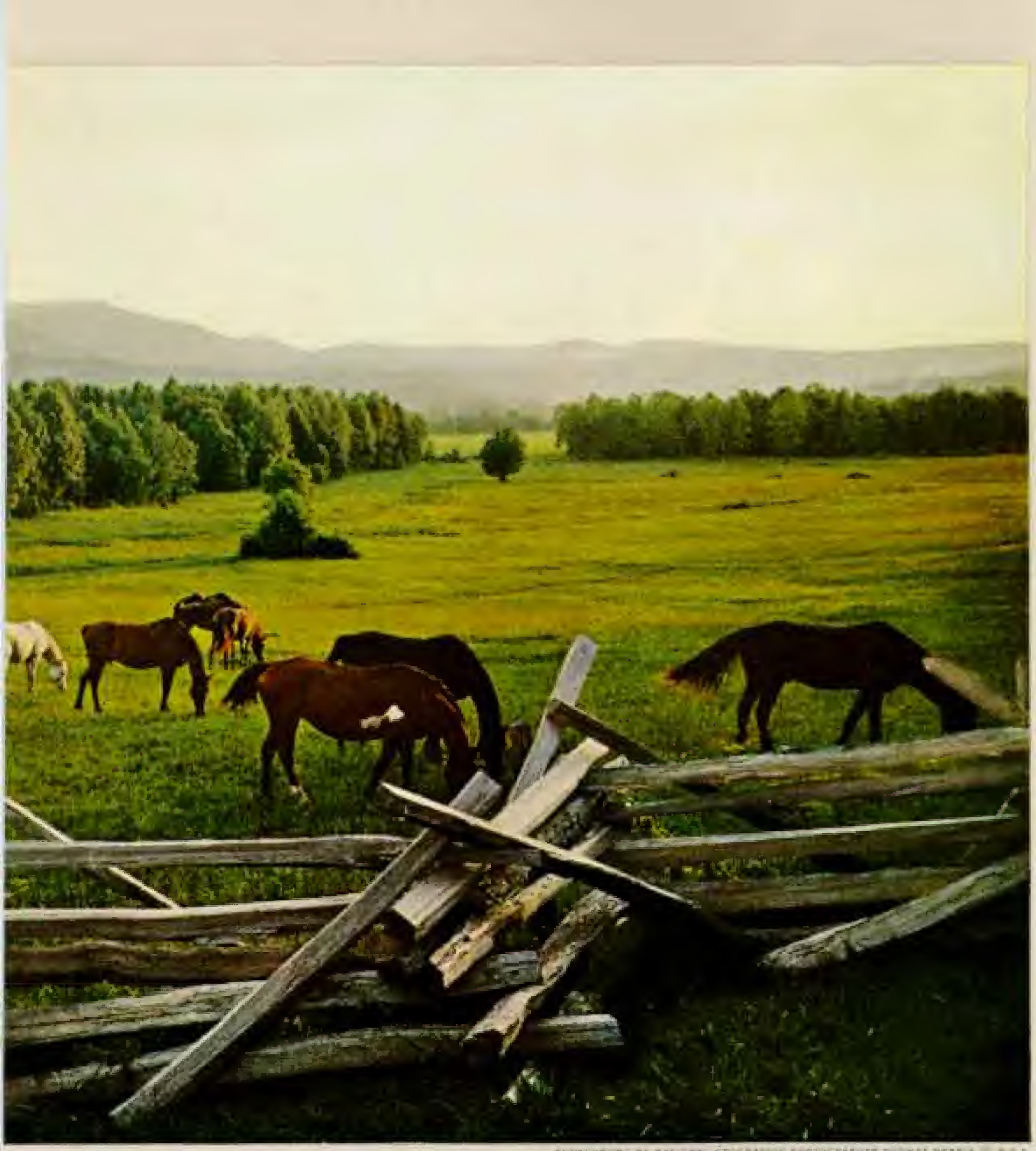
White-tailed deer

The Cove has a strong hold on all who have experienced its solitude and its

CATTLE, sheep, and hogs were the greater portion of the wealth of the old-timers. But if they grazed them in the Cove, there would be insufficient room for crops. So they grazed them in open places on top of the range, called "balds." On the ridge to the south of the Cove is a large open field known as Gregory Bald, named for Russell Gregory (1795-1864), whose tombstone in the Cove carries the inscription "murdered by North Carolina Rebels."

Several miles distant from Gregory Bald, in a northeasterly direction along the same ridge, are the Dan Lawson Range, Spence Field, and Russell Field. Hannah Mountain, to the southwest of the Cove, was also grazing ground.

No one knows the origin of these grassy open places. Randolph Shields, a biologist and botanist who was born in the Cove, the great-grandson of Fed Shields, told me that in a cycle of a century these balds or fields would probably be reclaimed by the forest. They have not been grazed for 25 years, and



glories—hollows filled with hardwoods, crests covered with oak, beech, and pine.

the oak, beech, blackberry, blueberry, azalea, and rhododendron are invading them.

The balds lie about 5,000 feet high, and in the early days stock was not sent up until April. The hundred or more families in the Cove grazed many hundreds of cattle and sheep on these balds. When pasture was sparse, the cattle lived on "feeren" (ferns). "Ivy" (laurel) was "pizen" to them.

Herders contracted to care for the stock. For cattle, they got one dollar per head or, if the herder furnished salt, a dollar and a half. For sheep they got 25 cents a head. Hogs were not herded; they roamed at will.

The cattle and sheep stayed on the balds until the first Monday in September. The hogs stayed on the slopes much later. They fattened on mast—acorns and chestnuts that grew on the fringes of the balds.

The herds were belled. Cow bells, sheep bells, and pig bells were made in the Cove. Herman Hodge, a former Cove resident who now lives at Walland, Tennessee, collects them. He has one room practically full of

PHOTOGRAPH BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JOE TAINTER © N.G.S.

When John W. Oliver and others stocked the creek with rainbow trout, people said, "They'll all go over Abrams Falls and be dealer'n four o'clock."

them. Unlike machine-made bells, each bell has a distinct personality and tone.

The herders were sometimes outsiders, sometimes Cove people. They built log cabins, planted turnips, potatoes, and cabbages, and hunted in their spare time. If wild turkey and deer were scarce, there were still—in John W. Oliver's words—"udlins of squirrels."

In APRIL the mountaintops are mostly barren. Spring creeps up the Smokies about a hundred feet a day. By the end of June, the laurel, rhododendron, and azalea form brilliant colonnades on the summits. Between April and June other flowering shrubs and trees bring life to the slopes: the flame azalea (known locally as "wild honeysuckle"), which shows red and yellow blooms from the same species; dogwood; silverbells; redbud; the mountain magnolia and the umbrella tree, with their large creamy petals.

The cabin near Gregory Bald was called the Moore cabin. Nearby, a cold-water spring with a vigorous two-inch bubble carries the same name, for Frank Moore of Maryville, a Presbyterian preacher. The cabin was built for him by Julius Gregg and Carson Burchfield of the Cove. Although the Reverend Moore spent a few vacations there, the cabin was primarily used by herders. There is a shelter there now, built by the Park Service and adorned by flame azaleas. No signs of the old herder cabins remain, either at Gregory or at any of the other balds.

In rounding up stock, the herders needed corrals in which to assemble the animals. They called these corrals "ga'nt lots," for when many cattle were penned, the forage went fast and the stock became gaunt. Dim outlines of the ga'nt lots can still be seen, though it takes a bit of imagination.

One June day, Harvey and Anne Broome, Ernest Dickerman, a member of the Smoky Mountains Hiking Club, Otis Imboden of NATIONAL GEOGRAPHIC, Michael Oliver, and I hiked into Gregory Bald. It rained incessantly, and when we reached the top, fog rolled restlessly across the bald. The azaleas had watery growths on them, some of them half the size of a lemon. They are known as leaf galls, or "pinxter apples"; we used them to quench our thirst.

Michael Oliver—son of Judge Wayne Oliver and great-great-great-grandson of the original John Oliver—and I explored the bald carefully. Michael, already six feet two at 16 years, has the stride of a mountain man; he travels uphill as fast as downhill. This day Michael and I learned that a new animal had come to Gregory Bald. Wild hogs had been rooting there, looking for grubs. They trace back to wild boars imported from Europe by a hunting club twenty miles distant and long since disbanded. The wild boars have crossed with native hogs, and the offspring range the hills.

We mentioned the wild hogs to Randolph Shields. The Park Service has begun to remove the hogs, he explained. Until they are gone and can root up the ground no more, those who have ancestors in the graveyards in the Cove will be anxious.

THERE ARE "RAMPS" in the Smokies, namely wild onions, scientifically called *Allium tricoccum*. The mountain people ate both the leaves and the bulbs in the springtime. The custom is so deep-seated that Cosby, Tennessee, has an annual Ramp Festival.

John W. Oliver chuckled as he told me about them. "That's an onion that'll strong ye," he said. "One bite'll stay with a man fer days. The herders up Gregory Bald stunk up their cabin when they ate ramps. Sure is a survigrous plant. Only protection a man has is to eat some hisself."

Harvey Broome, who is a Knoxville lawyer and president of the Wilderness Society, visited the herder cabin at Spence Field in 1926, shortly before grazing on the ridges ended. Tom Sparks of Cades Cove was in charge. A rock fireplace was at one end of the cabin and a partition divided it, setting apart a bunkroom.

"We asked Tom if we could spend the night," Harvey told me, adding, "It was a mere formality, for a mountain man never refused lodging."

Tom replied, "Pull up a cheer."

Tom killed a sheep for supper. Steaks were fried over the open fire and bread baked in a Dutch oven. Some articles of food were referred to in the feminine. Bread or sheep was meant by the question, "Is she dun yet?"

After supper Tom Sparks "biled" some sheep over the open fire, telling one of his assistants, "Better give her some more water."

As they cut mutton to put into the bucket for "bilin'," someone said to Tom Sparks, "You'll never get all thet sheep in thet bucket."

Tom dryly responded, "Never is a long time."

They spoke of some foods in the plural. "Pass me them cabbage." "Is them molasses all gone?"

They told tall tales of hunting. Tom Sparks related how he came across a painter in the dark. "Hit was so dark I couldn't see nothin', and hit jumped on my back and began clawin' me. I never did see hit, but I tuk my knife and began cuttin' at hit."

In the morning before daybreak Harvey had been awakened by two of Tom Sparks's assistants, Jesse Cable and Franz Sparks, talking. Birds were singing outside and Franz said, "The birds is hollerin'." Jesse replied, "Yeah, they're hollerin' keen."

These mountaineers never took anything for a night's lodging or for a meal, unless they ran a hostel, as a few did. But there was always an offer and a polite refusal. That happened on Harvey's visit. And when Harvey left Tom Sparks some food. Tom of course offered to pay Harvey.

I had this experience of Harvey Broome's myself, over and over again, as I called on the former and present residents of the Cove on my various visits there.

"I am God-proud to see you."

"Come in and set a spell."

"Pull up a cheer."

"Come in and have some dinner."

"The latchstring's always out."

I never had a more hearty welcome anywhere in the world, stranger though I was.

These mountain people are apt to stand aloof until they know what the intentions of the "furriner" are. The tradition of "revenooers" appearing in the guise of friendship is strong.

But once the visitor is admitted to the inner circle, there is nothing the people of Cades Cove will not do for him. It is always difficult to get away. With Kermit Caughron, it was his wife's ice-cold grape juice made from their own Concords. "'Nother glass won't hurt ye." With John W. Oliver it was one more story, one more memory of people and places in the Cove, until a gathering storm drove us out.

"Weather does look a bit rancid," he said.

THE MOUNTAIN PEOPLE of Tennessee have become known for their songs and dances. But the people of Cades Cove did not go in for dancing, none but "the sorry fellows," according to John W. Oliver. "They did their dancing outside the Cove, mostly at Chestnut Flats, about six miles away."

These dances were apt to be accompanied by drinking brawls, and once in a while a "fray," where a man was killed.

"They went on for days," Judge Wayne Oliver told me. "One was reported to have lasted two weeks."

There were mountain fiddlers in Tennessee in the old days. But there were few in the Cove. The main center of social life was the churches, and they were barren of musical

"I have a rather about whar I'll be buried." They had a faith in God

instruments except for a tuning fork used by the man who led the singing.

There were at one time four churches in the Cove. The first—the Primitive Baptist—was organized October 16, 1827. A Missionary Baptist Church was next. Then came a Methodist Church (South), and finally a second Methodist Church (North). All buildings but the last are there today. But only the Methodist Church (South) has Sunday services now, held in summer for the campers.

John W. Oliver was long a preacher in the Primitive Baptist Church. Today the two Baptist churches have no regular service, but once a year, on the first Sunday in June, the Cades Cove people from the three churches return for Decoration Day services.

Last year about fifty adults and twenty children returned to the Cove to decorate the graves of their ancestors and to do them honor. The first service was at the Methodist Church. First, the graves were decorated; then the service was held.

The gathering moved on to the Missionary Baptist Church. Here, too, there were prayers and singing after the graves had been decorated. John W. Oliver preached. Mrs. Virgil Burchfield read the poem "Face to Face." George Noah Burchfield and his daughter sang "Precious Memories."

The group then adjourned to the Primitive Baptist Church, where the graves were decorated. Tables were set under the trees and lunch was served. Each family brought enough fare for all of "his'n," and more.

At this third service, John W. Oliver led in prayer. Five-year-old Georgiana Sharp spoke words of greeting. Libby Garland recited "In Our Little Town." Elder Charles Taylor and Elder George Taylor each gave an address. Mrs. George Feezell asked to make a reading —"Me and Pap and Mother." The service closed with "In the Sweet Bye and Bye."

These three meetings were community affairs. All the singing was led by 12-year-old Jimmie Taylor, who tapped out the beat with his foot. The recitations, the prayers, the addresses were by lay people—descendants of those who had brought civilization over the mountains to Cades Cove.

THESE ARE GOD-FEARING PEOPLE who take the Scriptures literally and order their lives by them. I remember visiting with Charlie and Mae Myers, both born in the Cove. Mae Myers explained how the social life had revolved pretty much around the churches.

"Thar were big meetin's of a revival kind when a preacher-man came in from the outside," she said.

The schools were a second center of social activity.

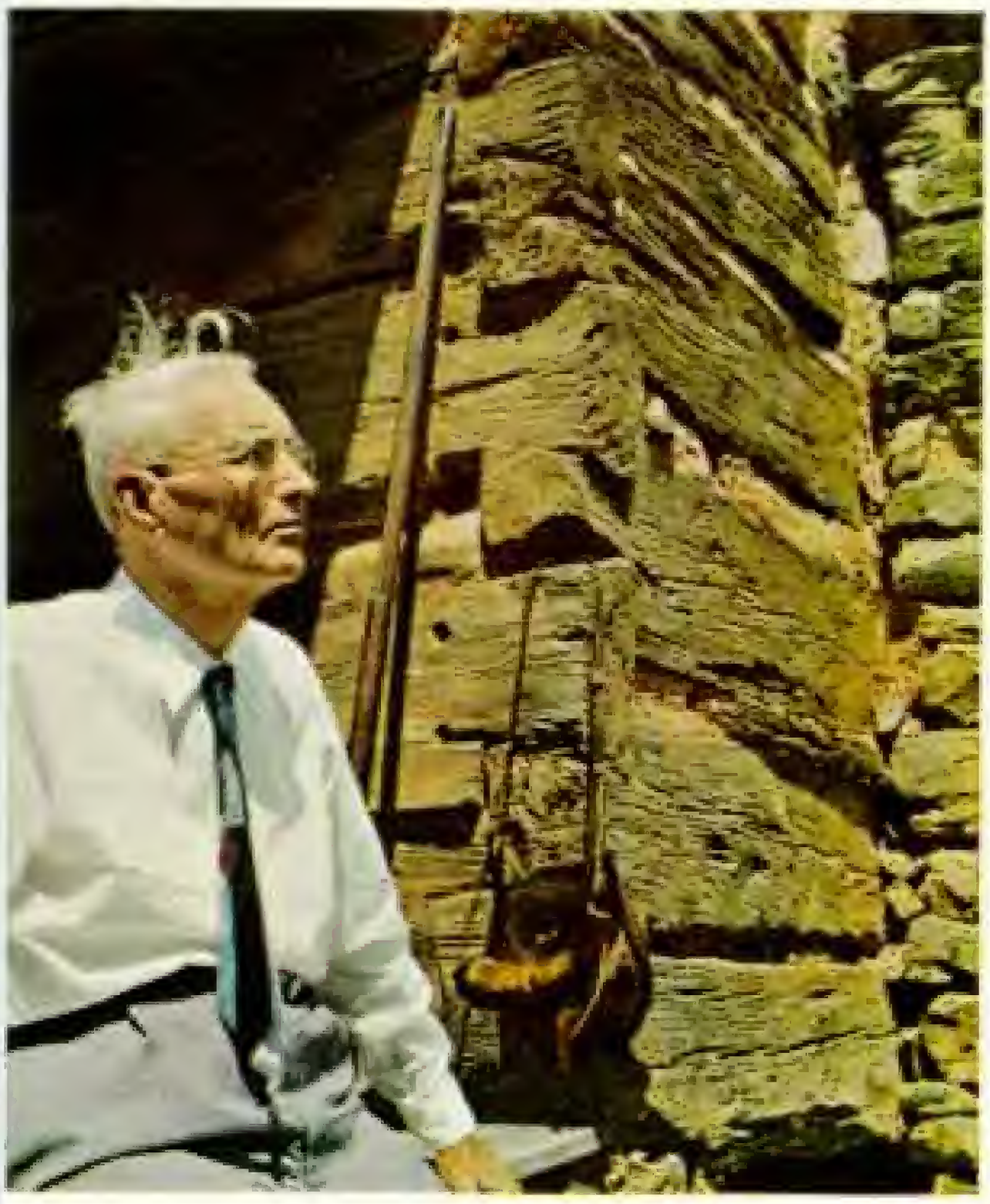
"When school closed, thar warn't no hoedowns," Mae Myers said. "But the children put on some mighty nice plays."

"Some were black-face," Charlie Myers added.

"Thar was singin' schools," Mae said,

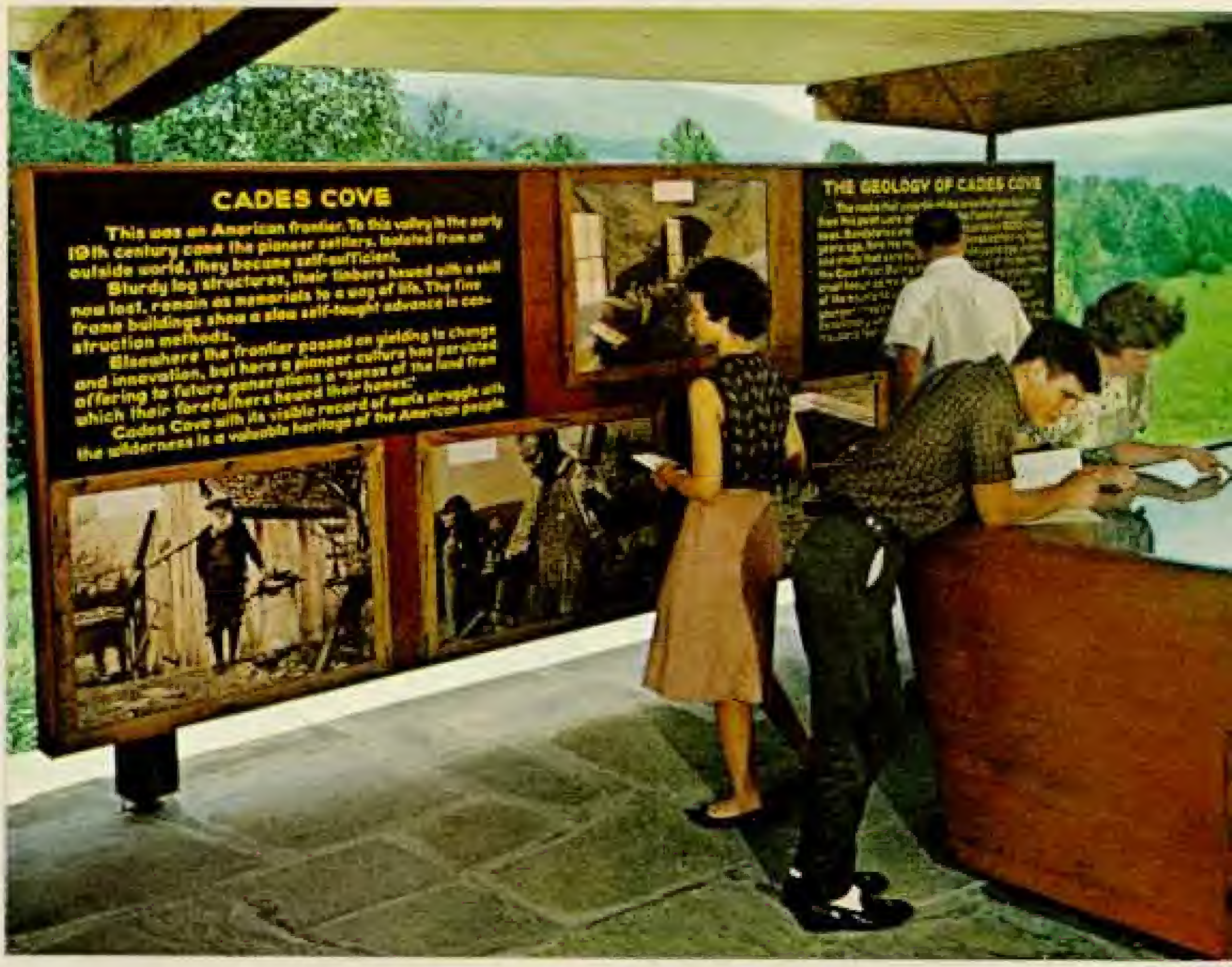
that made them giants among men.

"In the Sweet Bye and Bye"



Cades Cove, an inviting cup of meadowland rimmed by mountains and ridges, lies in eastern Tennessee, wholly within the borders of Great Smoky Mountains National Park.

John W. Oliver, Cades Cove's leading citizen, served its people as no one else, bringing them enlightenment and guidance in raising their standard of living.



The Cove is an area rich in American history. The first settler came over the mountains on foot in 1818, following an Indian trail. National Park Service exhibits at the Cove tell the story.

"and bean stringin'. Thar was quiltin' too."

Charlie Myers went on to say that the men pooled their labor in "corn shuckin'," in "hay thrashin'," and "house raisin'," and in "log rollin'."

"Log rollin'," I learned, was when neighbors assembled to clear a site for a home.

"There was serenadin' on Christmas Eve," Charlie Myers added. "Men and boys would go from house to house—firin' guns, ringin' cow bells, blowin' horns, singin' and yellin' until they war invited in." He said that once they were treated with nuts, fruit, or sweets, they moved on to the next farmhouse.

"It's a mite lonesome in the Cove nowadays," Mae added. "Only five families left."

The tourists stream by, but they are "furriners." There is companionship only with people who live "hyar."

"And so," said Mae, "we go clear to Maryville to church nowadays."

Charlie and Mae Myers are right—the life of Cades Cove lives only in memory. Yet it still is a powerful force in the affairs of men.

The people of Cades Cove were individualistic. So much so that they kept their speech fresh and inventive. They were dependent on their ingenuity and inventiveness to make a living out of a wilderness, to find survival for their babies, to face old age nobly.

They had a faith in God that made them giants among men. It came out in their prayers. When John W. Oliver led the prayers at the 1961 Decoration Day Service, he knelt and said:

"I am not ashamed to get down on my knees and pray as our forefathers did."

IT WAS NOT THAT ACT ALONE but the prayer itself which made me appreciate the stature of the people of Cades Cove. The prayer was of a people who, though in fog and darkness, knew there was high ground and sunshine ahead. They knew they had it within themselves to work their way out. The voice was the voice of those who would not be denied, who knew no defeat, who would surmount all obstacles.

Their prayer was a summons to all that is best in man. It was less a supplication than an announcement—a "give-out" as they say in the Cove, that man is strong and self-reliant, that with faith in God there is nothing he cannot achieve.

The secret of America's great strength was in people like those in Cades Cove, I thought over and again. The Olivers, Caughrons, Myerses, Shieldses, Burchfields, Cables, Coudas, Tiptons, Sparkses, and all the rest parade in memory as the kindest, most thoughtful, most generous people I have known. At the same time they were the proudest and the most independent. I found in Cades Cove the warm heart and the bright conscience of America. THE END

"A good b'ar would meat us for a month." Some cured bear middlings just as they cured hog middlings.

Cades Cove survives under care of the National Park Service, which requests that visitors respect the fields, fences, and weathered old buildings. This party lunches in a picnic area. I hated to leave the idyllic Cove because of its beauty and serenity.

I FIRST SAW the Parthenon, its time-scarred columns gleaming in the February sun, when I arrived in Athens with my fellow students. But full appreciation of what it meant did not come until later, when I moved temporarily into a Greek home.

For two weeks I shared the life of the Petropoulos family. At dinner, over servings of roast pork or yogurt, they taught me something of their language, their love of heated debate, and their fiery pride in a cultural heritage. For me, the Parthenon and all of Greece were enriched by the family I lived with.

Each of us in the International School of

America has his own personal memories—of the Parthenon and Taj Mahal, of Japanese flower arranging and life in divided Berlin. We were students fortunate enough to go to school while circumnavigating the earth.

We ranged in age from 17 to 21 years, and we came from all parts of the United States. One girl, Masayo Yamamoto, was Japanese. Three students had done college work, but for most of us this was a bonus year of study between high school and university.

All of our faculty, drawn mainly from United States universities, traveled with us. Experts from colleges along our globe-

Round the World School

By PAUL ANTZE

Photographs by
WILLIAM EPPRIDGE

strolling route also gave us instruction during our eight-month course. Where possible we stayed with English-speaking families.

A nonprofit educational institution, the ISA is the brain child of Karl Jaeger, who preferred teaching to running an Ohio factory that his industrialist father gave him. He heads the school and helps support it.

Mr. Jaeger set up a quartet of basic courses —humanities, social sciences, natural science, and French. Except for French, the program emphasized each country as we visited it. We spent two days a week in classes, three on field trips, and many weekends in travel.

Grecian glory of the Parthenon breathes life into the classics for students of the International School of America visiting Athens. During eight months of study, eighteen youngsters traveled 19,000 miles with their textbooks and teachers. In fifteen countries they learned by living and added a new dimension to their quest for knowledge.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

JAPAN GAVE US an unforgettable welcome. With the dawn behind us, we pressed to the windows of our jet plane to relish the sight of steep green valleys swimming in morning's mist, of jagged, ink-dark peaks brooding on the horizon. We had reached the Land of the Rising Sun.

We met our host students at Keio University. Bowing low, we each intoned, "*Doso yoroshiku*," a highly idiomatic greeting perhaps best translated, "Please be kind to this humble person." Most of the Japanese laughed, applauded, and responded with a handshake and "How do you do?" But my host, Takeshi Mori, apologized for his halting English.

"The language give me much confusion."

We scattered over Tokyo, each to his first weekend with a Japanese family. My room with the Mori family blended East and West. A bouquet arranged according to the ancient Japanese art stood atop an ultramodern electric clock. My bed was a traditional Japanese floor mat, but it rested on a fold-away couch. Outside the window, in Mrs. Mori's carefully kept and venerable garden, stood Mr. Mori's practice net for golf.

On a television set, tales of Japanese feudal times competed with sagas of the American West with dubbed-in dialogue.

I watched a showdown in Dodge City. Wyatt Earp, in white, faced a lanky villain.

"*Ju-o-sutero*" (Drop that gun), Earp commanded. But the villain defied the law.

Lead sprayed, and the dying badman gasped, "*Hoonkan ni ippon yararetu!*" (I was done in by the marshal). So peace returned to Dodge City and to Tokyo television.

In Japan our fellow student Masayo Yamamoto became the girl of the hour. "What does that sign say, Masayo?" we asked. "Where's a good place to eat?" "Masayo, how do I get home?" Besides being a guide and etiquette expert, Masayo was soon teaching the other girls how to wear a kimono.

Gradually we learned. As we coped with sign language, chopsticks, and sliding paper doors, we found warmth and affection in our foster homes. What seemed strange at first soon became delightful—the Japanese bath, for example. The tub, a wooden box three feet square and nearly as high, was only for soaking, Takeshi explained. Since the whole family used the same water in turn, washing was done outside with a sponge and basin.

"Very interesting," I thought, "and it doesn't look hard." Washed and rinsed, I tested the tub water with my finger. It was steaming.

I came out red as a lobster. But Takeshi

The Author: Paul Antze, 18, of Detroit, Michigan, was among students in the International School of America's second globe-circling class. He plans a career in writing.

Student tour began on the U. S. east coast and ended 10,000 miles later in London. From there the students came home independently, completing their circuit of the world and bringing their total travels to about 22,500 miles.

Hilarity reigns after classes at Tokyo's Keio University as an undergraduate entertains with an American song in Japanese-accented English. Edward Kern, ISA's field director, strums the guitar. Universities, schools, and clubs around the world lent rooms for classwork.

Beauties of East and West meet at Konan Girls' High School in Kobe, where special classes teach the traditional household arts of flower arranging and tea ceremony.

was right when he said, "House is cold, so you must get hot." The feeling of warmth lasted the whole evening despite the autumn chill.

But we learned more than customs. With curiosity sharpened by study, we began to see things we had not noticed before.

On our first day in Japan, Takeshi and I walked in a park overlooking the Tama River. "What would you consider the country's greatest problem?" I asked. Takeshi pointed down to the river swarming with small boats. "Too many people," he promptly replied.

Added to study of the population problem in our biology class was the impact of direct experience. At Japanese subway stations, special guards we called "pushers" had only one job—to shove projecting arms, legs, and backsides into the doors of grossly overcrowded cars. Once I saw several windows shatter as a train took a curve, throwing the sardine-packed occupants against the glass.

But there were solutions to the pressure of population. A government-sponsored control plan has brought the birth rate down; population is now almost in balance at 94,000,000. To improve diet, the Japanese are continually searching for new food sources, more nutritious strains of rice, and better crop yields through improved farming methods.

At a fishing village near Akashi, we saw cooperative methods in action—community-

owned boats, nets, drying racks, and cleaning tools—that can win better harvests from Japan's other major treasure house of food, the sea. The Japanese eat almost everything that swims, crawls, or grows in the sea, and we adopted the habit. We learned to enjoy raw fish, sea urchins, cuttlefish, king crabs, octopuses, eels—even seaweed.

Our visits to the ancient cities of Kamakura, Kyoto, and Nara, with their castles, palaces, and shrines, gave new meaning to our history lectures.

A topic in social sciences was the anti-American riots of June, 1960. We discussed the riots in an interview with Douglas MacArthur III, then U. S. Ambassador to Japan.

"Besides suggesting what we think the Japanese should do," the Ambassador urged, "let's try to see their side of the story."

We took the Ambassador's advice to heart. What, we wondered, was the viewpoint of Japanese students who took part in the riots?

Friends arranged for us to meet twelve members of the radical Zengakuren student organization. They came from Tokyo University and met us in a big classroom at Keio University. One or two spoke English; we talked with the others through translation by our Keio classmates.

"We did not want to harm President Eisenhower's press secretary, Mr. Hagerty," "Our purpose was not to cancel the President's trip—we only wanted to protest the treaty signed by our own government." "No, I did not myself take part in the riots, but my friends. . . ."

The discussion was noisy, animated, almost an uproar. It lasted a serious hour and a half. Then we all had tea and cakes.

What impressed us most, I think, about the Japanese outlook was the common love for beauty, subtlety, balance. We found that the traditional home, with its panel walls, stark simplicity, and uniform, almost drab, hues, is planned to be an unobtrusive setting for people, people often wearing colorful kimonos, people busy with their ceremonial arts.

When the time came to leave Japan, some real tears were shed both by ISA students and by our hosts. We had become enchanted with a land where flowers decorate even buses and public lavatories. . . . Where you can dabble in the stock market in any department store, or pick out a swimming fish dangling its own price tag. . . . Where coffeehouses play "Back home again in Indiana" at the sight of an American customer, and where they serve soup for breakfast—and you like it.*

*See "Japan, the Exquisite Enigma," by Franc Shor, in the December, 1960, NATIONAL GEOGRAPHIC.

Differences of political philosophy spark a lively exchange between John Hendry and two members of a radical student group from Tokyo University. Japanese and American students later discovered areas of agreement in religion, art, and music.

Reclining on a *futon*, Fred Rawe (foreground) bids goodnight to his "foster" family in Kobe. Painting of masks worn in *No* plays decorates the doorway. Rawe, like most ISA students, won high school academic and leadership honors.

HONG KONG, OUR NEXT STOP, brought us two weeks of intensive classwork—and more vivid impressions. Our billets well illustrated the crowded conditions in the British Crown Colony.* Most of our ISA boys stayed in Y.M.C.A. rooms—the best then available—so narrow that we could touch both walls by stretching.

Several girls stayed near a refugee area. "Those poor people were awake all night," one of the girls remarked. "and so was I."

After a few such nights, our hollow-eyed ISA girls were moved to quieter quarters.

Just as Hong Kong itself shelters the extremes of rich and poor, two of us were unbelievably lucky in our accommodations. Mike Andes and I spent two weeks in the home of Mr. Hari Harilela, an Indian-born representative of ISA. Mr. Harilela's three-story mansion—protected by solid steel gates—was a dazzling combination of maharaja's palace and luxury hotel.

In harsh contrast, we went into the New Territories behind Kowloon and saw narcotics addicts working in a rehabilitation camp. On a day's trip to Portuguese Macau, we stood a stone's throw from a mountainside commune of Red China. Talks with refugees made us feel fortunate indeed.

Our class studies gave us the same scene from a different angle, and we saw the refugees as fragments of humanity squeezed from the relentless mold in which the Communists are attempting to reshape old China. We discussed Confucius and his theories of society and state, weighing them against the men and ideas that rule the country today.

*See "Hong Kong Has Many Faces," by John Scofield, in the January, 1962, NATIONAL GEOGRAPHIC.

Recess Time in Hong Kong: Students Crowd a Junk

The British Crown Colony fades astern as *Sea Dragon* passengers pose for a class portrait. Refugees from Red China constantly swell the city's polyglot population, which now exceeds three million.

Lesson in transportation teaches Mike Andes that rickshu travel offers comfort and reasonable speed in crowded streets.

Lesson in bargaining educates the rickshu rider to a popular Hong Kong practice: debate over what is a reasonable fare.

THAILAND, A BRIEF HOP from Hong Kong, is the land James Michener has called "the joyous land." It is also among the most fortunate. With a long history of peace and independence, plenty of food and little disease, it has escaped many of Asia's hardships.*

In Bangkok a prevalent attitude was expressed by the words *Mai pen rai*—"it does not matter."

Our encounters with the drivers of *samlohs*, or three-wheeled scooter-cabs, bore out this mood. The drivers refuse to put meters on their cabs because they love to haggle. But they were never bitter, grinning even at a refusal. One driver agreed to take a student across the city for seven bahts (thirty-five cents), but got lost on the way. Finally reaching the destination, the driver asked ten bahts.

"Oh no," the student said. "You agreed on seven. Take that or nothing."

"All right," the driver laughed. "Nothing." And he drove away.

From scum-covered canals where Thai both swam and threw refuse, to TV studios, where stage hands searched high and low for a stray insect whose chirp rang mysteriously into the microphones, much of Bangkok seemed touched with comic opera. Take the Thai boxing match we saw one evening at Rajadammoen Stadium. Opposed were Prakae Petch, billed as "Bright star of Petch Chingchai camp, who loves to march in and bangs it away from gong to homestretch," and SreeSak Wongdeves, called "Blast-up star of Wongdeves camp, the good produce of the cauliflower industry of Bangkok."

To the accompaniment of reed horns, these two went at it in a whirlwind of punching, kicking, and gouging that drove spectators wild. Rules, obviously, would spoil the fun.

Hand in hand with Thai whimsy goes a reverence for the past. We toured Bangkok's great temples, inspected the dry docks of the royal ceremonial barges, and watched an exhibition of Thai classic dance.

But could such a tradition-bound people adapt to the needs of today?

Two field trips gave an answer. First, at Saowapha Institute we saw snakes milked for venom to produce antivenins. Medical technicians explained promising research in rabies treatment. At Kasetsart University we observed laboratory work in the genetics of cattle and rice. The brisk competence of Thai scientists impressed us tremendously.

Before leaving Bangkok, a number of us took college board examinations, sealed tests that could be opened only on the same day they were given in America. Then, with our completed exam papers turned in for mailing, we were off to India.

*See "Thailand Bolsters Its Freedom," by W. Robert Moore, NATIONAL GEOGRAPHIC, June, 1961.

Rubbing rice paper with blue paint, James Pollock traces a marble carving that adorns Wat Po temple in Bangkok, Thailand. Panels illustrate the *Ramayana*, an ancient Sanskrit epic of an adventurous prince. A passer-by from the city's American colony pauses to watch.

Bejeweled Bangkok Outsparkles the Moon

Sequin lights spangle trees outside the grounds of the Temple of the Emerald Buddha as Bangkok prepares for the King's birthday. Glittering bracelets ring the spire of the Golden Chedi; the Pantheon wears a shimmering crown. Shadowy roof-peaks suggest the graceful arms of dancers.

Hands express the thought and feeling of Thailand's classic dramas. Aspiring actresses at Bangkok's Phakavali Institute captivate ISA's Diana Layne, a student of ballet (center). Many popular plays derive from the *Ramayana*, pictured in the bas reliefs at Wat Po (page 104).

Turbaned merchant of New Delhi extols his wares—hand-painted bowls and plates of paper pulp molded by Kashmir artisans. His customer, Lucy Langohr, earned part of her ISA tuition by selling metalwork and jewelry that she created.

Prime Minister Nehru talks informally with author Anne of India's colorful past and problem-filled present during an interview in Delhi. Nehru voiced pride in his country's spirit of tolerance for diverse faiths and races and said he regarded the nation's unification problem as basically solved.

Holy city of Banaras, now officially renamed Varanasi, drew ISA members with its temples, fakirs, and hordes of pilgrims. Venturesome Diana Layne lets a seven-foot python writhe about her shoulders; the snake belonged to a Banaras fakir who performed for the students.

INDIA HAD A STRONG IMPACT on all of us, partly because so much of our course work concentrated on that ancient land. In biology classes, Dr. Joan Rahn had been lecturing on the overpopulation problem; in social sciences, Dr. Kazuo Kawai had stressed the historical background; in humanities, Dr. Philip Appleman had lectured on Hindu traditions and literature.

The capstone of our Indian experience came when Prime Minister Jawaharlal Nehru invited the ISA to tea. For days we had been writing and revising questions to ask the Prime Minister; we had brought our tape recorders so the whole interview could be preserved. Finally the hour arrived, and we sat cross-legged on the carpet of the Prime Minister's drawing room. Nervously, Mike Andes opened the interview:

"Mr. Prime Minister, I've been rehearsing this question all day, so I'll probably get it wrong now, but. . . ."

Mike did not get it wrong, and soon the air relaxed. Lucy Langohr finally asked the question that had occurred to us all:

"Mr. Prime Minister . . . you look so young and healthy—how do you do it?"

"Well," answered Mr. Nehru, "there are various reasons." He chuckled. "One of them is that I've spent considerable time in prison."

He became serious: "There has to be a curious mixture in a man, an element of concentration on what one has to do and yet—what shall I say—vagabondage. You must be tied up in the job you're doing and yet be slightly apart from it. You can't let it eat into you."

Mr. Nehru also gave us an apt summary of India's paradoxes: "When you have to deal with a society which is very ancient, with roots thousands of years old, you find advantages and disadvantages. . . . If you pull your roots out of the age-old soil that has conditioned them, you become rootless, superficial. . . . We have to keep those roots and yet change—and flower and put out branches. This is the challenge India faces today."

He concluded with a lesson from the life of Gandhi: "If your means are wrong, then your good objective won't save you. Wrong methods will lead you away from the good thing and hand you somewhere else."

We received our most vivid impact from India when we saw the varied faces of the people: fanatic sun watchers, snake charmers, contortionists, turbaned Sikhs and bathing pilgrims; naked holy men and business executives wearing Oxford gray.

At 5:30 one morning in Calcutta, I slipped out of my hotel room to do some exploring on

my own. Dr. Kawai had already warned us:

"Beware of thieves in the Calcutta slums. Don't show your money to beggars."

Outside the hotel, on Calcutta's main thoroughfare, I found a peaceful scene. Except for an occasional trolley, the street was empty. I walked around a corner—and promptly entered a different world.

In a small side street, groups of moving figures were silhouetted against the dawn. Turbaned, some of them carrying baskets, they moved silently to avoid waking those still sleeping on the sidewalk. Others were getting themselves cleaned up for the day. For toothbrushes they used a plant stalk called neem; its fibers form the bristles and the plant juices serve as toothpaste.

While watching this sight, I very nearly stumbled over four men squatting around a brazier. Three of them sipped from earthenware cups and a fourth tended the fire. I was seeing a portable one-man restaurant. When the customers had finished, they paid the proprietor, picked up the cups and smashed them on the ground. Cups are destroyed, I learned, to prevent the spread of disease.

The streets seemed ruled by animals. A plodding sacred cow brought a taxi to a screeching halt. And baboons stole the show. They sat on window sills, hung from drain pipes, and shambled along as nonchalantly as if the city were their jungle home.

Violent Encounter Ends Happily

As the daylight increased, I noticed an alley with a dim passageway beyond. About four feet wide and forty long, it crossed another alley at the end. Curious, I entered the passage. On each side crude holes in the wall served as both doorways and chimneys for the one-room homes inside.

As I neared the end of the passageway, a shadow on my left suddenly sprang to life, bellowed, and seized my arm.

"Vat are you doing in my home?" growled the voice.

"No!" I yelled. "It's a mistake!" I felt myself being dragged into the light.

"Vat are you doing in my home?" he repeated. He was a hard-looking fellow with deep-set eyes, big frame, a poorly kept beard, and a dirty turban.

"I—I thought it was a passageway," I explained.

Seeing that I meant no harm, he smiled, then led me to an alley wall.

"Spell your name," he said. And as I complied, he took a stone and scratched the letters on the wall to impress me with his literacy. Except for upside-down *A*'s and a backward *E*, he succeeded.

"You print very neatly," I observed.

"Ah, tenk you," he said. He then showed me to the street, and as we passed his home again, he pointed to a 5-foot wood-and-cardboard addition above the ground floor. "You see, second story," he said. "I live better than most people here. Any time you come again, you alvays velcome in my home." We shook hands solemnly, and I took my leave.

Vegetarian Fare Weakens Iowan

We were welcomed to other Indian homes —more smoothly but with the same open hospitality—when we arrived in New Delhi. Most of us stayed with government officials. The girls packed away their finery from Japan and Thailand and learned to wrap saris. David Rowe practiced turban-tying and then learned basic yoga from his hosts.

But I still considered myself the luckiest when I met my hosts, Mr. I. K. Gujral, Vice President of New Delhi's Municipal Council, and his charming wife Shiela.

"If a woman has leisure time," said Mrs. Gujral, "she should devote it to the betterment of her people." Thus she explains her own pursuits as a biographer, author of poems and short stories for children, and a devoted worker in the fields of education and child welfare.

Charlie Keen had a more difficult billet. A husky 4-H farm boy from Iowa, where his father raises beef cattle, Charlie found himself living with a family of vegetarians.

"I don't want to hurt their feelings," he told us after two days. "But I'm getting weak." Mr. Edward Kern, our field director, then conspired so Charlie could slip away regularly—to a restaurant.

Friend's Trailing *Dupatta* Guides a Blind Woman Past Delhi's Famed Red Fort

Derby-domed cupolas cap lofty Lahore Gate, main entrance to India's once-lavish sandstone citadel. Mogul Shah Jahan, emperor-architect of the Taj Mahal, completed the fortress in 1648. He studded apartments with gems and installed a throne valued at $30,000,000. Indian troops massacred 50 captive Britons here in the Mutiny of 1857.

THE BIBLE LANDS

at Christmastime were our goal as the Constellation droned westward from Delhi. Then we landed at Beirut, Lebanon, and faced a crisis. "You cannot go on to Jerusalem," officials told us. "Lebanon has a bus strike. There could be violence."

But while we waited in despair at the airport, one of our instructors made some quiet negotiations and found two buses from Damascus that were not on strike. We piled in while attendants warned, "If the crowds throw stones, get on the floor."

But no one threw stones, and we learned an important lesson about the Near East: a crisis can be exaggerated.

Our bus followed the road that once led the harsh Saul of Tarsus—later to become St. Paul—from Jerusalem. We crossed the River Jordan, skirted the arid shores of the Dead Sea and Jericho's ruins, climbed through Bethany and around the Mount of Olives, and spied Jerusalem outlined against the sky.

At one point Mr. Kern pointed to a classic hillside scene: three humble travelers, each leading a camel toward the Holy City. For a moment it seemed to us that time had stopped in this season of the Three Wise Men.

For most of us, Christmas Eve itself proved a disappointment. We arrived in Bethlehem after a hard bus ride. Hoping to find the dreamy village of the Christmas carols, we found instead a crowded, noisy town awash with floodlights. Outside the Church of the Nativity, where we attended midnight mass, a loudspeaker ironically blared a scratchy recording of "Silent Night."

But Christmas was not lost. Next morning we explored Jerusalem, attending services at several churches, retracing the Stations of the Cross, prowling changeless streets, and feeling closer to the drama of Jesus' life and martyrdom.

At dusk we returned to our hotel. Several of our party trooped into the reading room singing "Joy to the World." The rest of us turned off the lights, stuck candles on saucers, and joined in an impromptu caroling session.

Roger Majak, whose voice had won him a national American Legion public-speaking championship in 1959, read aloud the story of the Nativity. We felt the warm thrill we had missed the night before. "At last," said Mr. Kern, "we've had our Christmas."

Jericho's stone tower, unearthed in 1953 by Britain's famed Dr. Kathleen Kenyon, basks in Jordan sunlight. Built about 8,000 years ago, the bastion defended the oldest known walled town.

Picture of patience, an ailing camel rides a makeshift ambulance. The rubber-tired cart rolls along Cairo's Shari El Corniche, a palm-fringed boulevard that borders the Nile.

Magnificent treasure of Thebes, the solid-gold coffin of Tutankhamun graces the Egyptian Museum in Cairo. Scientific exploration of the boy-king's lavishly furnished tomb, found intact in the Valley of the Tombs of the Kings after three thousand years, remains one of the greatest archeological events of the 20th century.

EGYPT. FAMILIAR AS THE LAND of sun-scorched desert, surprised us in January. As we traveled south from Cairo, Fred Rawe sat in a corner of the railway coach, shivering in his jacket. Sand sifted through the window frames.

"We'll be f-f-frozen to death by morning," he said through chattering teeth.

But morning brought a different crisis. Arriving at Luxor in the height of the Egyptian tourist season, we found that our request for reservations had gone astray. There was not a spare room in all Luxor.

The manager of one hotel took pity on us.

"I can promise nothing, but let me see what I can do," he said. He returned a few minutes later, followed by several maids and cooks who eyed us with friendly interest.

"We can do it," said the manager victoriously. The girls would crowd into regular hotel rooms; the boys would move into a kind of barracks behind the hotel—usually the quarters of the hotel servants.

"We can stay with friends," a houseboy explained. So our stay in Luxor took on the spirit of a house party. The hotel servants became our companions and even joined us in some pranks played on the faculty.

The great ruined temples of Karnak and Luxor overwhelmed us. So did the Valley of the Tombs of the Kings, and those solemn stone portraits of Amenhotep III, the Colossi of Memnon. As our group walked among the towering colonnades and gigantic statues, we couldn't escape a feeling of almost oppressive power.

But as we walked among those majestic ruins of the past, pathetic reminders of the present tagged after us—troupes of ragged beggar children. Here was the paradox that confronted us more than once on our travels, the contradiction of the genius and the fallibility of man.

From the sculptured splendor of the Pharaohs, we returned to Cairo and midyear examinations.

Defying time, the Great Pyramid and Sphinx shadow desert dunes near Cairo. Forty-five centuries ago, thousands of slaves labored beneath broiling sun and flailing whips to erect King Khufu's towering tomb, hewing and raising stone blocks of as much as 15 tons. A few years later artisans chipped the lionlike figure of King Khafre from a knoll of rock. Students scaled the 450-foot pyramid in 25 minutes.

Work horse of Egyptian waterways, a lateen-rigged felucca sails a dusk-shrouded Nile. Similar craft plied the river as ferries and freighters in the days of the Pharaohs.

Forest of pillars testifies to the onetime magnificence of the Temple of Amun at Karnak. Bundles of papyrus plants inspired the columns' shape 33 centuries ago.

TURKEY AND TIMELESS ISTANBUL

quickly won ardent devotees. Many Turkish laws still on the books stem from Justinian's reign, in the days when this city was Constantinople. Local scholars helped us trace the rise and fall of numerous civilizations from two continents that had flowered and faded here where Asia and Europe meet.

We saw the mighty Rumeli Hisar, or European Castle, and the great mosque of St. Sophia, built by Justinian as a Christian cathedral. We admired the Byzantine chapel of Kariye, the Sultan's Topkapi Palace, the Roman cisterns. In these and other monuments, we perceived how antiquity lay over this great city—a metropolis with as rich a texture as a Turkish carpet.

But we did not slight modern Turkey. The United States Information Service arranged excellent lectures for us, and one day Lt. Col. Turhan Cağlar, then head of Radio İstanbul, invited us to his station.

In response to one student's abrupt question, "How do you start a revolution?" the cherubic colonel obligingly explained how he had been among a handful of military men who on May 27, 1960, had overthrown the government of Premier Adnan Menderes. Student Janet Rogers later witnessed a tense day in the trial of Menderes, accused of high crimes against the state, a trial that led to his execution in September, 1961.

Our classroom in İstanbul was a room in the Turkish-American Language Center. It commanded a wide view over the Bosporus and Golden Horn. Outside, winter quietly gave the city a fairy lightness, for all the mosques, floating beneath their minarets, were haloed in falling snow.

Our professors spelled out for us the changes wrought by the social revolution that has swept Turkey in the past 40 years. The cultural about-face engineered by Mustafa Kemal Atatürk, first President of modern Turkey, even changed everyday habits of the people: women's faces were unveiled and the Roman alphabet replaced Arabic script.

"If you're wondering where the new Turkish culture is going," a Turkish woman social worker told us, "just look at the teen-agers in İstanbul. They're enthusiastic over everything American."

Since most of us were living with teen-aged hosts, we had already noticed her point.

Lucy Dances the "Charliestone"

"We were at a professional basketball game between Turkey and Israel," Lucy Langohr told us one morning. "Before play began, the Turkish star, Ali Baba—he was my date later in the evening—traded bouquets with the Israeli captain. Then he kissed his flowers and threw them to me. Someone yelled '*American!*' The whole audience burst into cheers, and two photographers flashed away at me.

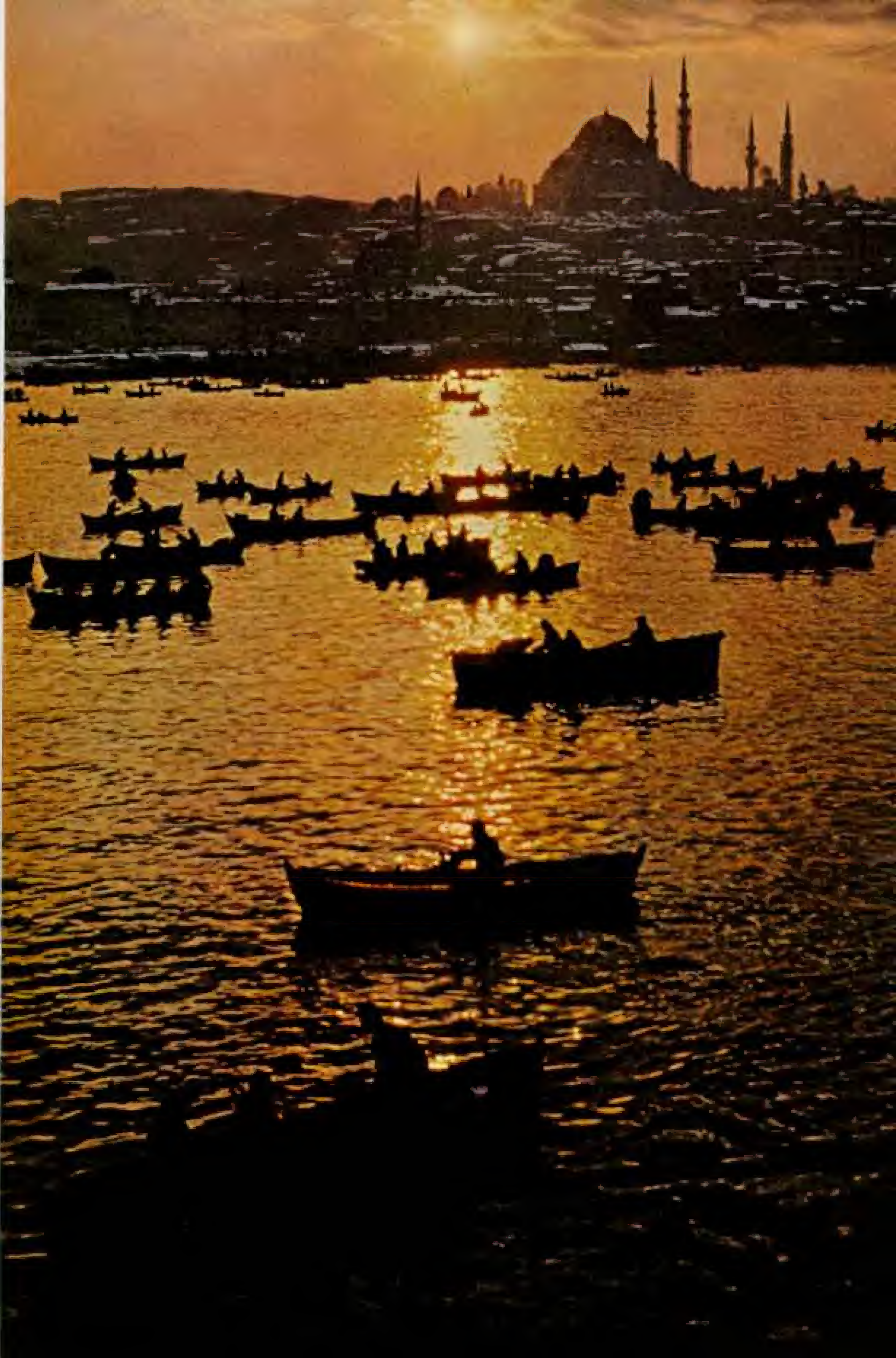
"At a nightclub after the game," she said, "they insisted that I demonstrate the 'Charliestone,' as they called it. My performance—and it was pretty corny—brought wild shouts for encores.

"Afterward, six carloads of Turkish students followed us home, just to wish me '*Allahsmarladik*'—'May Allah go with you.'"

Sunset Fleet Fishes in the Golden Horn

Trailing handlines, Istanbul anglers harvest winter waters where tunnalike palamut feed in vast numbers; they often take feathered hooks as well as bait. Twilight plates the estuary with bronze; frosted rooftops glint with snow. Scaffolding webs minarets under repair at the Mosque of Suleiman the Magnificent.

Turkish schoolboy of Küçükbakkal near İstanbul reads his geography homework for his classmates and American guests.



GREECE SEEMED LIKE HOME. We felt that we had returned to the roots of Western culture.

On my first day in Athens, after walking across the city to visit the Acropolis, I learned there was an admission fee of ten drachmai (about 33 cents). My fingers probed empty pockets. I had just turned away when a Greek boy inside the gates hailed me.

"You!" he shouted. "Come up here!" When I reached him, he smiled and said, "No money, huh?" I explained that I'd forgotten to cash a traveler's check. "Here," he commanded, "you see Parthenon. Take this." He handed me ten drachmai, then dashed away.

I came to realize that this was not simply generosity. It was a sign of the strong pride today's Greeks have in their country's past.

We also encountered stubborn resourcefulness, a vital trait in a land of scant resources. In Olympia we visited the ancient stadium grounds. A local photographer took pictures which he hoped to sell to us.

"You're wasting your time," we told him.

Two hours later, as our bus was climbing a steep pass forty miles from Olympia, a motorcyclist shot by and signaled us to stop. Our photographer friend emerged from a cloud of dust, jumped on the bus, and waved a sheaf of prints. "Anybody want to buy pictures?" he asked. It was a sellout.

Priceless relics of an early civilization surround James Pollock as he takes notes at the Athens National Archeological Museum. Here a world-famous collection of ancient Greek art kindled student curiosity about the culture that produced it. Standing figure of a young man, called a *kouros*, once adorned a tomb.

Avenue of antiquity, Rome's Appian Way knew the tramp of Caesar's legions, the shuffle of slaves, the thunder of chariot wheels whose marks can still be seen after 2,000 years. Cemeteries for Roman noblemen once lined the thoroughfare. Fragments of their grave markers pattern a wall beside vine-covered Casal Rotondo, largest tomb along the route.

ITALY PUT OUR POWERS of assimilation to new tests.* In Rome a visitor with time and sound legs can easily walk through three thousand years of history.

Ross Holloway, an American Academy archeologist, peeled back the layers of time for us in the 11th-century church of San Clemente. Beneath its floor we found a fourth-century basilica and groped farther down into foundations of second-century houses where exist the remains of an altar to Mithra, Persian god of light and truth.

An art scholar named Ian Taylor instructed us in "looking selectively." He would say, "Fix the lower part of this church façade firmly in your minds, but don't look at the upper—it's a 19th-century reconstruction."

Clipboards constantly in hand, we scribbled volumes of notes. And so through hearing, seeing, writing, reading, even through smelling and tasting (we marveled at Roman food!), the learning process went on.

Walking through Rome's past, we had to keep alert to the hazards of the city's present. An Italian student explained the secret of street crossing:

"You see those white stripes? They're called 'zebras.' Any time you want to cross the street, you walk on them and the cars aren't allowed to hit you. If they do, then there's the law."

"The law?" I asked.

"Yes. They have to pay for your burial."

By way of Florence, we moved along to Geneva, Switzerland, where the highlight of our stay was a reverse twist that Mr. Kern applied to our training.

"For months now you have been led," said Mr. Kern one morning. "Now we'll test your initiative as independent journalists."

We called it the Swiss Village Project. Mr. Kern gave each of us a slip of paper with the name of a village on it.

"You'll have to find the place on the map," he said, "take a train or bus or bicycle there, hunt out something interesting about the town, and write it up. You all know enough French now to make your own way."

On the morning after this adventure, strange tales were told. One boy had found himself in the village where Voltaire once lived, and another used his interest in archeology to talk his way into a crumbling abbey. One girl worked in a factory that made candy Easter eggs, and Mark Lohman rode along beside a bike-borne policeman who claimed his two-wheeler was the best possible vehicle for the pursuit of robbers.

*See "United Italy Marks Its 100th Year," by Nathaniel T. Kenney, NATIONAL GEOGRAPHIC, November, 1961; and "Rome: Eternal City With a Modern Air," by Harnett T. Kane, NATIONAL GEOGRAPHIC, April, 1957.

BERLIN, WHERE CRISIS succeeds crisis with almost the regularity of the seasons, seemed to sprawl in all directions as our plane circled to land.

On one side a brilliant net of neon spread outward from Kurfürstendamm, its glow flung high into the black sky. Streams of traffic coursed along the arc-lit autobahns.

On the other side the glare was cut off as if by a drawn blind. Beyond lay a sea of darkness sparsely strewn with street lamps. The plane's landing lights briefly picked a shattered wall out of the gloom.

Our students, faces pressed against the plane windows, were meeting the fundamental fact of Berlin: It is a divided city.* For the first time since India, we became totally engrossed in the momentous questions of the present and the future.

At the Albert Einstein School in West Berlin, Mary Wohlford and I talked with a tall, intense boy named Helmut, who had fled East Germany several years earlier. Quietly he explained that he had escaped because "they would have made me do things against my beliefs."

"What do you mean?" I asked.

"Well, I wanted to go to a university. I knew I couldn't get in without joining the state-run Freie Deutsche Jugend (Free German Youth); my loyalty would be questioned, you know. Anyway, I wouldn't do it."

"Why not?" Mary asked.

"It tries to turn young people into party workers. If you join you have to take part in their 'spontaneous' demonstrations. You may even be sent to West Berlin for espionage."

We visited East Berlin (before the wall was built), and I saw thousands of people attending a government official's funeral. A popular man, I thought; then a West Berlin bystander showed me something I had overlooked—armed guards on the crowd's fringes to make sure nobody left.

Enjoying West Berlin's cultural riches, we

*See "Life in Walled-off West Berlin," by Nathaniel T. Kenney and Volkmar Wentzel, NATIONAL GEOGRAPHIC, December, 1961.

Second-century splendors of Rome appear in miniature in the city's Museum of the Civilization of Rome. Giant horseshoe of the Forum lies to the right of the ring-shaped Colosseum. Tub-like Stadium of Domitian dominates the foreground. Guide, who seems to wade the Tiber River, faces the Circus Maximus.

Clasped hands bespeak friendship in the West Berlin home of Dr. Gerhard Lütgert, where plaid-shirted Mike Andes stayed two weeks. He later wrote to the family, "After living with you in your divided city, I understand much better the meaning of peace, freedom, and democracy."

thrust aside the image of the city as a cockpit of crisis. By twos and threes we went off to an opera or an oratorio, or stood in wonder before the superb Rembrandts and Rubenses in the Dahlem Museum. Yet neither these tranquil pastimes nor the gay lights of Kurfürstendamm could completely push back the proximity of the Iron Curtain.

But in the solid comfort of the Gerhard Behnke home in West Berlin's district of Zehlendorf, the external threats to Berlin seemed remote and improbable. The Behnke house was of stone, and conservative in style, but a remote-controlled magnetic gate betrayed a flair for modern gadgets.

Herr Behnke, an able finance lawyer, was a man whose jovial humor easily overcame the language barrier. He was learning English, and was delighted to use me as a captive audience for conversation practice.

Even for a German woman, Frau Behnke was incredibly industrious. One day I came home to find my second pair of shoes gone.

"The heels looked a little worn," my hostess said, "so I sent them to the shoemaker." She refused to let me pay for the work.

Meal Lasts All Evening

The Behnkes were no exception to the German fondness for substantial food. Breakfast each morning was a stack of pumpernickel slices and a vast array of sausage.

As I left for school, Frau Behnke stuffed an extra sandwich into my coat pocket. "You might get hungry during classes," she said.

When I got home in the afternoon, it was time for "the coffee," the beverage being secondary to big chunks of pastry and meringues smothered in whipped cream. If I studied past ten, the Behnkes' daughter, Birgit, would poke her head into my room and say, "You are perhaps hungry?"

"Hungry?" I began. "I just. . . ."

"Good. I have made a small snack." The "small snack" was a huge bowl of pumpernickel sandwiches, salad, and a bottle of beer.

Sometimes we combined supper and snack into a single meal that lasted most of the evening, while Herr Behnke expounded with Germanic thoroughness on the financial complexities of Berlin's position. The discussions were refueled by a bottomless supply of beer.

At the end of World War II, the Behnkes, like most Berliners, East and West, were left practically penniless. Now, 17 years later, they and the vast majority of their West Berlin neighbors enjoy a prosperity comfortable by anybody's standards.

PARIS, ONLY TWO FLYING HOURS from Berlin and a wind-driven March snow, had put winter behind. A warm breeze ruffled the unfolding leaves and blossoms of the chestnuts along the boulevards, and the city's sidewalk cafes overflowed.

Still, our classwork competed with the wonderful distractions. The French, inclined to believe that American students do too many things besides studying, were amazed at how hard we worked. They hefted our green cloth bookbags—about 20 pounds of reading matter—and gave appreciative "uh-huhs!"

Newly minted Dauphine bodies glide overhead

Certainly, a lot of work was behind us. Throughout the trip, we had struggled through reading assignments that totaled nearly 400 pages a week. Our French instruction paid off here in Paris, where even first-year students could follow much of a Molière play we saw at the Théâtre de Français.

But it was springtime in Paris and wanderlust possessed us. Mike Andes, my roommate, laid out a schedule of afternoon walks that would take him through every part of the city at least once. "And if that doesn't work," he explained candidly, "we can use this ladder to sneak out after Mr. Kern's curfew."

Our roamings introduced us to the elegance of a Dior fashion show. They brought us to the tiny church of Ste. Chapelle, its floor a kaleidoscope of color projected by the sun through stained-glass walls.

Wandering in the Luxembourg Gardens, we heard metal balls thump on the dirt as families played the national game of *boules*. And dawn caught us homeward bound from after-opera onion soup and snails at Au Pied de Cochon (At the Foot of the Pig).

The honesty of Parisians impressed us.

as 18A pupils study a Renault production line in Flins, France. Plant assembles 1,400 cars a day

Posing as sidewalk artists in Paris, Nell Johnson (left), and Lucy Langohr compete with professionals behind the Cathedral of Notre Dame. Here, with chalk and crayon, they sketch the Madonna and Child. Mite box and multilingual sign invite contributions.

The girls collected a crowd but only 3 francs (60 cents). They used part of the money to buy a newspaper from an English boy who was earning his way to Italy. They also bought ice cream from a vendor who had been their heaviest contributor.

Dazzling Eiffel Tower Seems Poised for a Trip Into Space

Girders gilded with light pierce the Paris night to loft a beacon 984 feet. From this height students surveyed the vast panorama of the French capital. Though a guidebook said they might sight the spires of Chartres Cathedral 55 miles away, poor visibility deprived the visitors of such a view. Trademark of Paris, the tower rose for the Universal Exhibition of 1889.

Street lamps scatter stars along the Pont d'Iéna; Avenue de New York (foreground) runs past the park of the Palais de Chaillot.

One day Mary Wohlford left her purse—it held her passport, air tickets, cash, and traveler's checks—in a car of the Métro, the subway of the French capital. In three days it came back to her intact.

We found Paris an extraordinary epitome of man's achievements—and problems. There was sobering realization, when confronted with the Winged Victory of Samothrace, that as many as 23 centuries ago man was as facile in artistic expression as he is today.

Even more sobering was a visit to Supreme Headquarters, Allied Powers in Europe, where a dapper French officer lectured on what would be the Allied response to "someone pushing the war button."

On our last day in Paris, Mike Andes and I paid the price for oversleeping. When we woke, we found our airport bus was long gone. In panic, we dressed, packed, and rushed out to find a cab.

"The airport," I told the driver desperately. "*Allez très, très vite!*"

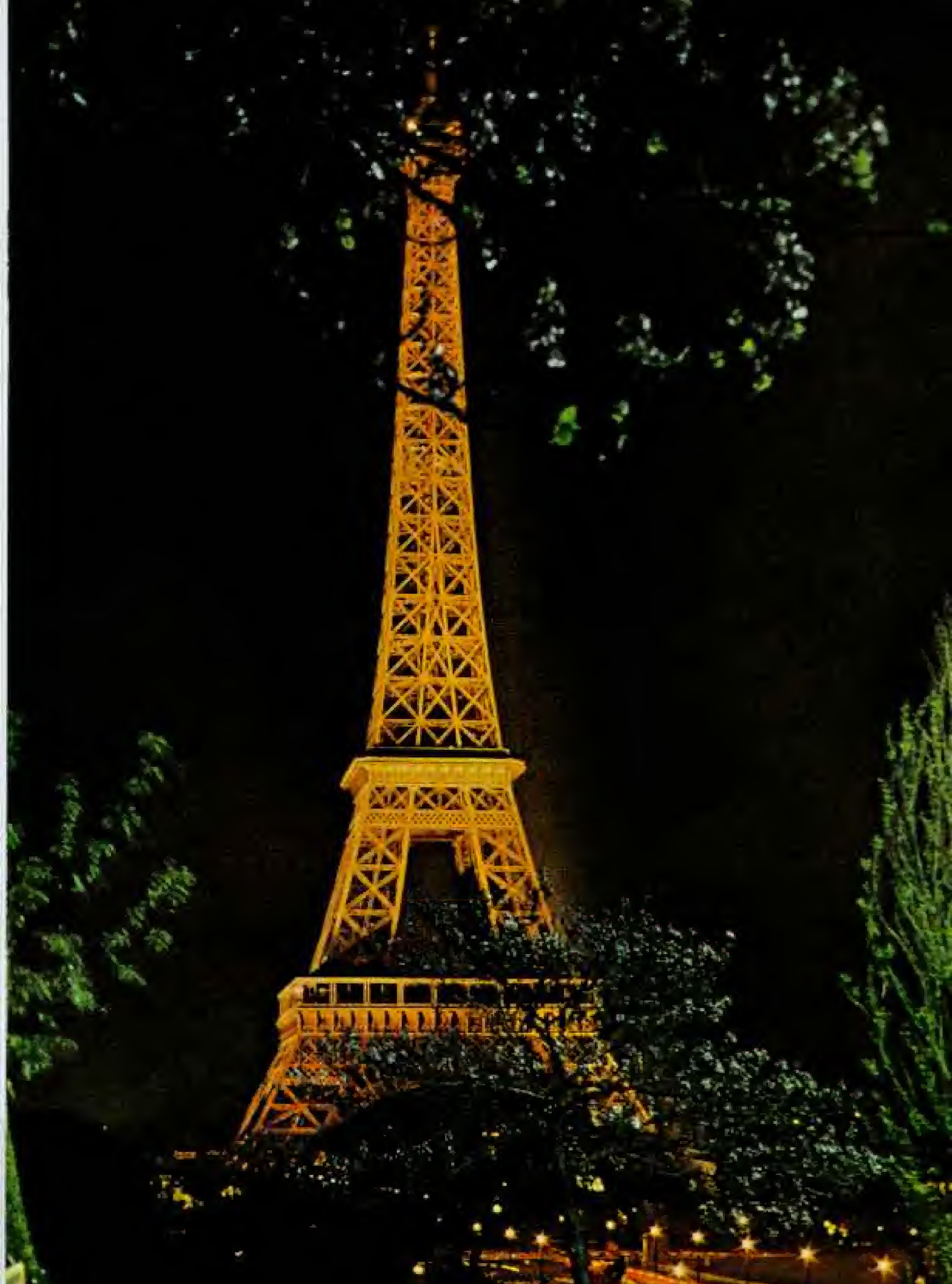
The taxi screeched away from the curb, but even 70 miles an hour was not enough. We reached Orly just as our jet lifted off.

Discouraged, we went to the ticket office and talked our way onto the next flight. We had no idea how lucky we were.

"You actually made it!" our friends exclaimed to us in London.

We wondered why they were so surprised.

"Haven't you heard? The Algerian generals are in revolt, and President De Gaulle has closed all French airports. You got out on the last flight!"



ENGLAND DELIGHTED US, but our delight was dimmed by awareness that our trip was near its end.

Mr. A. E. Joll, our honorary representative in London, is a retired civil servant and a stickler for appearances.

"There are occasions in this country," he said, "when you should wear your best bib and tucker. In this, as in other ways, we are perhaps a bit different. England isn't Europe."

No, the British Isles aren't Europe, or any other place. But we saw that today's England still defends the historic rights of man. When the Committee of 100 (the Bertrand Russell group that opposes nuclear weapons) planned a procession, we went to watch.

Everything went smoothly at first; the line of bobbies on either side of Whitehall didn't faze the hundreds of marching demonstrators. Then another police line sprang up before them, a solid wall this time, blocking off the road. The procession shuffled to a halt.

Hyde Park humorist Billy MacGuiness entertains with lighthearted oratory in London's open-air forum. Giving friendly challenge, ISA speakers mounted nearby soapboxes.

Shoeless ISA students pinwheel their punts as they try a favorite British pastime on the Cam River at Cambridge.

"We haven't anything against demonstrations," the senior police officer explained, "but we can't have you disturbing the traffic like this. I'm afraid you can't go any further."

"Very well," one leader said, "we'll sit down where we are."

"We'll have to arrest you," the officer said.

"Fine. Spread the word." Messengers ran down the line explaining the situation, and the demonstrators, 826 of them according to the press, plunked themselves down on Whitehall.

At this point in many a country, tear gas and fire hoses would have appeared. But here English manners rose to the occasion. Paddy wagons rolled up, and the bobbies quietly began to arrest the whole crowd, one at a time. Each demonstrator, with equal civility, smiled, went perfectly limp, and forced the bobbies to carry him off like a sack of potatoes.

Onlookers voiced sympathy mainly for the demonstrators, but we also heard shouts of "That's the

way, officer!" and "Good work, constable!"

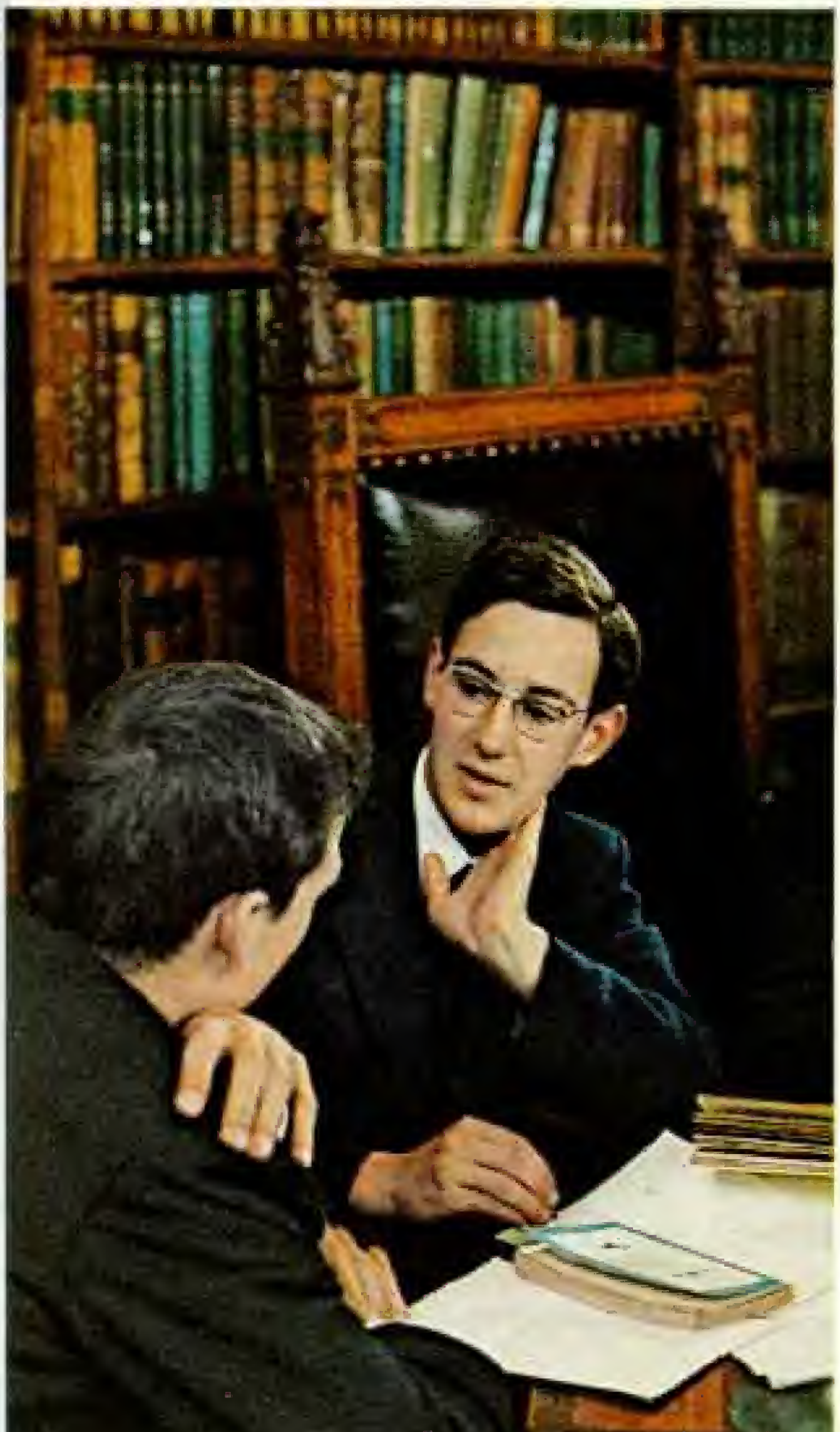
We left the scene with a feeling that Britain's sensible people retained their staunch adherence to the cause of personal liberty.

As final exams neared, we threw ourselves into a last turn of bookworming. Two days of ordeal, then—freedom! (We were lucky at that: Future ISA students would be required to have completed a year of college, and their tests would be correspondingly harder.)

Only a week was left. We spent those precious days on a tour of England's rural south.

The ISA, class of 1960-61, assembled for the last time for dinner at the Prospect of Whitby, which claims to be the oldest riverside pub below London Bridge. For once the group was subdued, as memories of our eight months of adventure came rushing back.

I shut my eyes and the neon brilliance of Tokyo's Ginza glittered before me; I fancied I smelled again the pungent scent of drying



Twilight wraps the Houses of Parliament, whose lights glow above the Thames. School and travels over, students pause below Westminster Bridge for a goodbye to London. Union Jack atop Victoria Tower flies when Parliament meets. Big Ben at right marks the hour.

Arce atque vale! A bespectacled scholar at Harrow bids John Hendry hail and farewell in Latin. Chartered in 1571, the boys' school near London requires students to take entrance tests that demonstrate a knowledge of both Latin and French.

fish. I blinked, and it was early morning in Macau. Junks like silent gray ghosts slipped through fog to the sea. The dawn turned rosy, and I was standing atop the Taj Mahal, hearing the call to prayer ring out across the plain of Yamuna. Faces flashed by, and eyes —the deep, watchful eyes of Calcutta street urchins; the sharp, twinkling eyes of Pandit Nehru; the burning, angry eyes of the German refugee, Helmut.

The images began to merge—beggars asking baksheesh and black-tie diplomats, cabbies and rickshа drivers, posturing Thai dancers and rock 'n' rolling Turks—myriad faces, sights, and sounds, all flooding together. ISA founder Karl Jaeger had come to London to be with us for the closing days of the school year. Now his voice intruded on my reverie:

"This has been a full year, I know, for all of you. Now that the trip is almost over, you may think the school's job is done. Not at all. What you have seen and learned will keep working on you as the years go by. Actually, the most important part of the ISA has just begun for you."

But already, after only months have slipped by, we students are starting to understand how truly Mr. Jaeger spoke. THE END

THE BIRTH OF CRATER LAKE

When Mt. Mazama Lost Its Top

Oregon beauty spot owes its origin to terrific volcanic eruptions about 4000 B.C.

By LYMAN J. BRIGGS, Sc.D., LL.D., Ph.D.
Chairman Emeritus of the National Geographic Society's Committee for Research and Exploration

FROM A FEW HANDFULS of charcoal, scientists in recent years have been able to determine the time of the tremendous volcanic eruptions that gave America one of its beauty spots—Crater Lake, in Oregon.

Two independent dating tests by the carbon-14 method have shown that the cataclysm occurred only about 6,550 years ago.

To understand the story, we must go back to a time when the volcano now known as Mount Mazama was a seemingly dead peak standing where Crater Lake National Park is today.

I say seemingly dead because Mount Mazama had not erupted in centuries. Evergreens fringed its lower slopes, and glaciers mantled the 12,000-foot peak. What is now the United States was one vast wilderness, its stillness broken only by wild creatures, isolated bands of Indians, or the elements.

In far-off Mesopotamia, a crude village stood where mighty Nineveh would rise, and

Thundering to the skies above primeval America, glacier-sheathed Mount Mazama erupts in the climactic convulsions that gave birth to Crater Lake. The eruptions cost the 12,000-foot volcano a mile of its height. Hurled up from the fiery maw amid smoke and pumice, steam condenses into billowing thunderheads slashed by jagged lightning.

PAINTING BY PAUL POGHOSIAN, UNDER DIRECTION OF ASSISTANT JOHN WILLIAMS, UNIVERSITY OF CALIFORNIA (L. A.)

Molten rock belches from Mazama's throat, setting the stage for an awesome collapse

THOUGH explosions blew away part of the peak, much of it vanished into a void within the mountain itself (diagrams, above). As eruption followed eruption, fiery magma deep in the volcano's throat escaped and formed glowing avalanches. The magma also found subterranean channels and drained away, creating a chamber in the heart of the mountain. Then the summit, its props weakened, tumbled into the vast cavity. Geologists believe the collapse took only a few days.

Deep-blue Crater Lake occupies the cavity created by the loss of Mazama's crown

SEVENTEEN cubic miles of the mountain vanished in the cataclysm, leaving a caldera six miles wide and 4,000 feet deep (above). Years passed before the crater cooled. Rain and snow gradually filled the basin to about half its depth.

Jagged cliffs imprison the glassy surface, a 20-square-mile mirror (below). Water's depth, 1,932 feet, surpasses that of any other lake in the United States. Even so, its surface lies 500 to 2,000 feet below the caldera's rim.

Egyptians by the Nile were 20 centuries away from their great period of pyramid building.

In the Cascades of western North America, volcanic forces of unimaginable power were building up for a climactic eruption. What happened next is well depicted in paintings by artist Paul Rockwood, based on exhaustive studies by Dr. Howel Williams of the University of California at Berkeley.

The eruption began with violent explosions, Dr. Williams says in his book, *Crater Lake, the Story of Its Origin*. So much dust filled the air that day seemed night. There was a lull of several weeks; then the explosions resumed, and a puff of steam from the summit quickly grew into an enormous cloud (painting, pages 128-9). He continues:

"Suddenly there was an ear-splitting roar; the cloud . . . surged down the mountainsides with ever-increasing speed . . . divided into many branches that poured into the canyons . . . At the base of each advancing cloud there was an incandescent avalanche of fragments . . . Many swept along at more than a hundred miles an hour.

". . . the avalanches compressed the air in advance until it was scorching hot, and the violent winds mowed down trees like skittles . . . The turbulent mixture was mobile because each particle was cushioned by gas.

". . . the presence of all this expanding gas . . . accounted for the eery quietness of the avalanches and for their power to wipe out all obstacles in their path. Instead of sliding over the ground, they were buoyed up so that they . . . sprang along in bounds. . . . enormous lumps were carried for miles. . . .

"It was astonishing how far the avalanches rushed. Those that . . . entered the valley of the Rogue . . . only came to an end near the present village of McLeod, a distance of more than 35 miles from the source."

Deep underground, five or six miles beneath the crater, lay a huge chamber of molten rock that acted as a pressure tank, building up forces that produced the incandescent avalanches. The chamber was emptying not only through eruptions but through cracks far below ground, until a great hollow existed inside the volcano. The end was at hand.

With a roar of ten thousand locomotives, Mazama's peak collapsed into the void (diagram, page 130). When the dust settled, Mazama no longer had a peak—instead it had a vast basin 4,000 feet deep and six miles across. The volcano had lost 17 cubic miles of summit—one-tenth of it blasted skyward, nine-tenths of it lost in the collapse. Crater Lake had its bed.

Over the years water filled the great basin to about half its depth. Lava plugged outlets; seepage and evaporation balanced rain and snow. Nature's work was finished.

Charcoal Cracks the Riddle of Time

Scientists long ago pieced together the main events in Crater Lake's violent origin by patient sifting of the geological evidence: glacial scars, pumice deposits, and lava flows.* But geological evidence by itself can only suggest a time somewhere between 5,000 and 10,000 years ago. The process known as carbon-14 dating has given us a far more precise answer.

When Mazama loosed its terrible avalanches of fire, the incandescent torrents

* See "Crater Lake and Yosemite Through the Ages," by Wallace W. Atwood, Jr., NATIONAL GEOGRAPHIC, March, 1937.

charred trees on the volcano's slopes. These trunks were later buried by lava and pumice.

It chanced in 1939 that a Civilian Conservation Corps road crew unearthed bits of the charred trunks near Crater Lake Park. Mr. Guy R. Moore, a CCC educational adviser, was curious about the bits and saved some samples.

Nineteen years later, in August, 1958, Mr. Moore read a NATIONAL GEOGRAPHIC article on carbon-14 dating, "How Old Is It?" by Kenneth F. Weaver and myself, describing a method developed by Dr. Willard F. Libby for fixing dates from such bits of organic matter.

Mr. Moore sent me samples, and I submitted them through the National Park Service to the United States Geological Survey. There Dr. Meyer Rubin and Mrs. Corrinne Alexander ran painstaking tests. The answer: Mount Mazama lost its peak between 6,400 and 6,900 years ago. Findings by Dr. Libby himself had already yielded similar dates—6,200 to 6,700 years in the past.

The four figures average 6,550 years, placing Crater Lake's beginnings at about 4600 B.C. In the following article, Mr. Walter Meayers Edwards of the NATIONAL GEOGRAPHIC paints a striking portrait of Mazama's offspring as it is today.

Lumps of charred wood date Mazama's eruption. At Charcoal Point, 32 miles northwest of Crater Lake, Guy R. Moore examines remains of trees felled by fiery avalanches. Scientists, measuring radioactivity of samples he collected in the lake area, calculate the time of the eruption as about 4500 B.C.

Llaos Hallway, a 200-foot-deep gash that Whitehorse Creek cut through pumice, is named for an Indian deity. Glowing avalanches left the pumice. Hikers in the narrow ravine can touch both walls.

Crater Lake Summer

By WALTER MEAYERS EDWARDS

National Geographic Staff

Photographs by the author

Born of volcanic violence,

a crater-cupped gem of incredible blue

crowns one of the West's great national parks

PUMICE, pale-buff powdery pumice, swirled around our feet at every step, filled our shoes, filtered into our clothing. For a quarter of a mile we had toiled uphill, clambering over fallen trees and banks of snow that lingered on into summer.

My wife Mary, a step or two ahead, brushed between the drooping branches of two mountain hemlocks and disappeared. I scrambled after her, and found her gazing out over the edge of a cliff.

Before us stretched a sight incredibly enchanting—a vision of some other world. Pumice and discomfort were forgotten. It was a minute before Mary broke the silence.

"That blue," she said. "Can you believe it?"

We had heard about the blue of Crater Lake. The pictures we had seen seemed exaggerated. But pictures can do no more than hint at the reality. Robert Frost, in his poem "Fragmentary Blue," complains that the sky "only gives our wish for blue a whet." Surely here was blue enough and to spare!

Varicolored rocks and stately evergreens enhanced the scenic effect of the lake, just as a jeweler's setting points up the brilliance of a gem.

At first glance the lake did not seem large. Only later did we begin to comprehend its magnitude. The tiny island below us, called the Phantom Ship, is as high as Niagara Falls. Two 50-foot launches on the lake far below us seemed like water bugs. Nearby on our right,

Phantom Ship spreads rocky sails on a matchless sea. Crater Lake, heart of 250-square-mile Crater Lake National Park in southern Oregon. From waterline to mast tops, the crag equals the height of a 15-story building. Twin launches carry sightseers.

Ranger-naturalist at Sinnott Memorial Overlook uses a relief map to dramatize the birth

Dutton Cliff rise almost 2,000 feet from the water.

It was our good fortune to spend five summer weeks here in Crater Lake National Park, Oregon. The park forms a rectangle of 250 square miles, including a tiny 2½-mile-long panhandle on the south, added to preserve a majestic stand of ponderosa pine. It was through this South Entrance panhandle that we drove in early July and wound upward through evergreen forest to park headquarters.

Snow Clings to Rim Drive in July

"You've timed your visit just right," said Superintendent W. Ward Yeager. "Spring flowers are beginning to appear. The maintenance crews are clearing the last of the winter's snow from the Rim Drive today. Why don't you drive around it now and get acquainted? If you haven't yet seen the lake, you should climb up to Sun Notch for your first view. It's only a short hike from the road."

And so we got our shoes full of pumice and our eyes full of beauty. Then we drove the 34-mile circuit of Rim Drive.

Most such trips begin or end at Rim Village, on the southwest side of the lake

of Crater Lake

Light enough to float in water, pieces of pumice rode the wind hundreds of miles northeast after Mazama's upheaval. As far as 70 miles away, deposits measured a foot thick. Ranger-naturalist Suzie Twight throws a featherweight chunk to a colleague with almost the ease of tossing a pillow.

Volcano within a volcano. Wizard Island rises 763 feet above Crater Lake. Created by lava and cinders, it may have cooled only a thousand years ago. Two smaller cones lie hidden beneath the water.

With its lodge, cafeteria, community building, campground, and other amenities, this is the busiest part of the park (page 144).

Pumice Once Rained Afar

Ranger-naturalist John Butler was answering the questions of a young woman visitor when we stopped at Sinnott Memorial Overlook, a balconylike auditorium built on an overhanging rock inside the crater (previous pages).

"That's Pumice Point," he told her as she focused binoculars on a spot directly across the lake.

"Pumice from Mount Mazama is found almost everywhere in the park, and outside it too, for miles in all directions. In fact, when geologists were trying to learn the origin of Crater Lake, they found that these deposits of pumice were a valuable key."

We joined the group gathering around him, and Mary asked him to explain.

"Briefly, they found two kinds of pumice deposits," he answered.

"One kind accumulated from pumice fallen from the air. They know this from the way the various-sized particles and lumps are well-sorted. They were winnowed by the wind.

"The other kind came from pumice flows. These deposits are completely irregular and chaotic. They vary from very fine dust to

huge hunks 14 feet in diameter that were carried 20 miles in what geologists call glowing avalanches. The best place to see the results of the pumice flows is in the canyons to the south, in Annie Creek and at The Pinnacles, for instance" (pages 146 and 147).

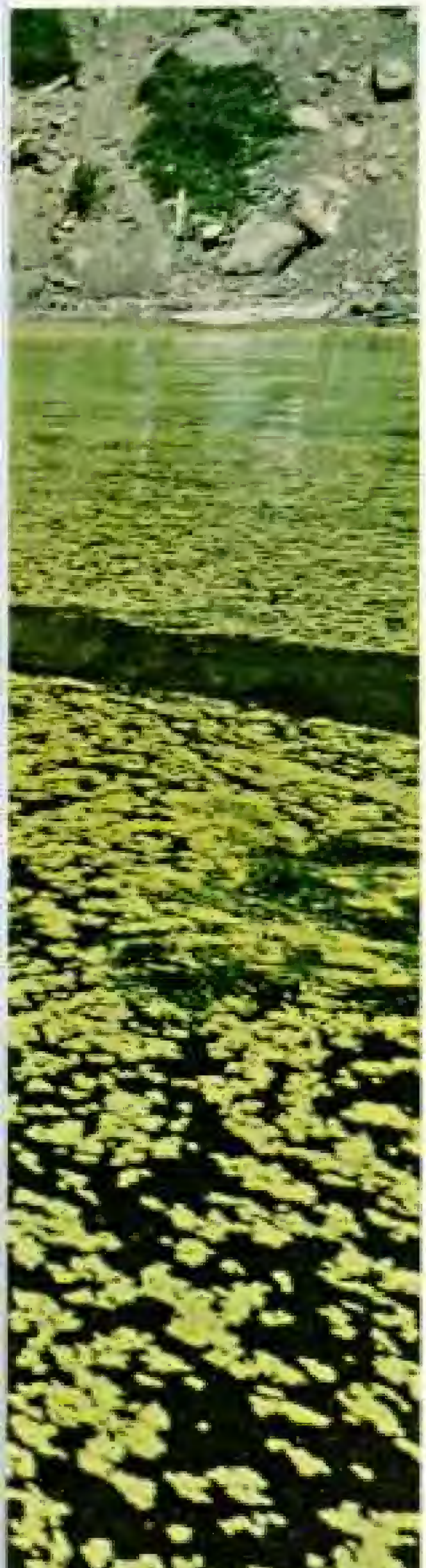
At the lodge one evening, another ranger-naturalist had reached an exciting moment in his description of the climactic eruptions that led to the collapse of Mount Mazama about 4600 B.C. and the subsequent birth of Crater Lake. On the screen shone a slide of the painting on pages 128-9. As he described the thunderous explosions, a jet fighter roared overhead. There was a shattering detonation as the plane broke the sound barrier.

The audience burst outside through the several exits, and only with difficulty could some be convinced that a new eruption had not taken place.

Walking along the rim one afternoon, we came to a small bronze plaque mounted on a rock near the edge of the cliff. It read:

JOHN WESLEY HILLMAN
DISCOVERED CRATER LAKE
AT THIS POINT
JUNE 12, 1853

In a scrapbook at park headquarters, I read the typewritten reminiscences of prospector Hillman, dictated just before he died in 1915. He and his companions, he wrote, were riding



Puffs of pollen from trees and shrubs above the lake float near Cleetwood Cove, suggesting a field of daisies. Usually invisible, the pollen becomes noticeable when breezes bunch it on the surface. Clumps drift for weeks until they sink or wash up on shore.

Fishermen, cleaving a wake through the golden dust, troll for rainbow trout and kokanee, a landlocked form of sockeye salmon. Visitors may rent boats and tackle.

Old Man of the Lake, a 33-foot hemlock trunk, has drifted around the caldera for at least 30 years. Buoyant enough to support a passenger, the log floats upright, exposing four and a half feet. Rangers theorize that the timber fell while green, and its sap retarded waterlogging.

up a long sloping mountain looking for a rumored lost mine and "did not expect to see any lakes. . .

"Not until my mule stopped within a few feet of the rim of Crater Lake did I look down, and if I had been riding a blind mule I firmly believe I would have ridden over the ledge to death. We came to the lake a very little to the right of a small sloping butte or mountain situated in the lake, with a top somewhat flattened—which was, I believe, named Wizard Island, by Hon. W. G. Steel some years later.

"I was very anxious to find a way to the water, which was immediately vetoed by the whole party. At last we decided to return to camp; but not before we discussed what name we should give the lake . . . and on a vote, Deep Blue Lake was chosen for a name. . . .

"Stranger to me than our discovery was the fact that after our return I could get no acknowledgement from any Indian that such a lake existed. . . . Later I discovered that they held this lake as sacred and none except a few of the medicine men ever gazed upon its surface."

Eruptions of volcanoes are recorded in legends of the Klamath Indians, and many frightening tales have been woven about them by the medicine men.

Less than two miles north of Discovery Point stands Hillman Peak, named for the lake's discoverer. Highest point on the rim, it rises 8,156 feet above sea level and almost 2,000 feet above the lake itself.

Hillman Peak and its neighbor, The Watchman, vantage point for a fire lookout station, were parasitic volcanoes on the side of Mount Mazama. Each was split asunder when the summit collapsed.

The saddle between the two peaks provides one of Rim Drive's best viewpoints for a look at Wizard Island, product of the volcano's last activity (page 137). In itself it is a fair-sized mountain, for in addition to the nearly perfect cinder cone rising 763 feet above the water, another 1,900 feet lie beneath the surface.

The last eruption—which could have occurred as recently as a thousand years ago, according to tree-ring studies—was a massive flow of black lava that welled from the side of the cone and almost connected it with the west rim. Studded with evergreens, the flow looked to us like dark gravel as we viewed it from the rim.

Later, when we spent a weekend on the island with Chief Park Naturalist Bruce Black and his family, we discovered that the lava was actually composed of huge blocks, some of them bigger than grand pianos.

Volcano's Fiery Breath Marks Cliff

For the trip to the island we boarded a boat in Cleetwood Cove and headed west for Llao Rock, a huge cliff that towers almost 1,900 feet above the water.

"This is an ideal place for a geologist to study the internal structure of a volcano," remarked Bruce. "Look at Llao Rock. See how the dark upper half of the cliff is separated from the lighter part below by a wavy line? See how that line dips down into a U-shape in the middle? What you are looking at is a cross section of a former glacial valley. The dark part is lava that filled it up and overflowed. Notice how it spread out over both sides?"

In a bay on Wizard Island's south side, where two floating tree trunks serve as a landing stage, a band of yellow pollen, resembling curd, lay on the surface (page 138).

We climbed to the top of Wizard Island, so named because it is conical in shape, like a wizard's hat. In and around the 100-yard-wide crater grew a few stunted, straggly pines, many dead, weathered a ghostly white and twisted into grotesque shapes.

When we returned to the island's shore, two of the children—hot from the climb—plunged into the lake for a swim. But its waters are too cold for most swimmers, including me—about 55° F. on a summer day.

We slept on the island under the stars, and

Scarred rock on the caldera's rim chronicles the passage of a glacier. As tongues of ice inched downward from Mazama's summit, scooped-up pebbles gouged the slab.

Clark's nutcracker, one of 160 species of birds recorded in the park, perches at left. Golden-mantled ground squirrel scampers away at right. Rangers call these two "the Crater Lake welcoming committee."

July snowbank becomes a slate for youngsters who scratch their names along Rim Drive. Melting streaks the surface and exposes, at upper left, a marker pole that helps snowplows to follow the road.

Crater Lake currant bears tart red berries. In 1896 Dr. Frederick V. Coville, a Trustee of the National Geographic Society, collected the first specimen of *Ribes erythrocarpum*.

the day that followed will linger in memory as one of pure delight.

Cruising slowly around the lake, exploring the caldera walls, our little party seemed quite alone in this vast and incomparable setting. People on the rim were too small to be seen without binoculars, although occasionally, when the breeze died down, their voices floated to us across the stillness.

Bruce lent me his rod, showed me how to cast, and helped me land two rainbow trout. We could watch the fish, deep down, trail the spinners and then strike.

The water is so clear that moss has been found 425 feet down. Moss requires sunlight, and the variety found here can live no deeper than 120 feet in most lakes.

Back from our Wizard Island digression, we stopped not far from the Devils Backbone to photograph rocks that once were striated and polished by a glacier as it inched ponderously down the mountain (page 140). The glaciers here once veered around parasitic cones, some of which no longer exist. Geologists learn about such detours by studying the direction of the glacial scratches.

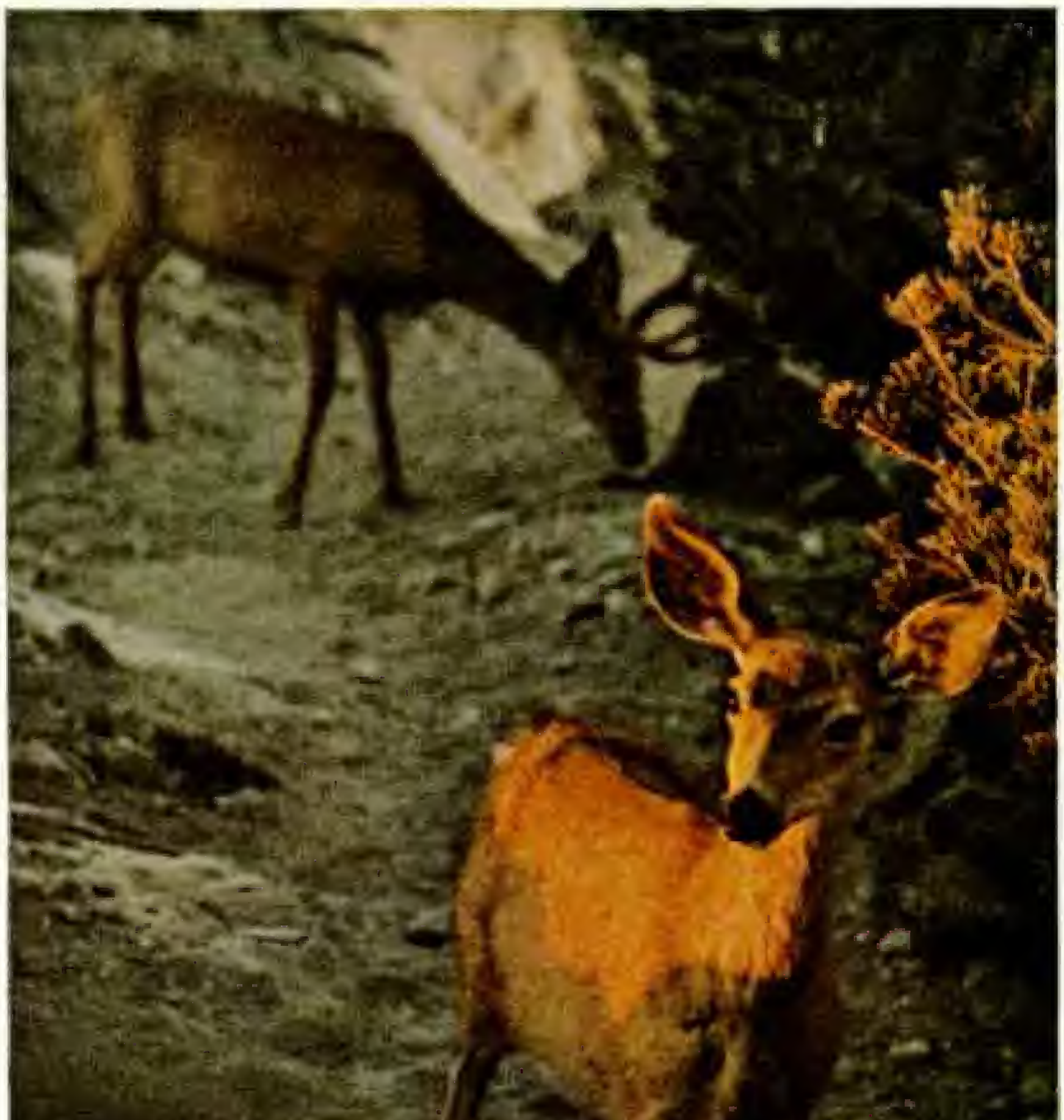
Rock Wears Cap of Black Glass

At the junction with the North Entrance road, Rim Drive begins to climb again and arches over the broad landward slopes of Llao Rock (map, page 136). The dark glass-like substance of this great lava flow, which geologists call dacite, is revealed by the road cut. The crust, which cooled more quickly, is shiny-black volcanic glass, obsidian.

We spent an hour spying on a colony of marmots living in the jumble of broken pieces of lava at the roadside, undisturbed by cars whizzing by but ever alert for an approaching footstep.

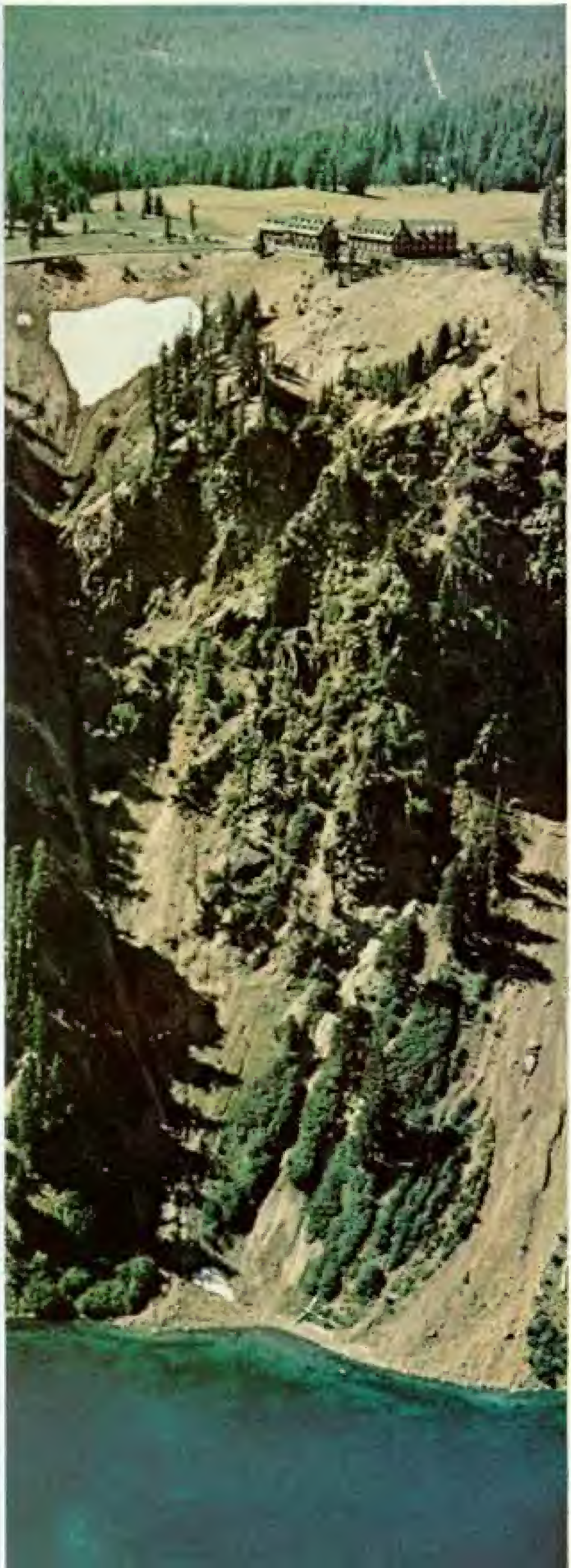
Leaving Llao Rock, the road again approaches the rim above Steel Bay, named for Judge William Gladstone Steel of Portland. He first saw Crater Lake in 1885, and his persistent efforts to have it set aside as a national treasure were rewarded 17 years later when President Theodore Roosevelt signed the legislation making it a national park.

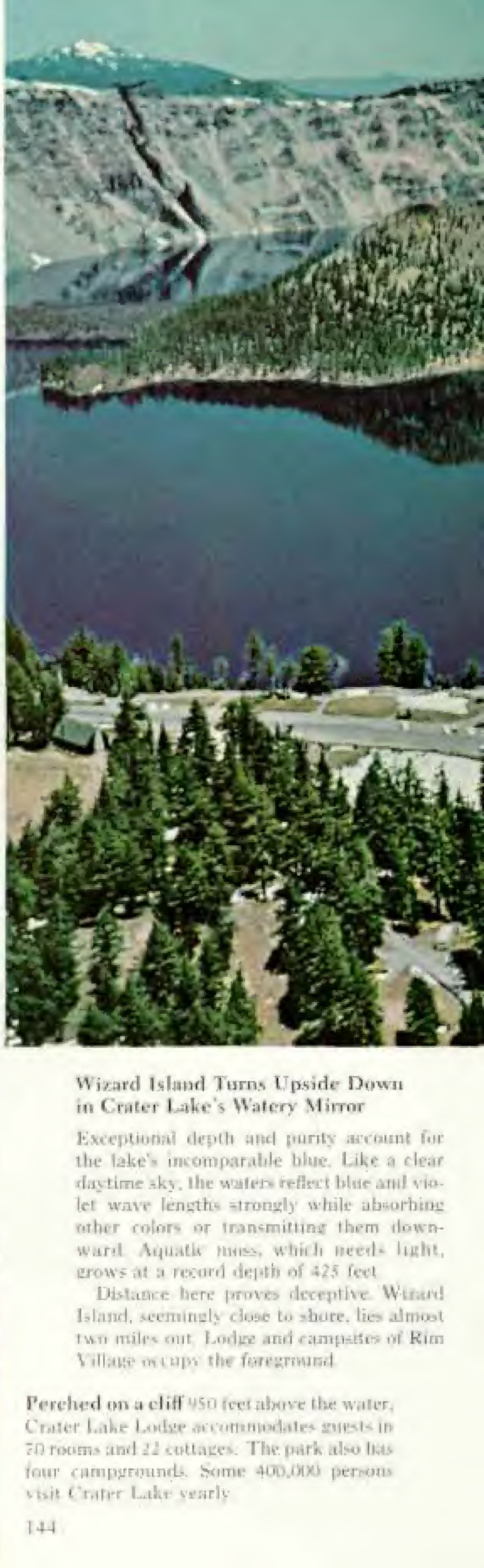
As a schoolboy in Kansas, Steel had learned of the mysterious blue lake from reading the



Ears at attention, a mule deer doe peers shyly into the fire lookout's station on Mount Scott as sunset gilds the scene. In the shadows beyond, an antlered buck nibbles a bedtime snack.

Mushrooms and mosses thrive in spray-drenched shade along the Rogue River, just outside the park. Boundary Springs, the stream's birthplace, lies within the park a few hundred yards upstream.





Wizard Island Turns Upside Down in Crater Lake's Watery Mirror

Exceptional depth and purity account for the lake's incomparable blue. Like a clear daytime sky, the waters reflect blue and violet wave lengths strongly while absorbing other colors or transmitting them downward. Aquatic moss, which needs light, grows at a record depth of 425 feet.

Distance here proves deceptive. Wizard Island, seemingly close to shore, lies almost two miles out. Lodge and campsites of Rim Village occupy the foreground.

Perched on a cliff 950 feet above the water, Crater Lake Lodge accommodates guests in 70 rooms and 22 cottages. The park also has four campgrounds. Some 400,000 persons visit Crater Lake yearly.

newspaper in which his lunch was wrapped. It was he who, in 1888, planted the lake's first rainbow trout.

At Palisade Point our attention was captured by a vertical cliff covered with brilliant yellow lichen that thrives, through some miracle of chemistry, on a bare rock wall.

Mount Scott, the remains of a parasitic cone that grew near the eastern base of Mount Mazama, is the park's highest peak. We hiked up the 2½-mile trail to visit Luther Zimmerman, the fire lookout, and his wife Rosalie in the tiny glass-walled room that served as their summer home.

"How do you get your groceries up here?" asked Mary.

"On Luther's back," said Rosalie, smiling.

"Once a week," added Luther. "From Klamath Falls. It's 146 miles round trip by car, plus a five-mile hike. We don't eat much!"

"What do you do all day, besides look for fires?" I inquired.

"We study quite a bit," said Rosalie. "We'll both be working for our masters degrees when we get back to Oklahoma this fall. I'm studying library science, and Luther's a mathematician."

They made us welcome, and as evening fell, we suddenly became aware of a pair of eyes peering up into our glass enclosure. Motionless, alert, with ears erect, stood a mule deer doe, her head shining in the orange glow

of the setting sun. Beyond in the shadows was a slender buck. They stayed long enough to be caught by my camera, then melted into the darkness (page 143).

Deer and other game can be seen in many parts of the park. Near Sun Notch at dusk one evening a fat mother black bear tore across the road in front of our car, followed by two roly-poly cubs. We came abreast of them just in time to catch the comical sight of their rounded rumps vanishing over a knoll in a cloud of dust. We never saw bears begging by the roadside as they do in Yellowstone, though we heard stories of their depredations around the campgrounds at night.

Below Cloudcap, to the south of a great V-shaped lava flow in Redcloud Cliff, a bright orange and pink formation of pumice and tuff protrudes from the caldera wall like the crenelated battlements of a fortress. The deposits were laid down when Mount Mazama was younger and smaller, and were covered by succeeding eruptions. Hot gases gave them their color. When the volcano collapsed, they were exposed, so that wind and water, eroding the softer parts, sculptured them into Castle Rock, best seen from Rim Drive a little to the south.

From this point the road skirts a high knoll and descends to one of the

Eroded Pinnacles below a spur road southeast of the lake suggest the spines of a dinosaur. Wheeler Creek carved the spires from pumice and scoria. They continue growing—not up, but down—as the stream erodes its porous bed.

"Fossil" fumaroles stab the sky along Wheeler Creek. The hollow Pinnacles are carved from once-hot pumice that choked the valley after Mazama's eruption. When scorching gases forced vents to the surface, they hardened the linings of the passages. Wind and water whittled away the softer pumice and scoria, leaving the needlelike chimneys.

lowest points on the rim at Kerr Notch, 6,753 feet, whose U-shape, denoting a glacial valley, we had observed from across the lake. Visitors reach for their cameras here, for the view of Phantom Ship is striking.

From Kerr Notch a steep spur road runs down the mountainside for six miles to The Pinnacles on Wheeler Creek.

The glowing avalanches of Mount Mazama's death throes almost filled the canyons in the southern part of the park with pale gray and buff pumice and dark gray scoria, in some places to a depth of 300 feet. The area was so fiercely hot and so heavily charged with gas that it became a veritable Valley of Ten Thousand Smokes, giving off hot gases for many years. The canyon has carved through the soft pumice, leaving a forest of slender pillars and spires. These pinnacles of pumice and scoria, fused into hardness by rising acid gases, have been aptly called "fossil" fumaroles.

Occasionally we saw a sky-bright mountain bluebird perch atop one pinnacle and then another. Small violet-green swallows flitted above and among them, catching insects. When we saw a mountain chickadee disappear into a hole near the top of a spire, we realized that many pinnacles were hollow and that all three species were nesting in them.

Flowers Have Brief Reign

In Crater Lake National Park, wild flowers do not spread in dazzling carpets as they do in spring at Mount Rainier. Yet there is great variety. In wholly natural Castle Crest Wildflower Garden, a few hundred yards from park headquarters, stenciled labels identify the flowers, shrubs, and trees, and it surprised us how quickly we became familiar with dozens of species.

The garden's beauty is at its peak when the Lewis monkey flowers and Klamath lupines are out in August and dozens of rufous hummingbirds hover and dart among them. Then the sun shines on the red cliff of Castle Crest above and glints from the tumbling waters making music among the rocks. From beds of saturated moss peep dainty white Macloskey violets and elephant-head pedicularis, whose tiny pink blooms are perfect elephant-heads, complete with trunk and tusks.

The blooming season is very short. Spring does not come until the first part of July, and by mid-September—sometimes as early as August—the snow once more begins to fall.

"It doesn't get really cold," said Jeff Adams, the maintenance foreman. "It's seldom down to zero. But you should see the snow. More than 50 feet falls in a year on an average, and some years we've had more than 70. We keep the South and West Entrance roads open right up as far as the lodge. Snow gets 20 feet deep up on the rim, and drifts nearly cover the lodge."

"How about headquarters?" I asked.

"It gets as deep as 17 feet," he replied. "We plow right up to the doors of the buildings; that's why the new houses have no front yards. We have to clear the roofs fairly often, too. Otherwise they'd cave in."

Then as an afterthought he added, "But the lake sure is beautiful in the snow!"

River Springs From Forest Floor

Because of the fragility of some features of the park, the only way to preserve them is to limit the number of visitors at one time. We were fortunate to visit one such spot, accessible only by a fire road—Boundary Springs, source of the Rogue River, on the park's northwestern border. Three large springs gush from the forest floor within a few dozen yards of each other and combine at once to form a river of considerable volume, many yards wide in places (page 142).

Since Crater Lake has no known outlet, yet its level remains fairly uniform, it is possible that the lake itself may contribute to the flow of Boundary Springs. However, the deep pumice deposits are capable of holding vast quantities of water, quite sufficient to supply this and all the other springs around the mountain.

At Boundary Springs, the cold, crystal current tugs at moss-covered fallen trees that lie lodged and rotting across the stream. Growing from the moss, armies of little yellow monkey flowers lend an elfin touch.

There is a whir of wings! A little gray water ouzel alights on a log, bobs and curtsies, chants a cheery song, then hops into the water. He floats, twisting and turning like a fallen leaf, then suddenly dives. In a few moments up he comes with an aquatic insect in his bill, shakes his wings, shoots into the air, and lands again on the same log.

What a contrast, this, to nature's mood when Mount Mazama exploded its fireworks and in the mighty convulsions of the earth Crater Lake was born! THE END

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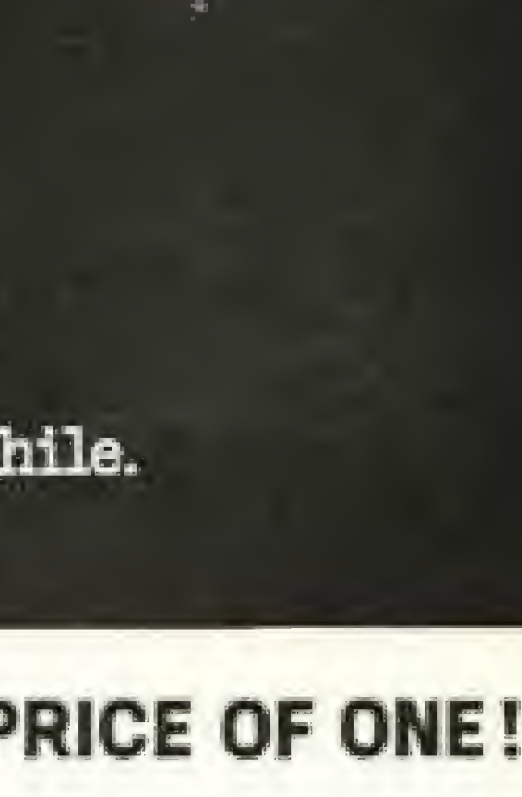

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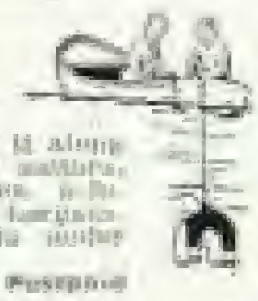

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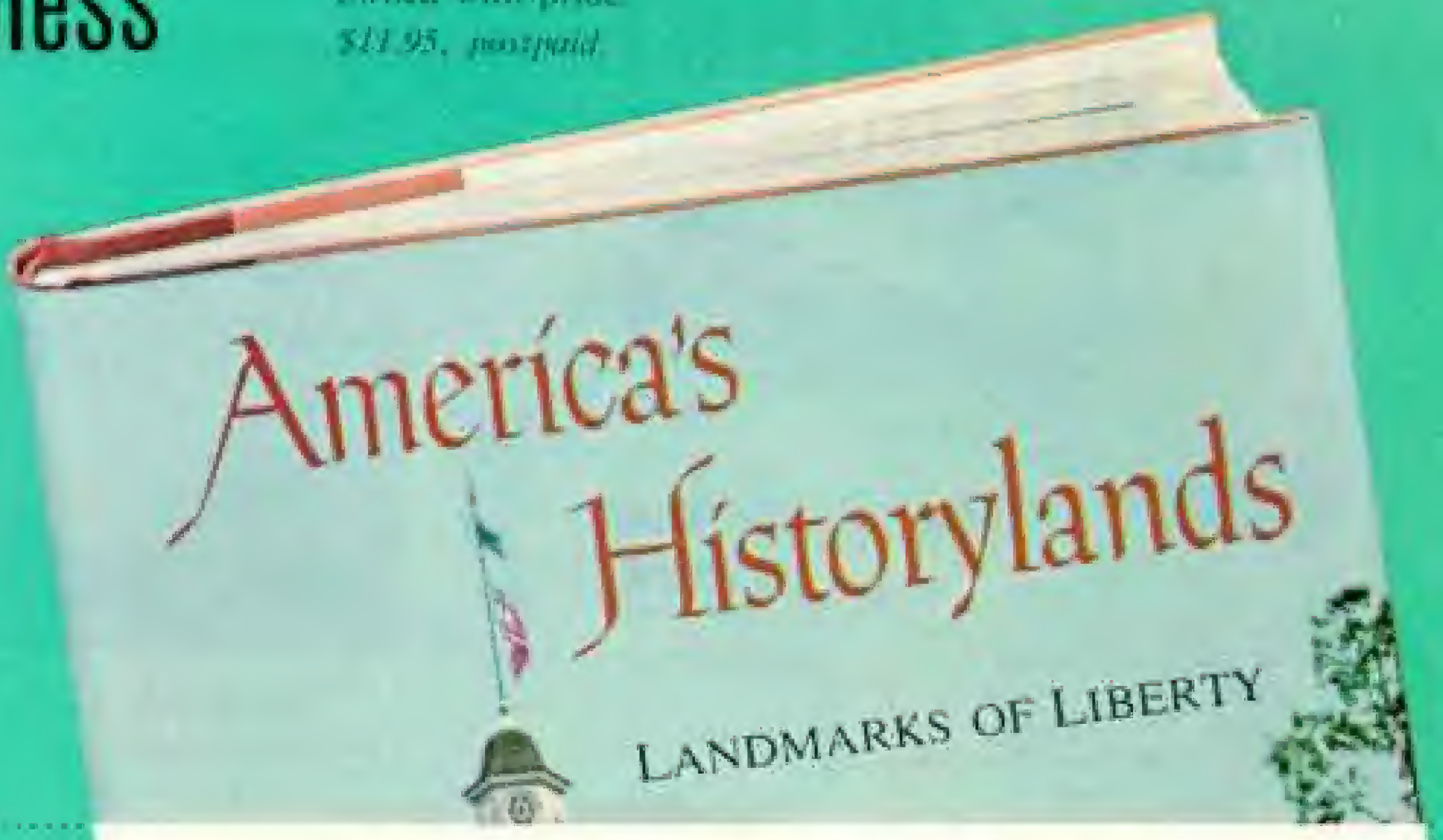

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