"CLOSE-UP: U.S.A." — MAINE, WITH CANADA'S MARITIME PROVINCES

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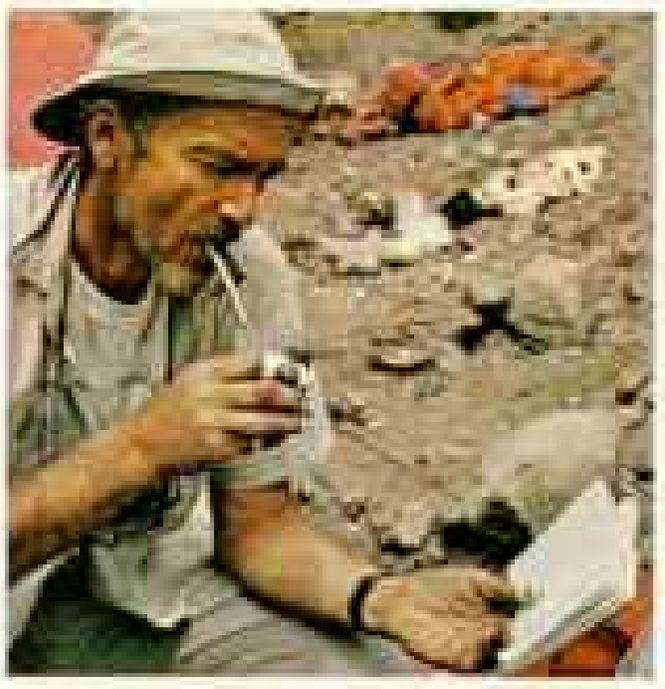
THERE ARE a few gifted individuals practicing the craft of journalism who can cover "both sides of the street"—pictures and text. They are a special breed, who often find themselves in exceptional places, where mobility is a prime virtue and circumstances are apt to be narrow. This issue contains the work of two such switch-hitters: Loren McIntyre and LeRoy Woodson, Jr.



LOREN McINTYRE, ON ACONCAGUA, READS THE DIARY OF A PERISHED CLIMBER

Geographic members have long been familiar with Loren's solid reporting on South America, and remember especially his Amazon River and Lost Empire of the Incas, articles that were first in popularity in two successive years, a unique feat.

A veteran of naval combat in World War II, Loren has an instinct for the exciting and the revealing. We have come to expect the unexpected from him. This time it was pausing during his seventh trip to Argentina to join a team that scaled Aconcagua, highest mountain in the Western Hemisphere, and brought down the frozen body of an American climber who had perished there at 20,000 feet.

It was a brutal experience. Loren's most moving tribute for the feat came from the climber's widow. "You put my mind at peace," she wrote. "Please know we'll never forget all you've done."

LEROY WOODSON IN IRAQ

The Kurds article is LeRoy Woodson's first appearance in our pages, but he is a member of the family, so to speak; his mother, Mrs. Ruth Woodson, has worked in the Society's Archives Department for many years. When Woody received an invitation to visit the Kurds, gripped in a then little-known struggle for autonomy in the mountains of Iraq, he asked if we were interested. We were.

Woody traveled the mountains by jeep, foot, and muleback, often under fire. Once he rode 17 straight hours to reach the encampment of the Kurdish leader, General Barzani. "I could tell you what part of me this assignment was toughest on," he said recently, "but I won't."

His report—in the GEOGRAPHIC's usual fashion—looks at both sides of the issue. Thus it helps to clarify a confused but consequential struggle for sovereignty in the inflammable Middle East. It is the kind of objective reporting that lets GEOGRAPHIC readers make sense out of the daily headlines and the hot political exchanges reported in other media.

The convictions of people—whether they are Kurds or Argentinians, Indians or Israelis—grow out of where and how they live, the traditions they observe, how they make their livings, what they believe in. We expect our readers, armed with such information, to reach their own conclusions.

Gilbert M. Grosvenor

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COVER: *Hawaii's Mauna Ulu spouts a fountain of molten rock. A geologist, approaching cautiously from the upwind side, records the volcano's tantrum. Photograph by Robert W. Madden.*

Which Way Now for Argentina?

ARTICLE AND PHOTOGRAPHS BY
LOREN McINTYRE

Tattered by wind and time, the 1940's face of Juan Perón (**facing page**) smiles from a 1973 campaign poster. His late wife Eva, beside him, is still revered as a saint by the *descamisados* —the shirtless ones. Her immense personal popularity added to Perón's power base, on which he built a virtual dictatorship. After "Evita's" death in 1952, Perón's grip on Argentina weakened. Three years later he was exiled, but still cast a long shadow over the nation until his return to power in a 1973 election.

Upon his death, his widow "Isabel," third figure on the poster, became President and the sole survivor of the Peronist pantheon. In a gesture of solidarity with the past, she had Evita's body brought back from Spain under armed guard. Her own future in doubt, *La Presidente* took up the difficult task of governing a nation of capable, educated people in a rich, productive land—a nation of great potential as yet unrealized.

THE DEATH of Juan Domingo Perón on July 1, 1974, closed a chapter in the life of Argentina, the nation that had to reckon with him for 30 turbulent years and must reckon with his legacy for a long time to come.

He left no clear ideology, but his followers still dominate the political scene. He had no children, but his long-dead former wife, Eva, remains a compelling political and spiritual presence. The day he died, his widow "Isabel"—María Estela Martínez de Perón—became *La Presidente* of Argentina.

Perón's passing also turned a page in my own life. I first saw Argentina eight years before Perón's name was known. At that time the country was vying for leadership of all Latin America. When Perón's decade of dictatorship began, I listened to voices raised in praise and scorn. When it ended in 1955, I was jailed by rebels while filming for U. S. television the revolution that overthrew him. During Perón's 18 years in exile, I watched Argentinians trying shakily to get to their feet under eight different governments, until they finally called him back.

2,300 Miles From Glaciers to Jungle

To pave the way for the return of the former dictator, a Peronist—Dr. Héctor Cámpora—had been elected President in 1973. Once more I found myself on my way to record a dramatic change in the life of the vast country that covers most of southern South America (map, page 302).

My flight companion, a homeward-bound student, displayed a bit of characteristic Argentine rivalry with the United States.

"We're a big country, eighth in the world in area, just after India." He pulled out an airlines map and folded it so that Argentina lay upside down over North America. "Politics aside, we resemble the U. S. more than we do other Latin American countries.

"Look. Argentina's length is the same as from Mexico's Yucatán to Canada's Hudson Bay. Topography and climate match: our northeastern jungle with Yucatán . . . our pampa with your prairie . . . our southern tip with northern Ontario. The Paraná River is our Mississippi. And our Andes—aha! A mile and a half higher than your Rockies!"

Those Andes form the landward spine of the 2,300-mile-long country, fringed by a continental ice cap and narrowing in the south to a glaciered wedge of mountains pointing to

Antarctica. Northward spread the deserts of Patagonia, then the flat pampa, as wide as Montana, and finally—on the jungled Brazilian border—Iguazú Falls, which puts Niagara to shame (pages 303-305).

If the country resembles its North American neighbors, so do its 25 million people.

"We've had more immigrants the past hundred years than any nation except yours," my friend said. "Mainly Italians and Spaniards, but you can find almost any New York City surname in the Buenos Aires phone books."

horse soldiers to "liberate" a hundred million acres with repeating rifles.

The way was open for ranching, and waves of European immigrants came to Buenos Aires (following pages). Only from a mile high on a clear day can one see all this capital city, spread beside the Rio de la Plata, a broad ocean estuary. The metropolis fans 18 miles and more into the flat pampa from the docks where the first immigrants landed.

Its concrete labyrinth is mottled with racetracks and stadiums to seat a million

Ethnically the nation is 97 percent European—and with reason: Argentina's Indians were largely eliminated. In the 105 years since Argentine troops came home from a conflict with Paraguay—their last war on foreign soil—they have not fired an angry shot at anyone except fellow citizens. But they've done a bit of that. The cavalry rode out to rid the pampa and Patagonia of hostile Indians in 1879—about the same time that the U. S. cavalry was sweeping our Western plains. It took only two years for Argentina's

people, and hundreds of spacious parks deflect the zany traffic so that millions more may fly kites, swap stamps, hold hands, snooze, or get their pictures taken on Sunday.

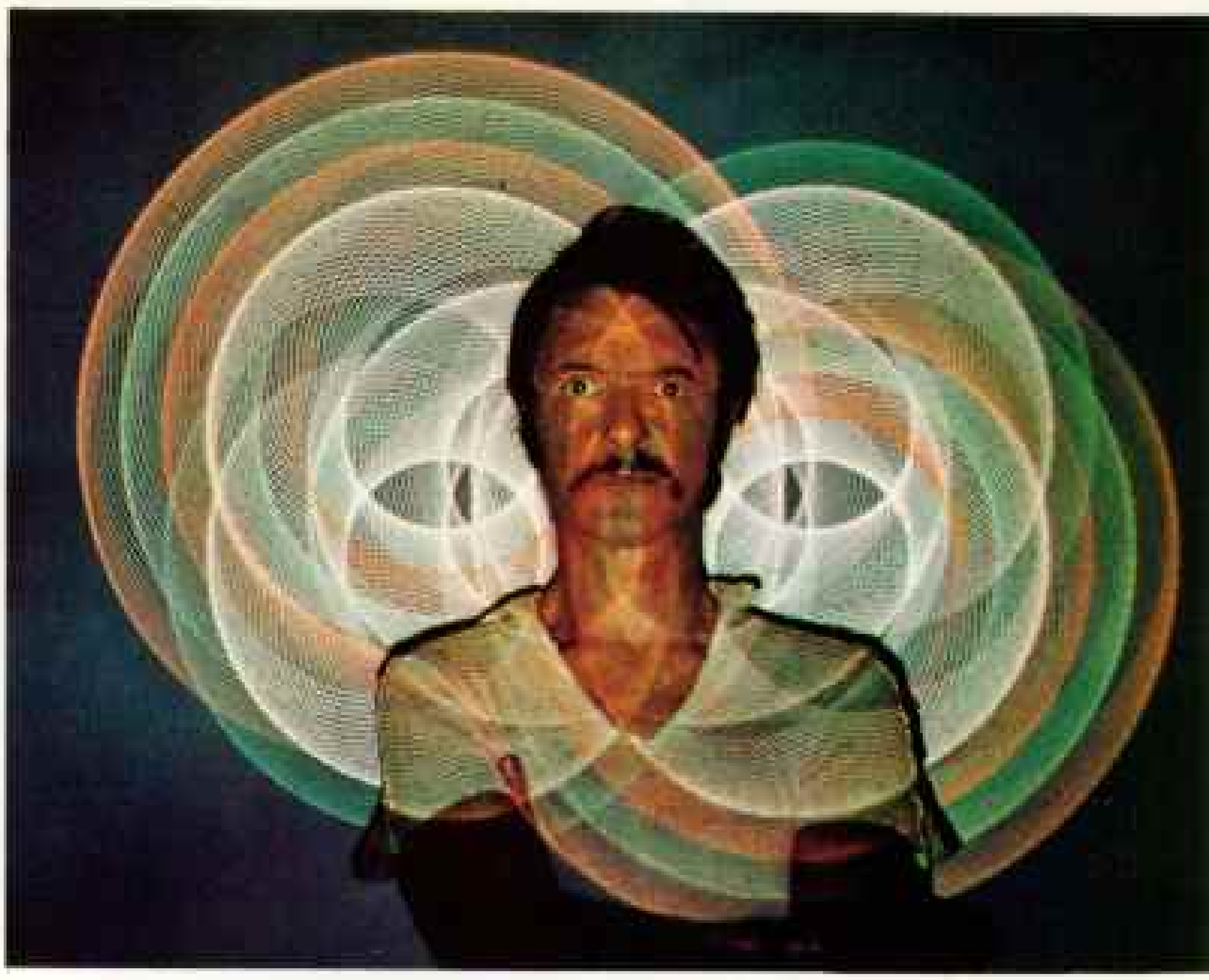
Buenos Aires' population has leapt to 8,500,000. A third of all Argentinians now dwell in this "nation within a nation," where all 22 Argentine provinces maintain *casas*, or small consulates. They must. No other great capital—London, Moscow, Madrid—reflects so little of its hinterland's culture.

BA's universality *(Continued on page 303)*

Almost a nation in itself, and one of the world's most cosmopolitan cities.

Buenos Aires sweeps southwest from the Río de la Plata toward the fertile pampa.

Literary magician, Jorge Luis Borges (**left**) writes poems, essays, and tales of metaphysical suspense that have earned him international acclaim. He combines myth and reality in unexpected plots, leading his characters to their destinies with the meticulous craftsmanship of an Edgar Allan Poe. Chance and coincidence conspire, in the blind 75-year-old author's imagination, to weave fantastic patterns across the folds of time. Borges has lectured at U. S. and European universities and held the poet laureate position of director of Argentina's National Library.



Glowing helixes seem to radiate from the mind of Eduardo Mac Entyre (**above**) when a slide of one of the artist's paintings is projected upon his face. Mac Entyre celebrates the circle as the perfect form of nature. Born in Buenos Aires in 1929, he is known in Europe and the Americas for a geometric simplicity that transforms industrial design into purely abstract art.

Convoluted grace of a stone sculpture carved between A.D. 200 and 300 reveals the highly developed artistry of Argentina's Alamito people. Their culture persisted for many centuries in the high northwest valleys near Catamarca, where their direct descendants still live. This rare piece, one of three pre-Columbian sculptures called "The Supplicants," represents a man with an imploring, upturned face.

Argentina

SHAPED LIKE A RIB STEAK with the Andes for a bone, Argentina has long been a world leader in meat production. Some 2,300 miles long by 900 at its widest, the nation spans most of temperate South America, with a good climate for food crops. Three-quarters of its people live in urban areas, a third in greater Buenos Aires. During centuries of Spanish dominion, Argentina remained a backwater of empire, providing mules and supplies for mines of Peru and Bolivia. Freedom came in 1816. In the 1880's, waves of immigrants, mainly Italians and Spaniards, settled the fertile pampa.

AREA: 1,072,000 sq. mi. **POPULATION:** 25,000,000. **CAPITAL:** Buenos Aires, 8,500,000. **LANGUAGE:** Spanish. **RELIGION:** Roman Catholic. **ECONOMY:** Farming, ranching, manufacturing. Exports meat, hides, grain. **CLIMATE:** Subtropical to subantarctic.

is mirrored by author Jorge Luis Borges (page 300), whose concise stories are admired by intellectuals from Texas to Tokyo. Of his Argentine homeland Borges once wrote, "Our tradition is all of Western culture."

I spotted Borges, a wan man wearing black, in San Martin Plaza. Under an *ombú* tree with branches so wide they sheltered an entire hippie fair, he strolled haltingly in the speckled sunshine at the elbow of a friend. I introduced myself.

At 75, Borges is as blind as Homer, his handshake boneless. We turned the corner to his apartment and sat in shadows by his creaky desk. His nonagenarian mother lives in the only sunlit room.

"Damn, the snobs are back in the saddle," the anti-Peronist sputtered. "If their posters and slogans again defile this city, I'll be glad I've lost my sight. Well, they can't humiliate me as they did before my books sold well. During the dictatorship, they sent police to monitor my lectures, fired me from my small library job, and named me poultry inspector."

"Is that why you're unforgiving?"

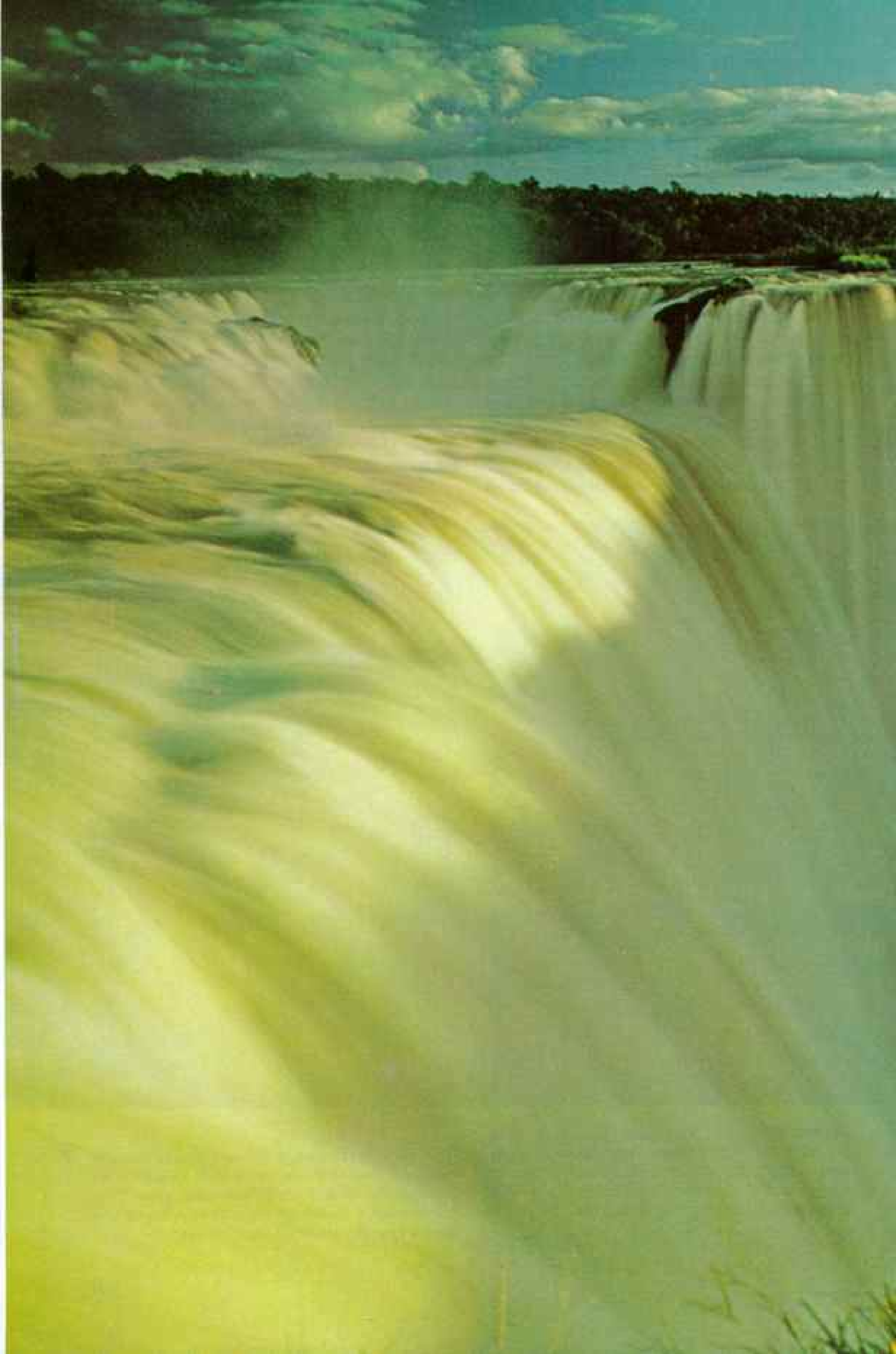
"Oh, no. I resented Perón's making Argentina look ridiculous to the world," Borges said. "As in 1951, when he announced control of thermonuclear fusion—which still hasn't happened anywhere but in the sun and stars! For a time Argentinians hesitated to wear Band-Aids for fear friends would ask, 'Did the atomic bomb go off in your hand?' A shame, because Argentina has really world-class scientists. If you want to meet one, go see chemist Luis Federico Leloir."

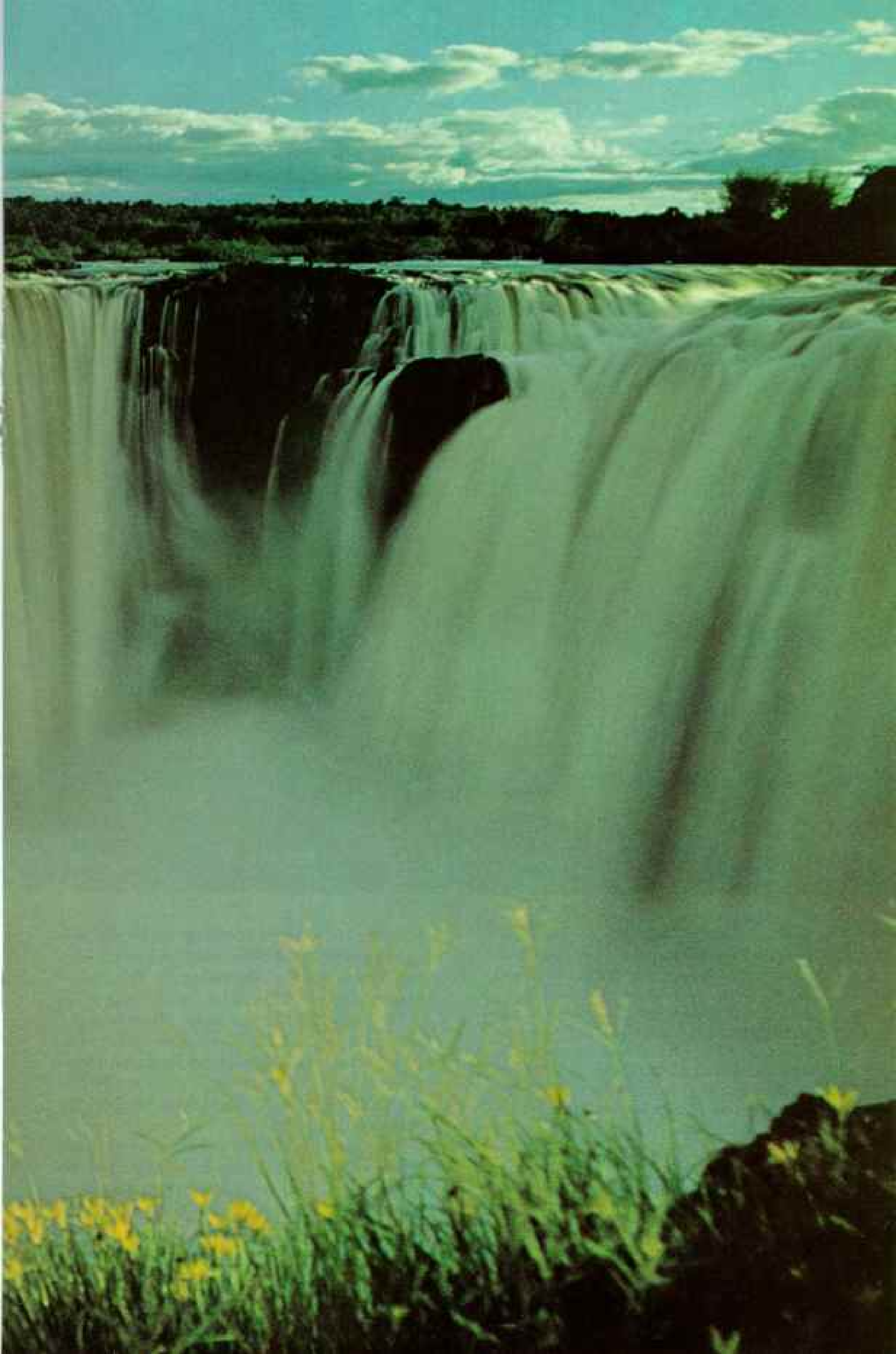
I did, after boning up on Leloir's Nobel Prize: $78,000 for his work on the body's metabolism of sugars. I expected to find him at one of BA's tinted-glass-and-concrete skyscrapers. But his lab is in an old schoolhouse.

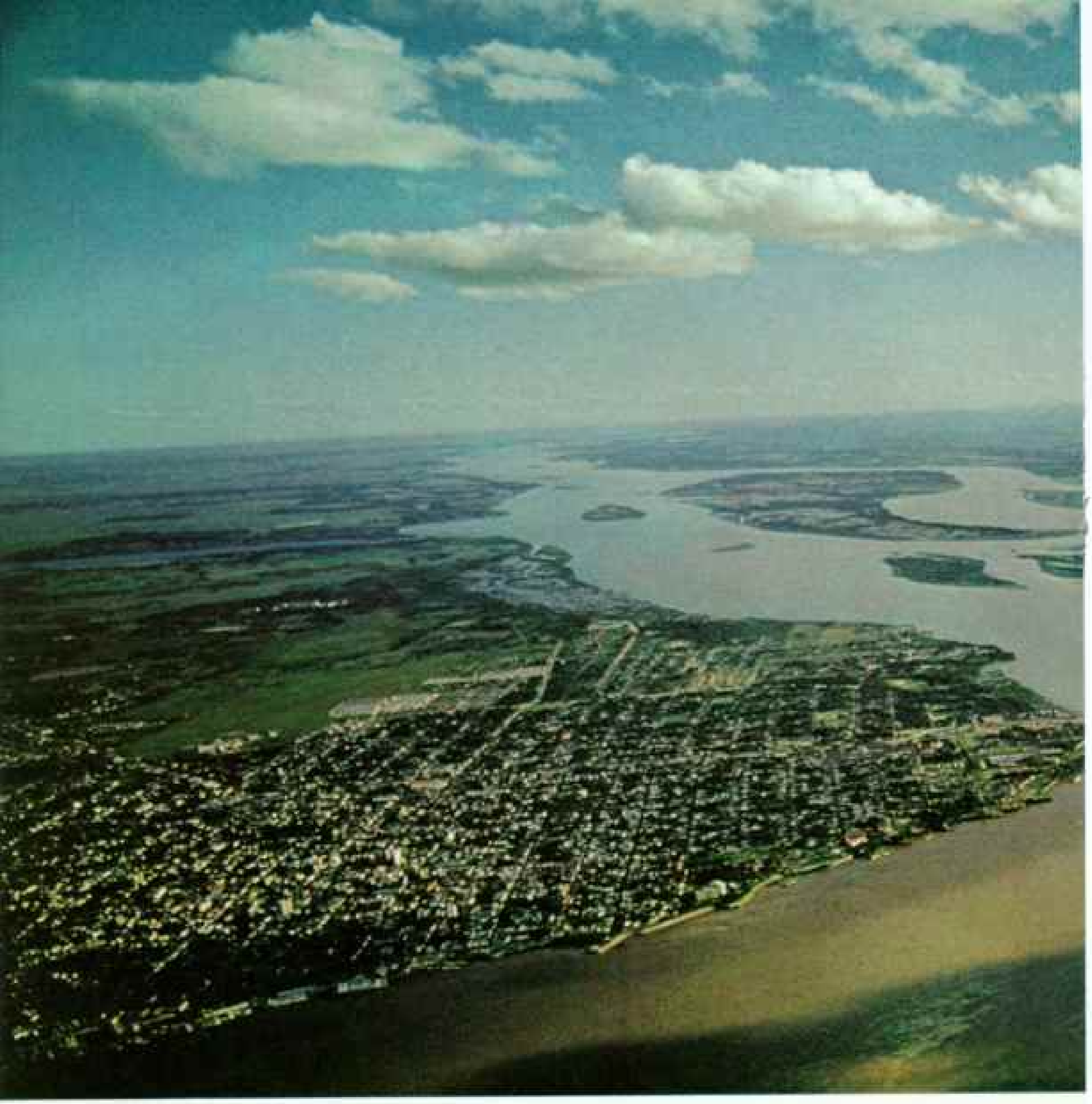
Inside it, a pretty girl led me through

Wider than two Niagaras, the Iguazú River thunders over falls between Argentina's far northeast and Brazil, on the left. Variations in flow can change the cataract from deafening walls of spray to small jets seeming to leap from the jungle.

The Devil's Throat, a 237-foot plunge into the misty narrows of the two-mile-wide falls, receives the main flow of the river (**following pages**). "Only the thousand moods of the Grand Canyon can match Iguazú's variety," says the author.







Argentina's "Old Man River," the flood-swollen Paraná shoulders past Corrientes on its way to the horizon, Buenos Aires, and the sea. A main route for early explorers and settlers, the river washes the western rim of "Mesopotamia," a hot and fertile crescent bounded on the east by Argentina's border with Brazil and Uruguay. At its heart lies the province of Corrientes—named for the currents of the Paraná—which grows a banquet of food, with citrus its specialty.

equipment-cluttered corridors with cockeyed window shades. In a cramped corner, under a hand-lettered sign *Se Ruega No Hinchar*—Don't Bug Me—I found Dr. Leloir (page 318).

He squinted at me over his spectacles and shrugged off his worldwide fame: "I'm just one of the Biochemical Research Institute's staff of 33 scientists and 14 assistants. We've lived and lunched and worked together for 25 years."

They average $6,000 a year in salary, with no time for moonlighting. Evidently esprit de corps helps them resist the brain drain that has drawn thousands of Argentinians to better-paying jobs abroad.

A few adventurous émigrés seek fortune on frontiers of their own country. Last year, TV anchorman Juan Carlos Rousselot chucked his career to begin anew in the Chaco, a thinly settled province adjoining Paraguay. He moved his family from Buenos Aires, lured his brother Ricardo from a well-paid job in Chicago, and bought an antiquated press in Resistencia, near the northern border, where I visited him.

"We haven't slept since," said Juan Carlos one night before putting his newspaper to bed. Ricardo, bleary-eyed, wondered, "Why did I leave the U.S.A. for life in the tropics?"

Juan Carlos laughed. "Not to get rich, that's for sure." He turned to me. "I'm a Peronist, but I'm trying to make *Diario Norte* a democratic voice in the northeast, not just a hard-line political rag. Democracy has its problems in Argentina because we're spoiled, unwilling to compromise."

Mardi Gras in "Mesopotamia"

Resistencia is the gate to one corner of a near-Minnesota-size region dubbed "Mesopotamia"—meaning "between rivers"—because it lies between the Paraná and the Uruguay. A new mile-long bridge over the Paraná (above) leads to the twin city of Corrientes. I crossed over to take in Carnival. At least

100,000 tourists jammed hotels, homes, and parks, nearly doubling the population of the normally inconspicuous frontier town.

Tent cities had sprouted on the waterfront. Families dozed in oven-hot autos or on the sunbaked ground. A golfer, Cesar Roberto Paterlini, lent me a key to his apartment after I won his favor by praising Argentina's "grandfather of golf," Roberto de Vicenzo, who at 51 had just won his 200th tournament.

At 11 p.m. a burst of skyrockets started a procession of floats and dancers drumming past orderly bleachers. Argentine spectators take their pleasures seriously and are not given to spontaneous romping in the streets. Band after band played tangos, fandangoes, and "The Stars and Stripes Forever." I ogled gorgeous skin and spangles on parade until daylight, for four sleepless nights.

I told Governor Julio Romero of Corrientes Province I was amazed a rural town could stage such a big-city show. "Rivalry between leading troupes is fanatical," he explained. "We foster it in hopes of attracting foreign tourists. Why not? We have the best Carnival south of Rio!"

Governor Romero raises cattle and cotton, and ranchers were the core of the privileged class that Eva and Juan Perón once humbled. However, Mrs. Romero, a lawyer, said she was grateful to the memory of Eva Perón. "She got women the vote. You might say I owe my position as Minister of Social Welfare of the province to her feminist policies."

Evita Won Hearts of Her People

Had it really been 30 years since Evita, a beautiful radio actress, had propelled her colonel friend Juan to the presidency? She had inspired an awesome workers' march that freed him from political prison. They married, and together Juan and Eva Perón amassed vast power by championing the underprivileged and assailing the wealthy. Eva created a $100,000,000 welfare agency that she manipulated with intuitive political skill.

When Evita died of cancer at 33 in 1952, millions waited in the rain to mourn at her casket. Worshipers knelt before her portrait in their homes and at her shrine in Buenos Aires' subway. Streets, a city, a state, and even a star in the sky were named for her.

Juan Perón's own star declined after Evita's death. In 1955 he was overthrown, as millions poured into the streets crying "*¡Libertad!*"

From exile in Spain, Perón dominated Argentine politics for years. He married a dancer, María Estela Martínez, "Isabelita." She became his envoy to the Peronist-party faithful in Argentina. But campaign posters still carried the dead Eva's picture and the words "*Eva Presente*—Eva Is With Us."

River Ports Reflect Former Riches

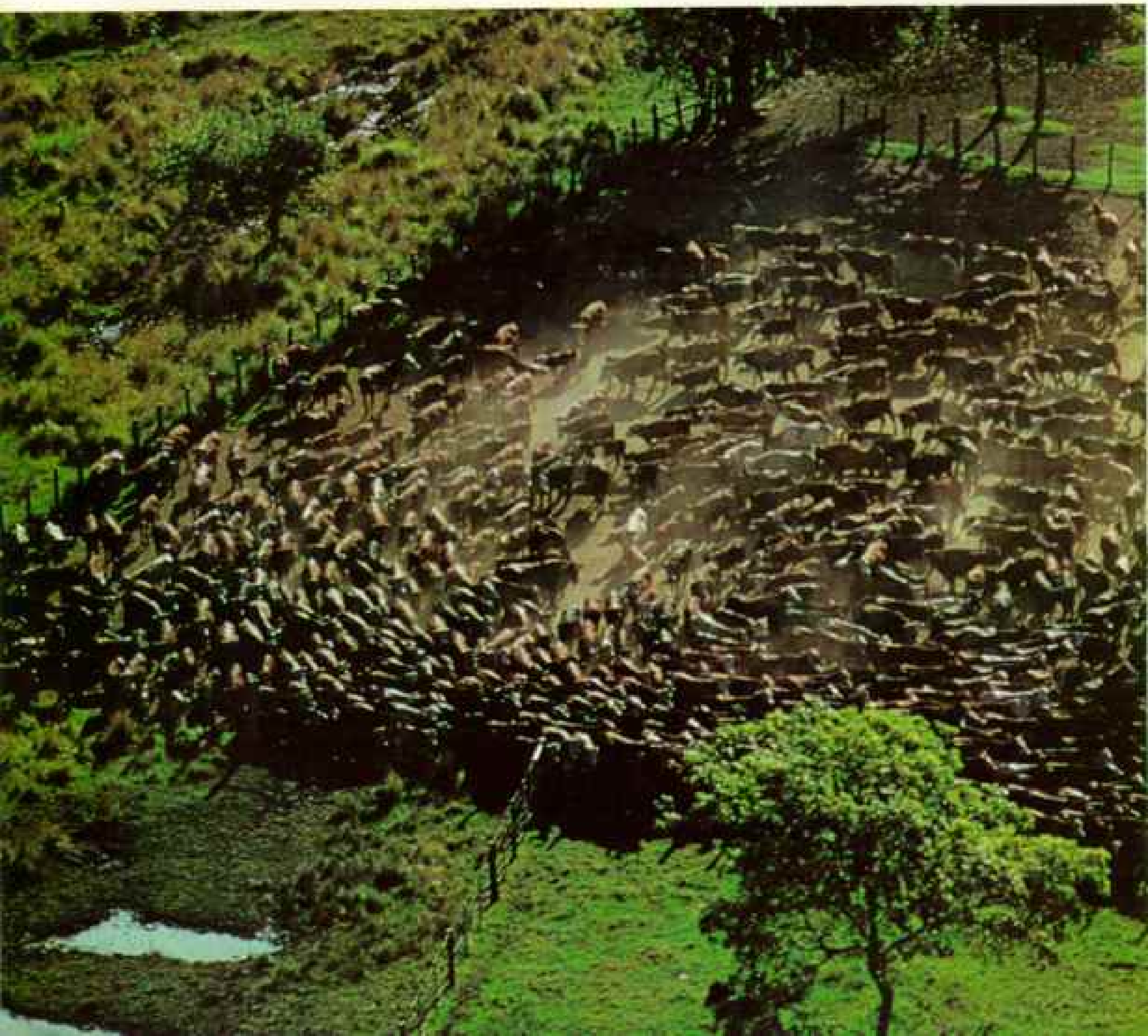
Below Corrientes and Resistencia, the Paraná flows between another pair of cities, linked by an impressive tunnel. Santa Fe and Paraná, like their upstream twins, are provincial capitals where almost everyone works for government or markets farm products from the hinterlands. The highway from Santa Fe south to Rosario so closely resembles a U. S. interstate highway that I was disappointed to find only three flavors of ice cream at a service-plaza restaurant.

Rosario's aging waterfront, lined with packing plants, warehouses, and wharves, seemed little changed since my first visit in 1935. Rosario was then the second city of Argentina in size (it is now third, after Córdoba) and led the entire world in grain exports.

That year I steered the freighter *West Notus* up the Paraná through channels so circuitous that ships on the horizon seemed to be cruising through fields of corn. I remember tapping my feet to the tango beat of "*La Cumparsita,*" piped from the ship's radio. Carlos Gardel, singing idol of the tango, had just died in a plane crash. Argentina was in mourning. Radio stations played Gardel's music incessantly: sad, nostalgic songs about betrayals and unrequited love.

In those days, Argentina led Latin America in wealth, stability, and world respect. For three hundred years an insignificant outpost of the Spanish Empire, the nation had flowered in the late 19th century. Massive exports of cereal grains and preserved meats to Western Europe gained Argentina a standing in the *(Continued on page 314)*

Last fling before Lent, Carnival turns Corrientes into a nightclub of the streets. Dancers often spend months in practice and hundreds of dollars on costumes for the brief flash and whirl. Symbolizing the all-out abandon of the week-long festival, celebrators hurl water-filled balloons at one another each day between 4 and 6 p.m.



Fires of youthful freedom gleam in the eyes of retired gaucho Evaristo Cabanelas (**right**). Born on the plains and reared in the saddle, he now acts the part for tourists at a restaurant near the Buenos Aires airport.

Spanish oversight spawned the brave and brutal gaucho. Searching for silver, 16th-century Spaniards skirted an empty pampa, but their escaping livestock soon multiplied on the rich pasture. Then came the maverick gaucho. Part Spanish, part Indian, he broke horses to chase cattle for meat and leather, spurring an economy that would eventually destroy his footloose way of life. Modern gauchos (**left**) cook supper and drink *yerba mate*—herb tea—from gourds on the San Jacinto ranch in Olavarria. Cattle, Argentina's treasury, swirl in a pen in the northern province of Chaco (**below**).

Under lowering skies, vacationists all but hide the pewter sands of Mar del Plata, a popular Atlantic shore resort. Behind them sprawls the world's largest gambling casino, where 24,000 optimists a night can ride their luck or reach the bottoms of their pockets.

Less-taxing recreation beckons from a flea-market stand that caters to the appetite for nostalgia (**right**). Old magazines in the top row feature Eva and Juan Perón apart and together. In the next row a browser has passed by a wanly idealized Eva Perón for Carlos Gardel, tango singer and national idol who died in 1935.

A bittersweet melancholy for the past haunts the Argentine present. In the 1930's and early '40's a literate, European-minded people of growing wealth looked to a grand future. Then came Perón, iron-handed rule, and costly attempts to industrialize. Even in exile, Perón's shadow fell across a country whose economy and population growth had stagnated. He came home in triumph in 1973, only to die after sounding a note of lost yesterdays.


Gráfico

Americas second only to the United States.

Few countries enjoyed a higher standard of living. For 60 years such abundance of British capital and Italian manpower poured into Buenos Aires and its satellite, Rosario, that they seemed more European than American, with vast parks, broad avenues, and opulent opera houses.

Port police in Rosario, upholding civic elegance in 1935, cautioned me to wear coat and tie ashore while the *West Notus* loaded corned beef. I exchanged a month's pay, 30 dollars, for 120 pesos, and became an instant hedonist. A slab of steak, a basket of bread, and a jug of wine cost one peso.

Last year in Rosario I paid 3,000 pesos for a meal that had no beef; laws restrict its sale to two weeks each month. No tie was needed, though I didn't conform to 1974 styles: trousers so snug that men carry purses. No tango, just hard rock. And all that remains of Rosario's Teatro Opera is a cobwebbed stage and a museum of unstrung violins.

Postwar Changes Squander $1.7 Billion

At the time of my first visit, two calamities were quietly undermining Argentina's world position: the Depression, and inept military intrusion into government.

Argentina did not fight in World War II. By war's end, though, she had amassed a treasury surplus of 1.7 billion dollars, most of which was blown on hasty attempts to industrialize a nation woefully lacking in raw materials. Ballooning costs of social welfare and political handouts started an inflationary spiral that hasn't let up in 26 years.

Nowadays garish political graffiti smear the graying facade of Rosario's medical school. At a kiosk across the street, I shared coffee and fervent conversation with white-smocked interns as concerned with national affairs as with medicine.

"We lack people . . . 25 million aren't enough to work this half-empty land. Our annual growth rate is one of the lowest in the Americas, 1.3 percent. The government ought to speed immigration."

"Hah! Immigrants don't go to Patagonia. They all bog down in Buenos Aires."

"*¡Escúcheme!*—Listen to me!" opens most arguments in Argentina. "We should be thankful we've escaped the population explosion and resultant poverty."

"We have people and talent to spare. But we're lazy, too addicted to the good life."

"We should boot the multinational firms and foreigners out. They've been milking us for a hundred years."

"Who's milking whom?" another asked. "Esso just paid a 14-million-dollar ransom to free a kidnapped gringo employee."

"Well, the guerrillas, like Robin Hood, wanted Esso to give money to the poor. . . ."

"Poor? We have no poor! We're the best-fed people in the world; always have been."

Indians Ate Glyptodonts—and Spaniards

Well, perhaps. Archeological evidence suggests that Patagonian Indians once ate glyptodonts, bizarre mammals with armor-plated bodies six feet in diameter and huge spiked clubs at the ends of their tails.

The glyptodonts were long gone by 1516, when Juan de Solis landed on the Rio de la Plata shore with eight men to take possession for Spain. Indians killed and ate Solis and all but one of his companions. Their horrified shipmates sailed for home.

Other sailors brought back reports of a "kingdom of silver." Their tale—probably a rumor of the Inca Empire—gave the name Rio de la Plata (River of Silver) to the estuary, and Argentina (Silvered Land) to the country.

In 1536 came Pedro de Mendoza with the largest expedition ever mounted by a conquistador: some 2,000 men and women. He founded Buenos Aires, naming it for a sailor's patroness, Santa Maria del Buen Aire—Favorable Wind. But Indians treated the colonists so badly that the site was abandoned. Not until 1580 did Spaniards reestablish the city that would one day claim more restaurants than any other on earth.

Some of Mendoza's horses escaped into the eight-foot-tall grass of the pampa—which proved to be worth more than all the silver ever mined. Cows got away from later expeditions. Within two centuries an estimated 40 million wild cattle ranged the plains. Argentinians became the heaviest meat eaters in the world. Today, in this land of the stretched belt, obesity is taken for granted.

At a roadside family restaurant, the San Jacinto, in the pampa near Olavarria, 180 miles southwest of Buenos Aires, I tackled a meal incredible even by Argentine standards. Each course arrived on several boat-shaped platters a yard long, selected from a menu of about a hundred choices. I hardly dented the spread, though my robust host, Ricardo Larson, ate his money's worth.

Larson helps run a 215,000-acre estancia, a cattle ranch not far from Olavarría. A fellow manager had just escaped from kidnappers, who had held him a month for ransom. "They claimed to be leftists," Larson said, "but of course they were simply common criminals."

Its estancias have made Argentina the world's largest exporter of beef after Australia—592,000 tons in 1973. At first the pampa's wild cattle were slaughtered only for their hides. Riders at full gallop slit their hamstrings with the curved blades of lances.

The cowboy was called a gaucho—a rustic. Usually born of frontiersman father and Indian mother, the gaucho enjoyed the prestige of being a mounted man. But he was a *señor de nada*, lord of nothing but the monotonous sea of grass. He lived on beef and a hot tealike brew, *yerba mate*, sucked from a gourd through a silver tube. He fought Indians—and sometimes turned renegade. He scorned the six-gun; his weapon and "eating iron" was the *facón*, a dagger worn at the small of his back under a broad belt. His bed was a cumbersome fleece-lined saddle. He kept his woman in a hide-walled hovel.

The gaucho lives on in legend, in dress, and in machismo—pride in masculinity. Argentine cowhands still wear boots and *bombachas*, billowing pants, when they ride the range, and on festive occasions sport a facón in a tooled-silver scabbard.

Ocean Resorts Festoon the Coast

I left Olavarría for the Atlantic coast with Eduardo McInnes, my companion on trips to the pampa. We drove past peaceful farms and towns that looked like Kansas in Spanish.

Eduardo had lost one leg in a tractor accident. His car, equipped with hand controls, had been provided by a government strong on socialized medicine. Eduardo's family typifies the fluidity of Argentine society. His father, Guillermo, once a rancher, now drives a taxi. His slim, blond sister, Alicia, is married to a former national minister of public works.

Our journey ended at Mar del Plata, a grain terminal and beach resort whose hotels host millions of summer visitors (pages 312-13). A gale piled surf on the sands; bikinied bathers huddled in woolen sweaters they call *pulovers*. Argentine speech is larded with words reflecting former ties with England.

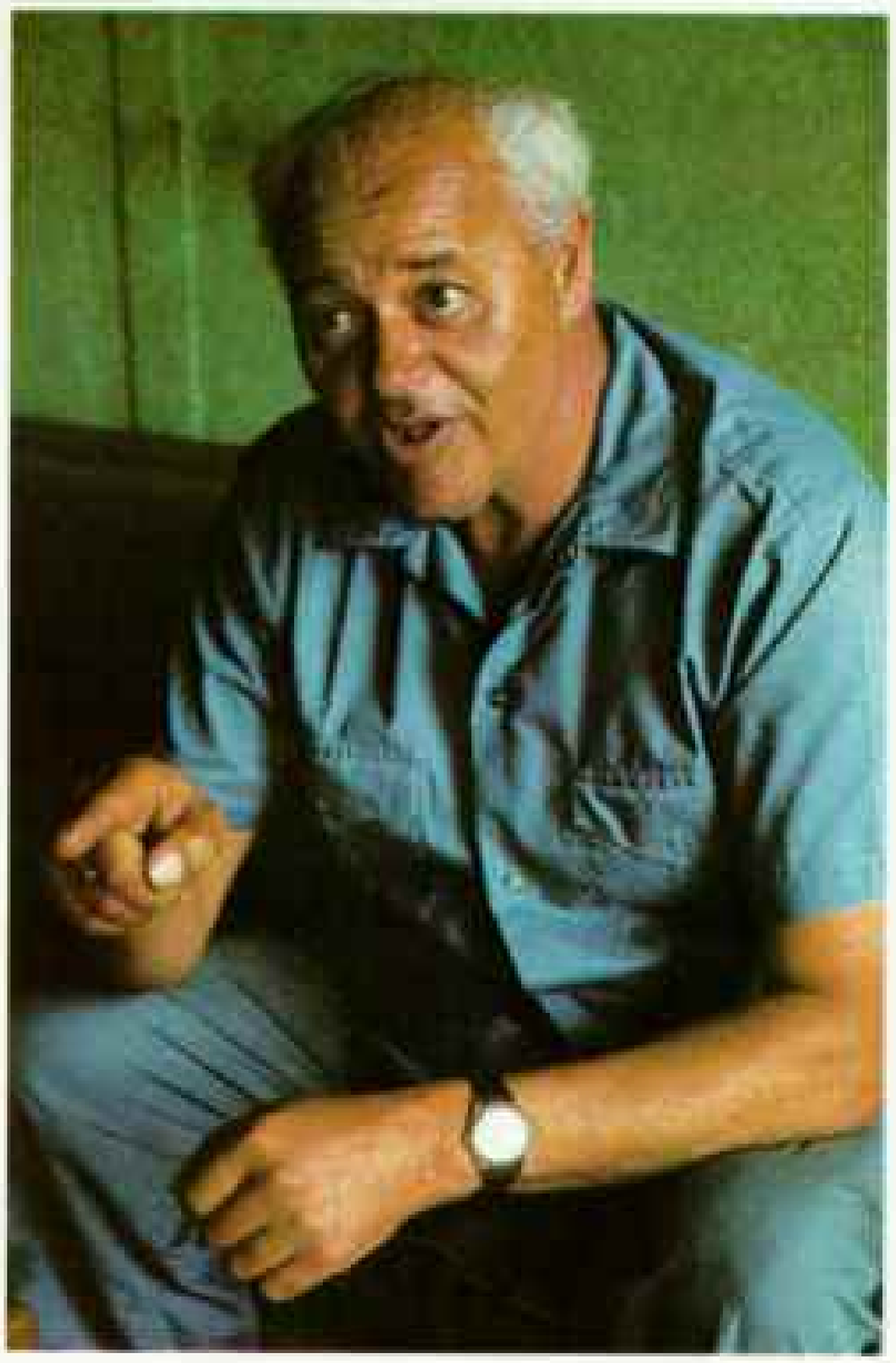
We lunched on Mar del Plata's famous *alfajores*, layered pastries. To wash them down, I bought a liter of milk. It came in a plastic bag. "How do you drink it?" "You tear off a corner with your teeth." I did, and caught the entire bagful right in my face.

From Mar del Plata to Buenos Aires, resorts festoon miles of beaches. At one resort town, Villa Gesell, I chatted with electrician Karl Gürnt, who emigrated unexpectedly from Germany in 1939 (below).

He had been a sailor on the German pocket battleship *Graf Spee*, chased by British cruisers into the Río de la Plata. The damaged warship sought repairs in Montevideo, but the government of Uruguay ordered it to leave.

As the world waited, radio messages flashed to Berlin and back. "Then," said Karl, "we blew the bottom out of our great ship; you can still see the wreckage off Montevideo at low tide. Our skipper—a noble man—was heartbroken. He shot himself.

"Most of the crew was sent home to Germany, but a few of us stayed here in hiding.



Instant immigrant Karl Gürnt came with World War II. His ship, the German pocket battleship *Graf Spee*, had been forced into neutral waters by the brilliant tactics of three outgunned British cruisers. To avoid possible capture or loss with all hands, the ship was scuttled in the Río de la Plata.

"Whoa" or "heel"? How do you command a horse no bigger than a dog? Julio Falabella talks softly to one of the hundreds of miniature horses he, and his father and grandfather before him, have developed by selective breeding. As curiosities or winsome pets—an owner can carry one in his arms—they have caught the fancy of collectors.

"I sell them all over the world for about $1,000 each," he says. "The smallest I ever

raised stood 15 inches tall and weighed 27 pounds fully grown." Don Julio also raises racehorses and giant cattle. "I once owned the world's tallest horse—seven feet, one inch at the shoulder, weighing 2,976 pounds."

After the war, hundreds of *Graf Spee* men returned. We get together monthly in Buenos Aires for a *Kameradenkreis Graf Spee.*"

"You never returned to Germany, Karl?" I asked him.

"What for? My home lies rusting on the bottom of the Rio de la Plata."

The huge estuary, 140 miles wide at its mouth, lends its name to the provincial capital, La Plata—once briefly renamed Eva Perón. En route to Buenos Aires, along freeways crawling with cars returning from *el weekend*, Eduardo and I stopped at a ranch near La Plata to call on Julio Falabella, a horse fancier well known on Argentina's tracks.

Don Julio's herds include not only fast horses, but also a herd of the world's smallest (left). He showed us 700 miniature mares in one pasture—dapples, pintos, chestnuts, blacks, whites, and roans.

Brain Power in the Wilderness

One Argentine family in three owns a car and, like U. S. tourists, many journey afar every summer. Some explore Patagonia, Argentina's thinly populated south—a vast region of arid plains and brutal winds, bordered by some of the loneliest beaches and loveliest mountains I've ever seen (and I grew up in the Pacific Northwest).

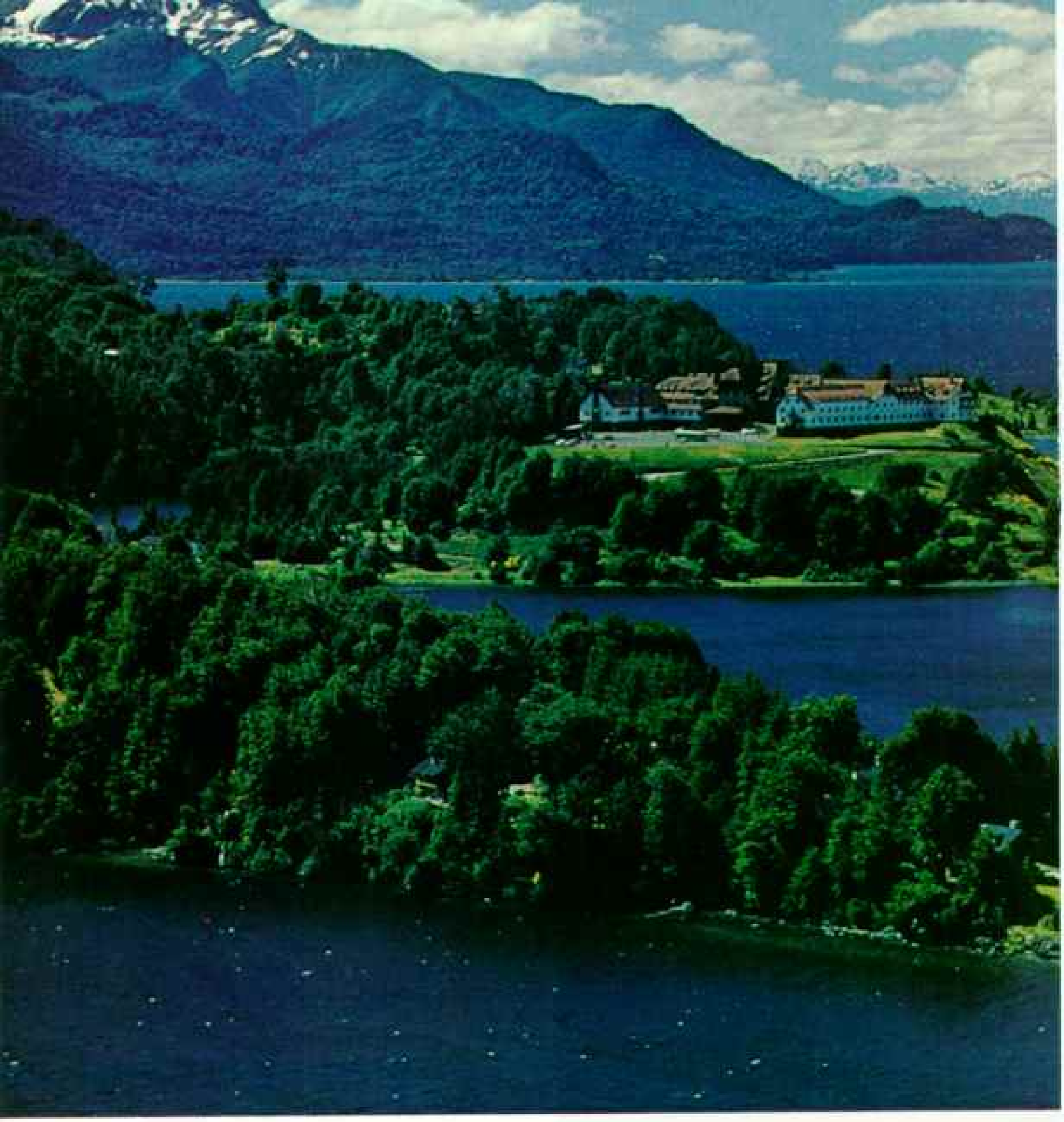
A highway leads to Bariloche, 1,100 road miles from Buenos Aires. The resort, visited by half a million tourists last year, nestles by a lake whose fjordlike fingers pry into the Andes almost to Chile (next pages). The town of San Carlos de Bariloche lies within primitive Nahuel Huapi, one of 15 national parks, totaling 6,000,000 acres with reserves, that Argentina has created since 1922.

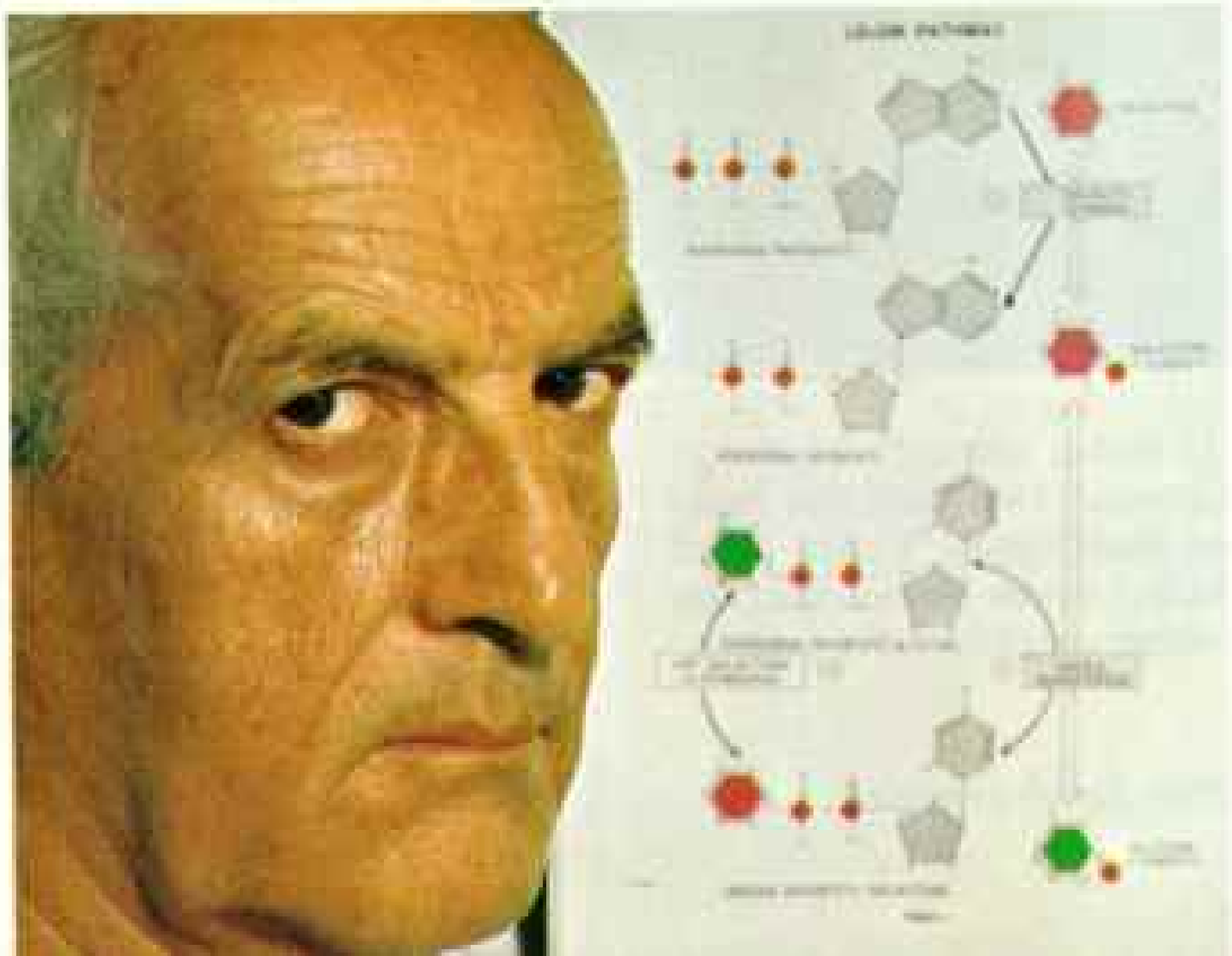
I think of Bariloche as Banff, Lake Louise, and Wyoming's Jackson Hole country all in one. That covers skiing and *el camping.*

"But we also have the best chamber-music society and highest concentration of scientists of any community in the nation," added my guide, Eduardo Krasnianski.

He drove me along the lakeshore, past Argentina's Atomic Energy Commission, to the Bariloche Foundation—a computer center and think tank whose headquarters occupies a big hunting lodge on a wooded rise.

Scientists of the Bariloche Foundation can step right out of their laboratories into primeval wilderness. "It's great to be free of the distracting environment of the capital," said Dr. Carlos Mallmann, the director. "Here,





Where ills of civilization seem only ugly rumors, Lake Nahuel Haupi in western Patagonia reflects the blue Andean sky. Its landlocked fjords, alive with plump trout, lie entirely within a national park. Llao Llao peninsula, with an elegantly rustic hotel (**above**), draws year-round visitors. On a slight rise to the left of the hotel nestles the Bariloche Foundation, where Argentine scientists pursue greater knowledge.

One of the foundation's distinguished fellows, Luis F. Leloir (**left**) earned the Nobel Prize for chemistry in 1970. His work on the body's complex metabolism of sugars has added to fundamental knowledge of human biochemistry. With dry understatement, he concluded his Nobel Lecture, "Fortunately, even after two decades our field of investigation has not become dull or too fashionable."

we're trying to develop science, technology, arts, and human resources to improve the quality of life in Argentina."

Abundant electricity is already at hand. Huge dams draw clean power from Patagonia's mountain streams. I saw one project near Esquel, 125 miles south of Bariloche. Esquel is the gateway to Los Alerces National Park, 650,000 acres of wild flowers, forests, and lakes untrammeled by tourists. I spent two days at the park with René Eggmann and his wife, Carmen.

My friend René is Swiss, a lean man with hulking shoulders. Carmen is as merry as her Danish forebears. After immigrating 37 years ago, René taught skiing until he broke both legs. For years, only the rising value of their land kept the Eggmanns and many other Patagonian pioneers alive: They bought a few acres, built a home, subdivided, sold, and bought anew. Now they raise livestock and tulips under Esquel's snow peaks (below).

Carmen served fresh fruit, cream from a hand-cranked separator, bacon, and homemade bread with currant jelly. Then we all journeyed to the Futaleufú damsite through wide valleys carpeted with dandelions and dotted with sheep. Welsh sheepherders pioneered this Patagonian province—Chubut—and gave their names to many of its towns: Trevelin, Trelew, Gaiman, Rawson. Argentinians raise almost as many sheep as cattle, mostly in Patagonia.

From a precipice we saw how the Futaleufú dam will wedge between two mountains and deepen by 300 feet a big lake cupped by cliffs.

That evening Carmen sang in the kitchen while cooking shoats' livers and chicken. René and I propped our feet by the fireplace, cracked walnuts, and sipped sweet white wine. We found how many likings we shared at the same age in life: the taste of apples and snow, the sound of a train whistle in the night, the smell of rain-wet dogs and forests, diving for pebbles, and climbing mountains.

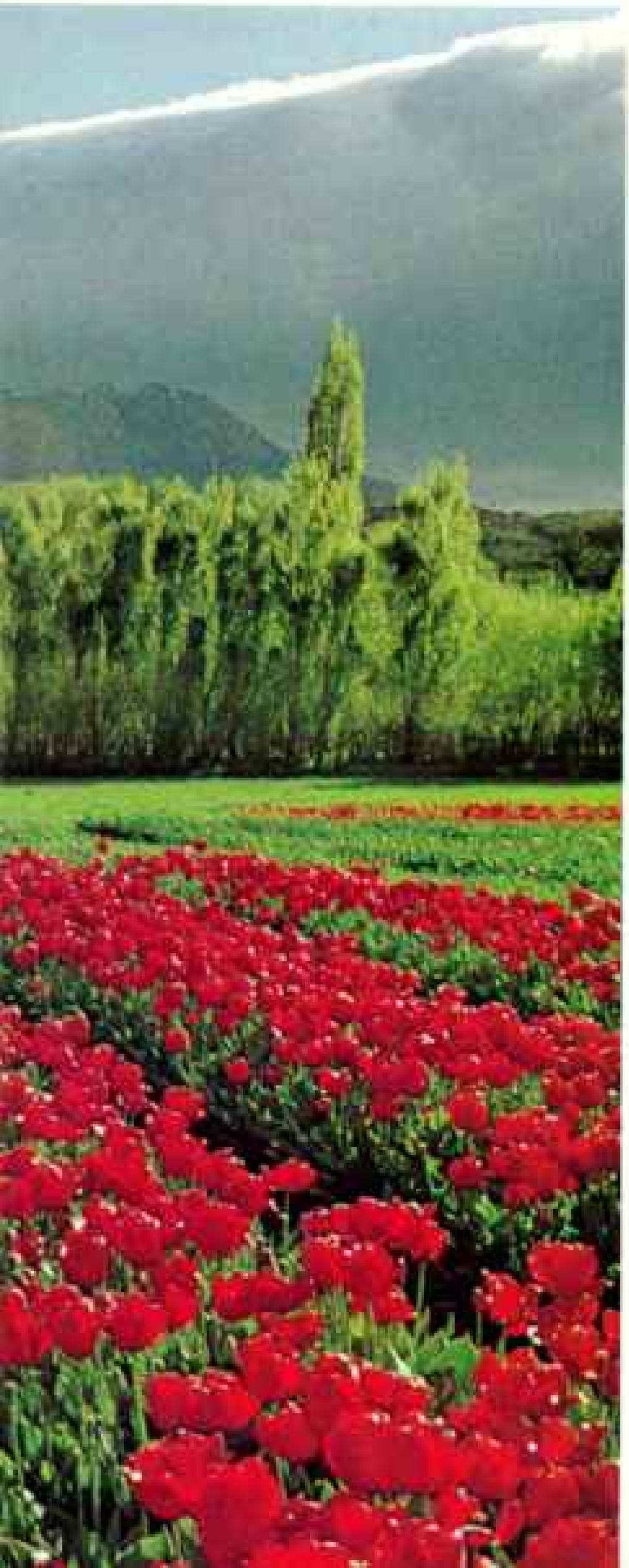
Flight to the Tip of the Americas

Argentina today fairly brims from border to border with friendliness for the visitor. It seemed otherworldly, on the plane next day, to read the news reports of Peronist leftists and rightists murdering one another.

The flight took me gradually into the bottom of the cornucopia, through the narrowing tip of South America, a land of 60-some sheep for every human and oil enough to help make Argentina nearly self-sufficient in energy. I spent a sleepless night at Rio Gallegos, so far south that the sunset glow merged into sunrise on December 21 and the racket in the streets—shrill radios, unmuffled cars, tourists and oilmen banging on doors—never let up.

With no regret I flew on over the Strait of Magellan to Tierra del Fuego, the Land of Fire, and rode to the end of the line, to Ushuaia, Argentina's southernmost town.

Quiet, clean, and hilly, Ushuaia was founded by an Anglican missionary who later, as a bishop, had all South America for his diocese. But his flock here was limited to a few Yahgan Indians, naked sea nomads who cruised as far as Cape Horn in bark canoes fitted with



Two in the bush—an Argentine beauty with bird in hand. Marisa Alsuri, a hotel receptionist, revels in the sunshine of the pampa near Olavarria.

Racing the weather, René Eggmann (**left**) hurries to cut tulips for his shop before a looming cold front moves in with battering rain. Himself Swiss, his wife of Danish parentage, the couple grows Dutch flowers in the lee of the Andes—a one-family example of the country's ethnic mix.

little fireplaces. Making landfall on precipitous coasts, Yahgan men (few could swim) leapt to the rocks and went to build fires. Women paddled out to moor their canoes to offshore kelp, then slipped into the icy water and swam ashore like seals, infants on their backs clinging to their hair. Yahgans never strayed inland for fear of the Ona, a tribe of tall bowmen who dressed in pelts of guanaco, an animal similar to the llama.

Early missionaries were hounded unmercifully by the Yahgans, even massacred. Eventually a man of remarkable courage and wit, Thomas Bridges, made a go of it. He mastered the Yahgan tongue, raised a family amid constant danger, and founded the first of the bleak and isolated sheep ranches that now dominate Tierra del Fuego.

I spent Christmas at that ranch, Harberton (pages 324-5). It overlooks the entrance to Beagle Channel, named for the ship in which naturalist Charles Darwin voyaged. Ranch manager Tom Goodall is Thomas Bridges' great-grandson. Tom's Ohio-born wife, Natalie, publishes maps and booklets about the Land of Fire, and gathers botanical data under a National Geographic Society grant.*

"Few pure-blooded Yahgans survive, and only one Ona man and two or three women," Natalie said. "They succumbed to civilization —measles, TB, and booze. The Onas battled both among themselves and with settlers."

Tourist Ships Now Sail to Antarctica

Astonishingly, thousands of tourists come to Ushuaia each January, many en route to the Antarctic. Some ocean liners carry up to 880 passengers—mostly Argentine and Brazilian—to the Antarctic Peninsula and its offshore islands. Argentina hopes the traffic enhances her claim to a 475,000-square-mile sector of Antarctica purportedly governed from the territorial capital town of Ushuaia.

In a day I jetted back over the windswept

*Natalie Goodall wrote "Housewife at the End of the World" for NATIONAL GEOGRAPHIC, January 1971.

In no mood to smile, a bull elephant seal bellows at a telephoto lens. The eye-to-eye encounter

deserts of Patagonia to the urban hive of Buenos Aires and was saddened to read in the *Buenos Aires Herald* that kidnappers were averaging $10,000,000 a month in ransom to finance further crime and disorder.

The *Herald*, founded 99 years ago, is a daily that English-speaking visitors to the capital find at their hotel doors every morning. To describe Argentina's current political scene, Robert Cox, the editor, one day recalled lines from a poem by W. B. Yeats:

Things fall apart; the centre cannot hold;
Mere anarchy is loosed upon the world,
The blood-dimmed tide is loosed,
and everywhere
The ceremony of innocence is drowned;
The best lack all conviction, while the worst
*Are full of passionate intensity.**

"For Yeats, that was the setting of 'The Second Coming,'" said Cox. "But the second coming of Perón didn't stem violence or restore our world stature. He had dumped the seed of Argentina's first flowering—money earned from the land—into industry. Yet we still don't manufacture enough for our own needs. We'd do well to concentrate on what once brought us wealth: raising and selling food, as world shortages are worsening."

Cox suggested I look at Córdoba, a city in central Argentina, to see industry in action—or inaction, as it turned out. In February, factories shut down for vacation. In March, a feud between police chief and governor stopped work another week. The airport was blockaded, so I made the 440-mile trip on a bus. The $10 fare included a full-course dinner with wine, served by stewardesses.

A child about five kicked and screamed despite a pacifier in his mouth, and beaming parents offered him candy. A sign in the bus read ONLY THE CHILDREN ARE PRIVILEGED. "That's one of the Twenty Truths of Peronism," a companion remarked. "We spoil

*From *The Collected Poems of W. B. Yeats*, by permission of M. B. Yeats and Miss Anne Yeats.

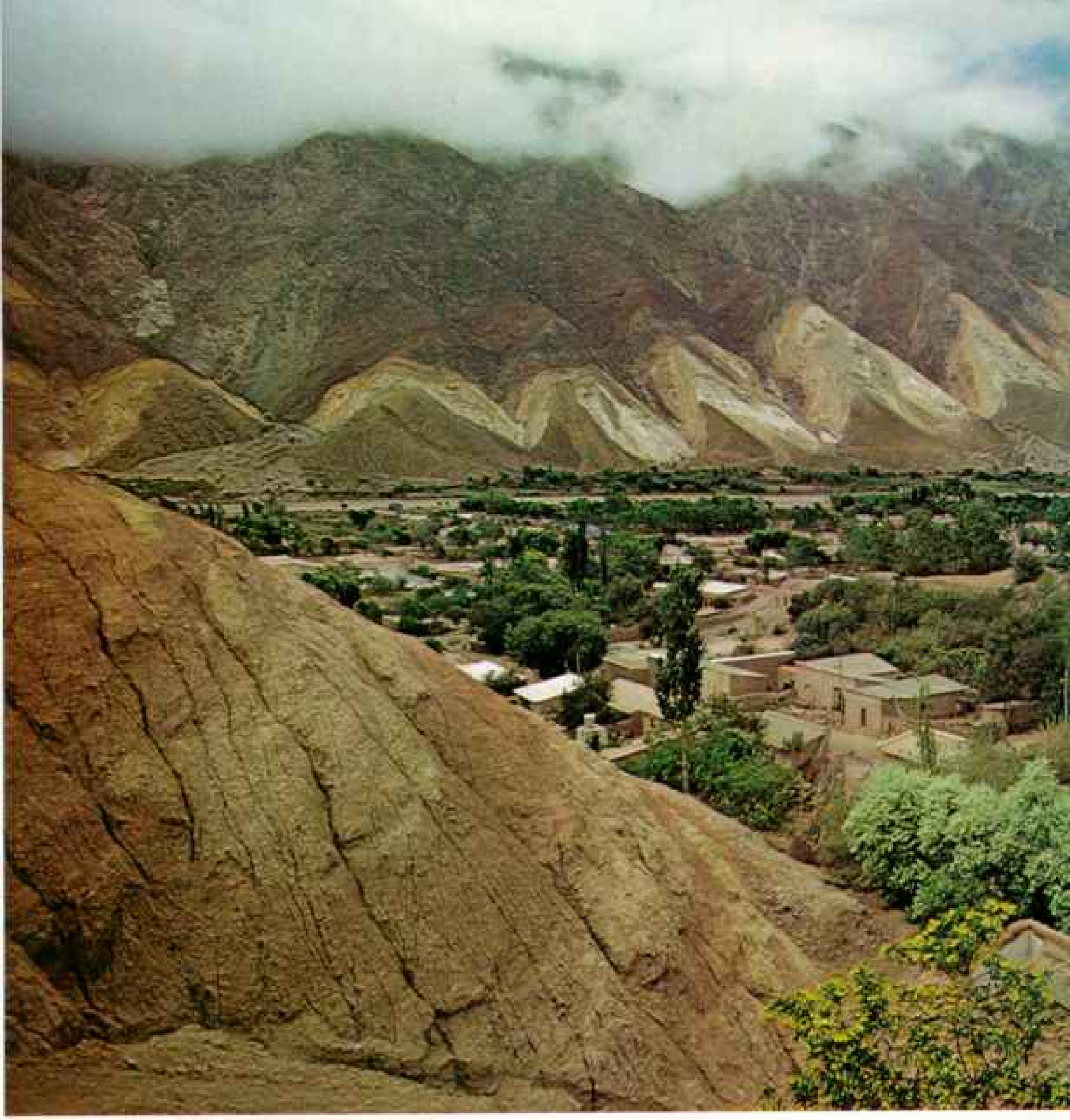
on the Valdés Peninsula, a prime breeding ground for marine mammals, ended in a standoff.

A midsummer's Christmas Day in Tierra del Fuego begins with lambs ready for an *asado*, a barbecue (**left**), at Estancia Harberton, managed by Tom and Natalie Goodall. The hard work of an all but self-sufficient life builds trencherman appetites.

As seen from the window of Tom Goodall's most essential vehicle—his light plane—the ranch houses notch the center of a small peninsula (**below, left**) jutting into Beagle Channel. Named for the ship Charles Darwin sailed on, the channel offers the last protected passage between Pacific and Atlantic before Cape Horn.

Although Antarctica, part of which Argentina claims, lies less than 700 miles away, Harberton enjoys a surprisingly temperate climate and a rare, richly diverse flora, the subject of Natalie Goodall's botanical studies.

For the tables of Europe, fishermen haul nets clambering with *centolla* crabs to be packed in Ushuaia, Tierra del Fuego. Though living nearly poles apart, centollas closely resemble Alaska king crabs in appearance and taste. Cold, hard, and lonely work brings good wages to the crabbers, most of whom are Chileans.



Scalloped by erosion, the painted hills of Maimará rumple the landscape of Argentina's northwest, near the Bolivian border. Through this high country, man's burdens since Inca times have been borne by that sturdy, whimsical beast, the llama (**left**).

Indians still thrive in this part of Argentina. Aborigines of the pampa and Patagonia were all but exterminated in the late 19th century when settlers went south, in much the same manner as U. S. settlers went west.

youngsters all the way through college. Some are never weaned, and they're the ones who are the troublemakers."

Córdoba, once a town distinguished for quiet scholarship, is now an excitable city often in the news for raising Cain. Its teeming university, vast factories, and strong army garrison spawn frequent uprisings of students, laborers, or troops, which tend to spread nationwide.

Now the second largest city in Argentina, Córdoba was the boyhood home of Ernesto "Ché" Guevara, the revolutionary whose likeness adorns vehicle mud flaps throughout Latin America. ("Ché" is a meaningless interjection peculiar to Argentine speech.)

"Our students seem compelled to emulate Ché with reckless assaults on all sorts of authority," said a manager of the idle FIAT locomotive works.

High Frontier of the Inca Empire

As I traveled north through sugar plantations to Tucumán, the tile-roofed towns and Indian-tilled fields took on a colonial look typical of the rest of Latin America and seemingly less "Argentine," less glass and chrome. For 250 years Spain's chief interest in Argentina lay in these northwest provinces, while Buenos Aires languished on its mudbank.

In the 1470's the Incas swept down from the north and absorbed the highlanders of northwest Argentina into their empire. Eighty years later Spaniards rode the same Inca highway and on to the edge of the pampa. There settlers bred mules to carry silver from Bolivian mines to Lima for shipment.

I followed the royal mule-train road, now paved from Tucumán to Jujuy, then climbed onto the 12,000-foot-high altiplano. The scene became indistinguishable from Bolivia: yellow bunchgrass, painted hills, llamas grazing (left), Indian women in bright woolens.

My driver refused to stop for pictures. "Forgive me, señor, but the Indians throw rocks. My windshield is irreplaceable."

He had a point; he was driving a Kaiser.

Meals in the northwest end with soup. A waiter explained: "It is unthinkable to take soup first; it spoils one's gusto. Taken last, it makes up for a poor meal."

Runoff from Andean snows is turned into wine by western Argentina's irrigated soil, by vineyards that grow up to 35 tons of grapes an acre, and by huge wineries. One blending tank in Mendoza holds 1,300,000 gallons.


10

"Yet it wouldn't supply Buenos Aires for two days," said a friend. "Argentina consumes 95 percent of its own wine, even though it's the fifth largest producer in the world."

Mendoza's colonial look vanished with earthquake and fire in 1861, and today it is a big city. But it has a small-town friendliness, and my Mendoza friends are very close, for all are climbers with whom I've adventured in the immense ranges west of town.

The Andes of Argentina are the highest mountains in the Western Hemisphere. Some 30 peaks top 20,000 feet. Aconcagua, tallest of all, rises 22,834 feet above sea level (next pages) and 42,500 feet above an ocean trench just off the coast of Chile.

Death on a Frozen Peak

One day I flew backward over Aconcagua's summit. I'd left Mendoza in a light twin-engine plane with Bernardo Rázquin, a veteran explorer and radio weatherman. He'd warned me, "Aconcagua has a treacherous *microclima*, its own peculiar weather." When our pilot turned into the wind, northwest of the peak, we drifted slowly tailfirst over the summit, despite our 125-knot airspeed!

Just as Bernardo was noting the outside temperature, a turbulent downdraft whirled us like a leaf into the abyss behind the south wall of the mountain. Metal screeched. Our necks whipped. Cameras and lenses shot about the cabin like shrapnel. And just as suddenly, the gust let us go.

Bernardo, unruffled, made a weatherman's calculation: "The summit temperature, minus 31° F., and wind of 130 knots, give a chill factor of at least 100° below zero." Such temperatures, together with lack of oxygen, have killed scores of climbers lured to Aconcagua's crest by technically easy approach routes.

Later I joined six of my Mendoza mountaineer friends to search for a NASA engineer who had been lost a year earlier on the glaciered east face of the peak. After 12 exhausting days and gale-whipped nights, we found his body perfectly preserved at 20,000 feet, higher than condors fly. He had frozen to death 150 yards from his expedition's uppermost campsite, where tattered tents, bedding, food, and fuel were still gripped in a snowdrift. With ropes and sleds we brought his body down to a snowfield accessible to a helicopter, and I hurried to Buenos Aires to phone the dead climber's family in Texas.

That evening I called on a close friend who had twice been a cabinet minister during Perón's exile. It's hard in Buenos Aires to catch a cab at 9 p.m., when half the adult population seems bound for restaurants, theaters, boites, and rendezvous—and the other half heads for moonlight jobs that a less than 40-hour work week, one of Perón's gifts to labor, makes possible.

My cabbie was a government clerk by day. "How else could I pay $7,000 for a locally built Ford?" he demanded, while gunning blindly through an intersection. "Holding two jobs is the only way to beat inflation."

My friend and his family live in Barrio Norte, one of scores of barrios, or districts, founded by outlapping waves of immigrants. Once a neighborhood of Paris-style mansions, it is now full of elegant apartment houses. I paid four times the taximeter reading, the legal surcharge to cover rising costs.

I told the ex-cabinet minister my impressions of the country. He said: "I've always opposed Perón, but I'm for him now. None of two civilian and six military governments during Perón's exile managed to curb his legacy of inflation and violence, or the fanaticism of his followers. Political murder is epidemic; only he is strong enough to pull us together."

Political Violence Runs Rampant

The day of Perón's return, June 20, 1973, had been prophetic. Left- and right-wing Peronists fought one another at pistol point to occupy the first overpass on his intended parade route from the airport. Some 200 died.

In new elections Isabelita Perón ran for vice-president on a Perón-Perón ticket. No matter that she didn't inherit Evita's popularity; she and the 77-year-old Perón won by a landslide.

While most observers estimated that not one citizen in fifty supported extremist causes and methods, violence became commonplace. Politically inspired assassination of labor

Hanging in a green canopy above a sleeping child, clusters of ripe wine grapes await pickers in a *parral*, an arbored vineyard near Mendoza. Dry climate, ample irrigation, and fertile soil produce enormous harvests, converted mainly to bulk table wines. For the export trade, vintners now are also trying high-quality, low-yield varieties.

Argentina's "stone sentinel," Aconcagua—tallest mountain in the Western Hemisphere—

shows its south face under a plume of snow blowing east at more than 100 miles an hour.

DIEGO GOLDBERG, CAMERA PRESS, LONDON

Facing terror as well as cheers, President Maria Estela Martínez de Perón (**left**) waves to a political rally in Buenos Aires, in a nation rent by violence and dissension between Peronist factions. To her right the powerful Minister of Welfare, José López Rega, private secretary and close adviser to Juan Perón, represents the old-line conservative wing of his party.

The year before, banners of all shades of Perón's supporters (**below**) marked the inauguration in Buenos Aires of President Héctor Cámpora, the stand-in who paved the way for Perón's return to power. Since then, insurgent left-wingers have gone underground, adopting terrorist tactics in opposition to the regime of Perón's widow.

leaders, army officers, police chiefs, and university radicals occurred at the rate of one a day—three to four hundred a year. Kidnappers focused on businessmen to finance terrorist campaigns.

"The extremists are trying to provoke a military takeover," an army acquaintance said. "But most of us believe it's not our business to doctor the country. Anyway, army economic and political remedies are old-fashioned and taste bad to the public."

"Then what is the cure?" I asked.

He smiled. "Whatever will promise a bigger bite of the good life without too much work. A new car in every garage. Argentina is no place to preach austerity."

Harassed by a Legacy of Terror

Several times I dined—in a place positively beyond the reach of terrorists—with one of the few foreign executives who hadn't fled Argentina. He told me his company would like to spend 100 million dollars on industrial development in the next five years—even on Argentina's terms. He's officially welcome, but he sleeps in a different place every night.

"I change cars and drivers often and always carry a fat Buenos Aires telephone book on the seat beside me. Why? To shield my face if bullets zap from some passing vehicle."

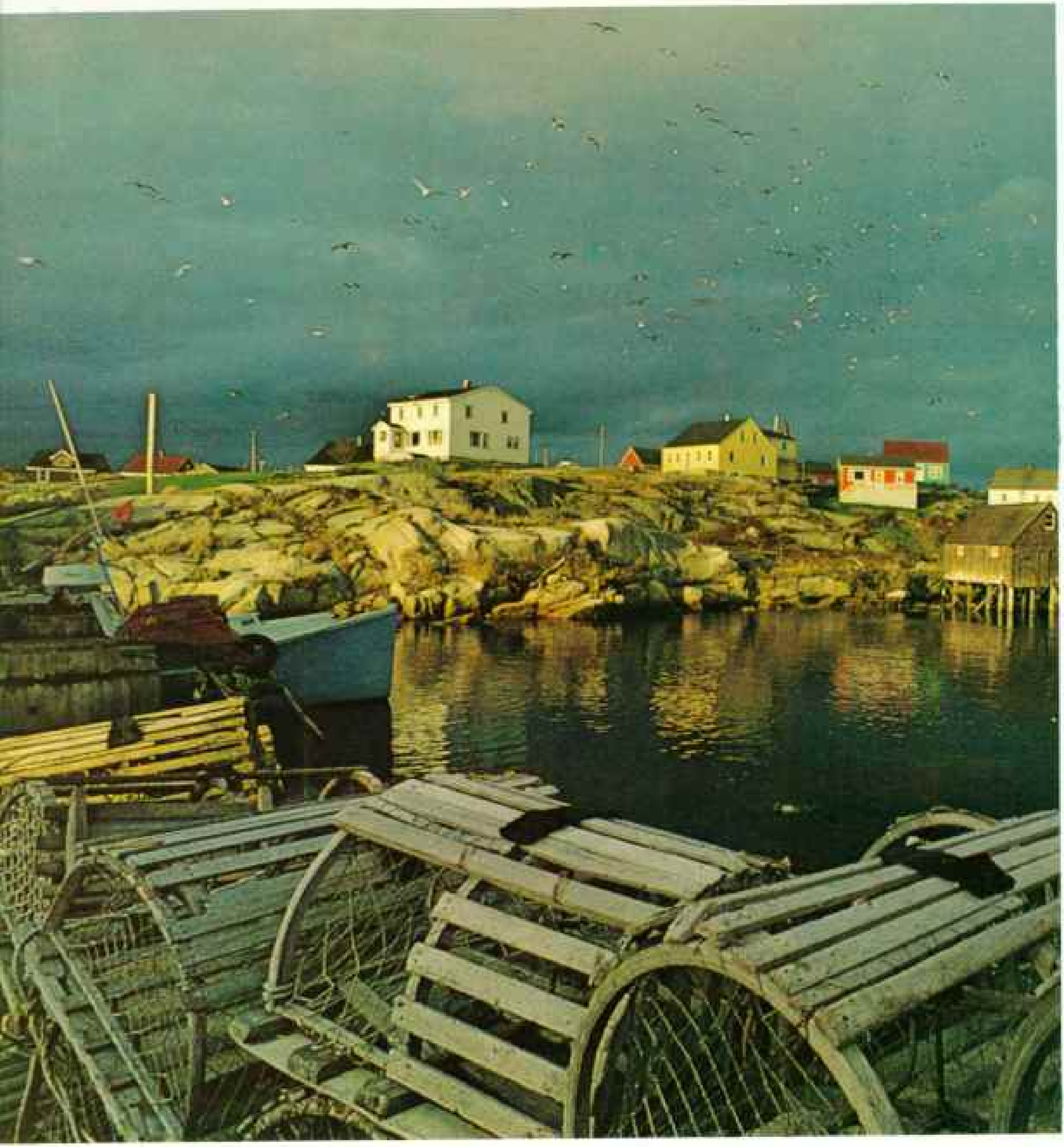
I asked about the current status symbol. "How much ransom insurance, how many millions does your firm carry on you?"

He rolled his eyes. "For the record, none. Between us, I hope it's at least five."

It was a reflection of Argentina's dilemma. Perón strove to mend his fractured country, but the violence of the preceding 30 years had acquired a momentum he couldn't stem. He was weak with age and died a year after his return. Before the end of 1974 the extreme left lost its slight share of government, went underground, and declared war on his widow and successor.

In her speeches Señora Perón—Latin America's first woman president—didn't liken Perón to Napoleon and Christ as Eva had. But she did proclaim that with the spirit of Perón on one hand and Eva on the other, she would steer the ship of state on a proper course.

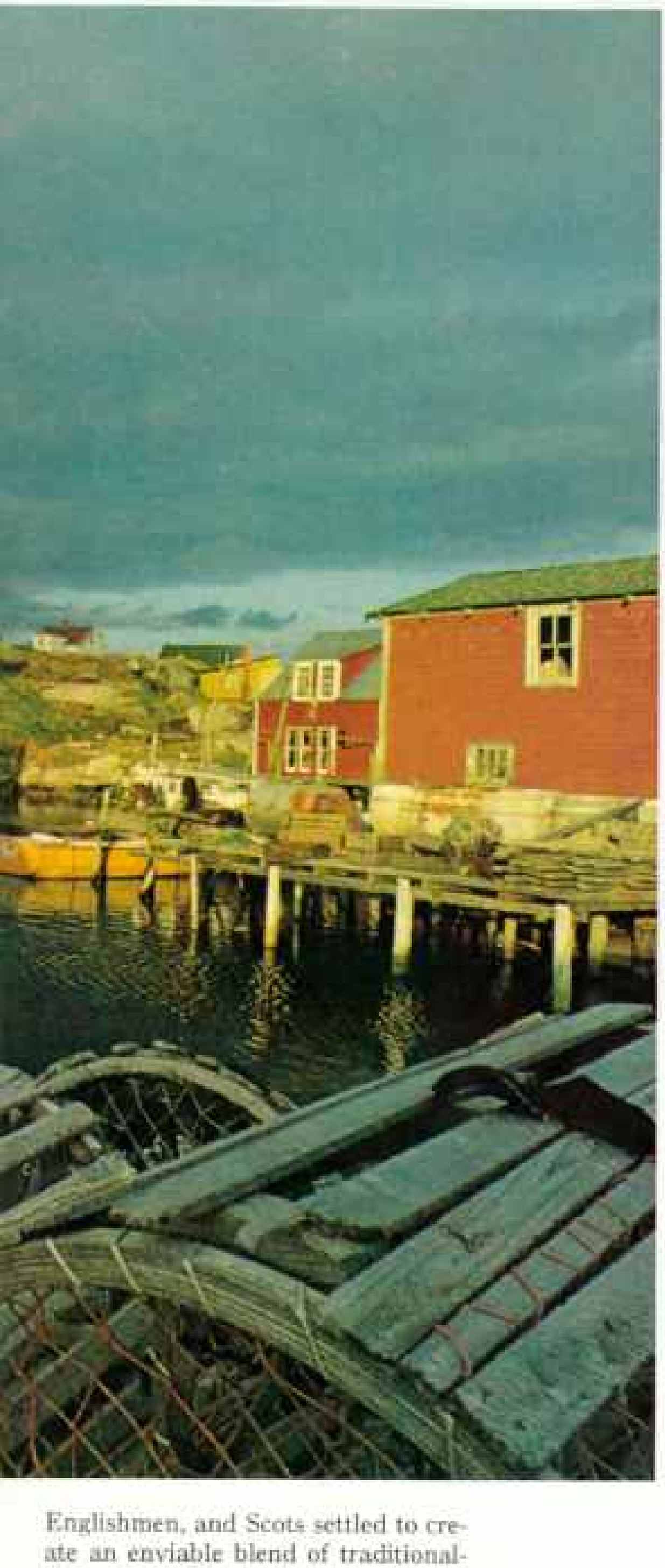
Juan Domingo Perón was gone, she said. But "he knows he had millions of Peronists who will continue his work from beginning to end." History will have to decide whether, with those words, La Presidente Perón offered Argentina comfort or despair. □



Gulls wheel above Peggy's Cove while sun and storm compete for the sky. Lobster traps identify the village as a fishing community, once a common sight in ocean-oriented Nova Scotia. Here Frenchmen,

Nova Scotia, the Magnificent

By CHARLES McCARRY Photographs by GORDON W. GAHAN



Englishmen, and Scots settled to create an enviable blend of traditionalism, resourcefulness, and contentment.

Anchorage

NATIONAL GEOGRAPHIC PHOTOGRAPHER

IT WAS MIDMORNING on one of those northern September days that lets you smell the turn of the season, and the waters off Nova Scotia's Second Peninsula were the color of nickel and as smooth as the worn face of an old coin.

David Stevens, master boatbuilder, and I stood on the beach, watching the mist retreat from the land. "In Nova Scotia," said Dave, "we don't have many days that begin with a brightness. We wake up usually to a fog, but we have this consolation: The sun has to get up early like the rest of us and get to work."

As you can see, Dave Stevens is a poet, and, as we talked, a lovely example of his work, spoon-bowed and schooner-rigged, bobbed at her mooring.

She was the *Kathi Anne II*, conqueror of the best and fastest boats New England had been able to send, three years running, to the International Schooner Races off Lunenburg.

Boat Names Honor Granddaughters

I asked Dave, who is 68 and "retired" after a lifetime that's seen the building of fifty boats, if he planned to build another. "Oh, yes," he replied. "I've got four granddaughters, you know, and I've named boats for only three of them, so I'm *obliged*. I've cut the lumber—I spotted an oak in my woodlot last fall, and looked up at it and said, 'You'll do,' so I have the keel already. She'll be schooner-rigged, of course, and almost every bit of wood in her except the Malayan teak will come from my own land."

If and when Dave Stevens completes his next schooner, there won't be many more like her, not even in Nova Scotia, where an age of oak and canvas has endured as long as it has anywhere. But even here the lovely square-riggers and fast clippers of the Atlantic and China trade linger only in fading photographs. Nowadays in Nova Scotian ports like Chester and Sydney they're building yachts and fishing boats of fiberglass and plywood.

Dave Stevens and his family—brothers, sisters, nephews, grandchildren—occupy a great part of Second Peninsula, an arm of land that gathers and gentles a bit of the sea northeast of Lunenburg near the middle of the Atlantic coast of Nova Scotia. Dave's father brought his ten children there from an offshore island 55 years ago and made a farm out of the clay soil.

"I hate to think the family would ever

leave this peninsula," Dave says, with a wave of the hand that shows you the cove and the woods and the meadows, "and I doubt that they will. There're not many places like it left in the world."

"That's true," I replied, and meant it. But I'd spent weeks exploring Nova Scotia, and I knew that there were a good many places like the Stevenses' Second Peninsula along the scalloped coast of the rain-swept, wind-bitten land—and a good many men like Dave Stevens who revealed, when they spoke of the sun as if it were just another workingman, that they regarded themselves not merely as a part of nature, but as nature's equal.

Nova Scotia is 375 miles long from the steep headlands of Cape Breton Island in the northeast to Yarmouth lighthouse in the southwest, across the Bay of Fundy from New Brunswick.* It is one of those places where nature takes a stand, and obliges the men who want to live there to do the same.

*See the supplement, "**Close-up: U.S.A.—Maine, with Canada's Maritimes,**" distributed with this issue.

The province consists of a long peninsula on the west, hooked to Canada's mainland by a strip of land barely 15 miles wide, and picturesque Cape Breton Island to the east. There are 6,479 miles of shoreline: cove after sheltered cove, harbor after safe harbor, village after village with their backs to the unbroken forest and their windburned faces to the sea.

Province Imbued With a Sense of Self

Natives say that Nova Scotia, on the map (page 343), looks like a lobster. "Acts like one, too," a fisherman told me. "She's all armor and claws, weatherwise, and makes it hard to earn a living. What meat as is in her, though, is worth the trouble."

I asked a lot of Nova Scotians, in one way or another, to explain their province to me. What is there about this salty place with its capricious weather, its miserly soil, its geographical loneliness, that makes most of its 813,000 people believe that it's the most tonic land on earth?

SIXTH BY CARY WOLINSKY

"It runs in the family," says boatbuilder Murray Stevens, smoothing an ash deck beam of a 50-foot ketch at his Second Peninsula boatyard. His father, David, handcrafts schooners, one uncle sews sails, and another sells nautical fittings. They carry on the tradition of nearby Lunenburg, birthplace of the famed schooner *Bluenose* and hundreds of swift sister ships for the Atlantic fisheries. Now vacation sailors flock thick as gulls for July races at Prince Inlet (**above**). Two schooners, right, are Stevens-built.

Nova Scotia's premier, Gerald A. Regan, gave me as good an answer as anyone. "We're proud of being what we are and where we are," Mr. Regan told me. "Nova Scotia is the most magnificent anchorage on the Atlantic coast of North America. That's what her history and her future are all about."

In war and peace, over a span of at least four centuries, Nova Scotia has been a gateway to Canada. Even today it is the end of the railroad and the beginning of the outside world. The great port at Halifax is always open, even when ice in the northern St. Lawrence blocks access to the harbors at Montreal and Quebec. Halifax is closer to Europe than any other major North American harbor south of Newfoundland, and as Premier Regan puts it, "It's a downhill run from here to the United States.

"Canada is a string of population islands 4,000 miles long, and Nova Scotia is its eastern outlet to the world. We have one of the best container ports in the world right here in Halifax, and the development of container shipping is as big a change on the seaways as the change from sail to steam," the premier told me. "I'm full of optimism for the future."

As to the past, some believe that Leif Ericson landed at Yarmouth during an epic voyage down the North American coast in 1001; others claim that John Cabot came ashore on Cape Breton Island on June 24, 1497, and planted the English flag, giving Britain its claim to the North American Continent. But there is no satisfactory historical evidence that either Ericson or Cabot ever sailed farther south than Newfoundland.

French and Portuguese fishermen were

catching and curing fish along the Nova Scotian coasts early in the 16th century, and there may have been a fishermen's village, built by the Portuguese, at Ingonish on Cape Breton Island as early as 1521—99 years before the Pilgrim Fathers stepped onto Plymouth Rock.

Lifetime Partnership With the Sea

If Nova Scotia's discoverer was a fisherman, he may well have been a good deal like Gilbert Tanner of Blue Rocks, and his first cousin Capt. Lawrence Tanner of Lunenburg. Both men went to sea at the age of 12, in fishing schooners. I chatted with them aboard a Lunenburg schooner, the *Theresa E. Connor;* she lies alongside a Lunenburg wharf as a tourist attraction.

"She's our last fishing schooner of all now," said Gilbert Tanner, and there was no regret in his voice. He spent 38 years as a fisherman, mostly as a doryman, fishing for cod on the Grand Banks. A vessel like the *Theresa E. Connor* would deploy ten dories, with two men and 40 fishing lines each.

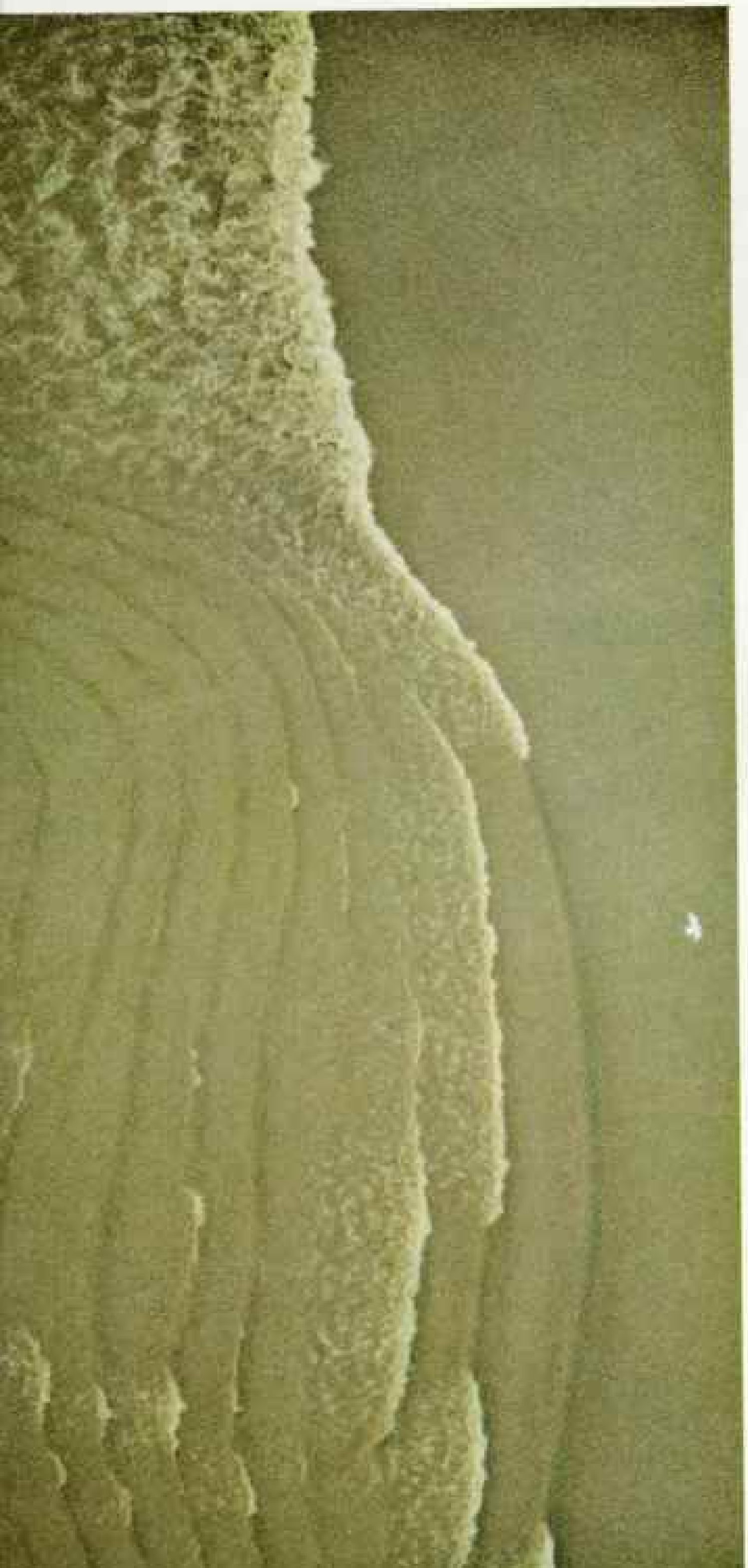
"We'd be up and out at three in the morning," Gilbert Tanner remembered, "and work till midnight. Then up and out again at 3 a.m. We'd be three months away from home, and if we got back with the ship full—say 200 tons of salt cod—each man in the crew of 24 would have three hundred or maybe four hundred dollars coming. Back in the 1930's, a man might make all of five hundred dollars out of three trips in a year."

Along the coast you'll hear tales of men who drifted away from the mother ship in snowstorms and watched their dorymates freeze to death; *(Continued on page 344)*

Up! Swing! Thump! To the beat of Gaelic rhythms, singers at North River Bridge pound wet woolen cloth (**left**) at the Milling Frolic. The tradition recalls Scottish forebears who softened blankets by the same method. Weary from sheep shearing, John Richardson of Scotsburn (**above**) rests on a bed of fleece. The Richardsons, who immigrated from Scotland in 1965, had their flock shipped to Nova Scotia five years after their own arrival.

Carved from the forest primeval, small farms pattern the Margaree River Valley, renowned for its trout and salmon. From here a scenic loop, the 184-mile Cabot Trail,

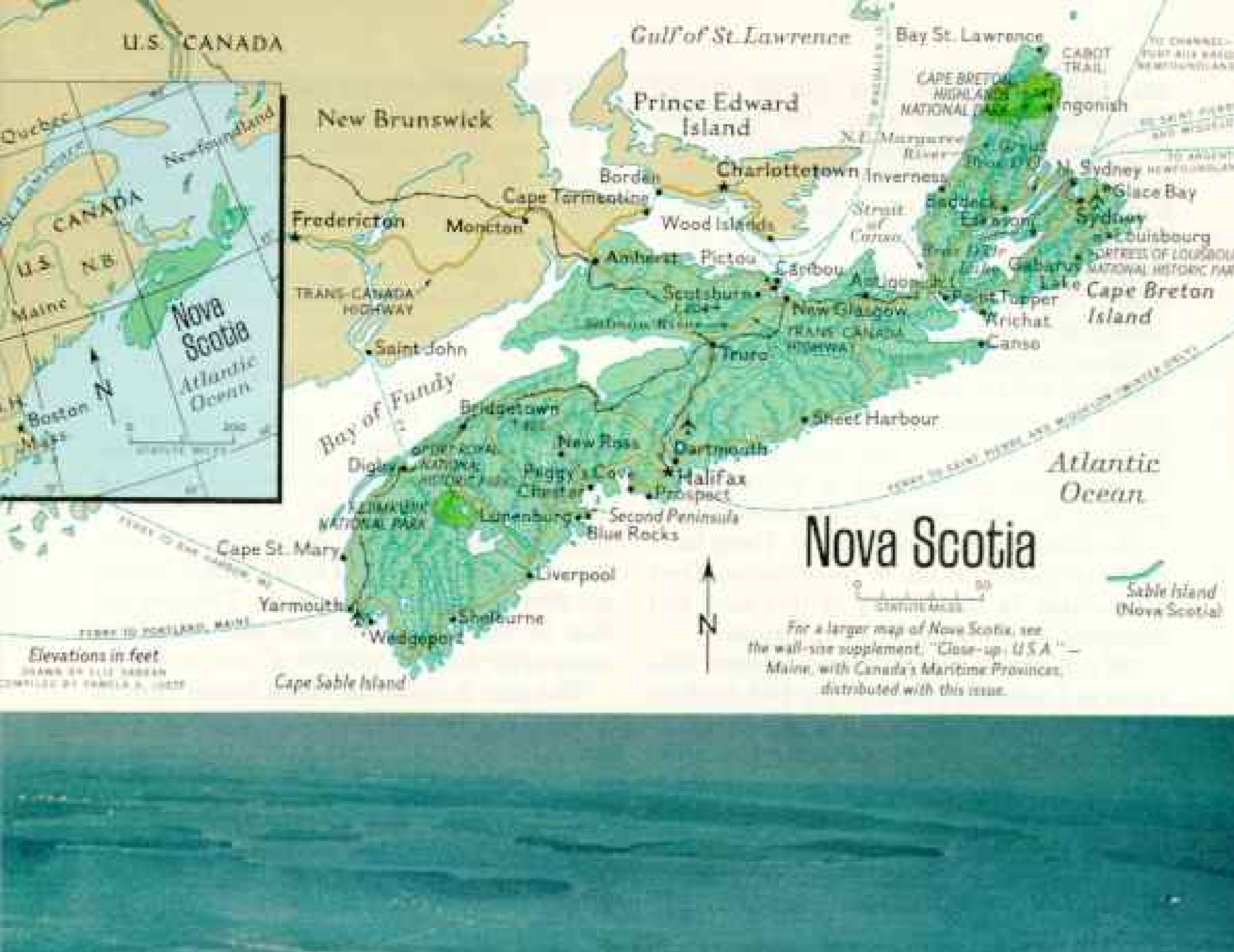
leads north to the headlands and mountains of Cape Breton Highlands National Park. There other pathways thread a realm of white-tailed deer and marten, puffin and grouse.



Moored like a great ship off Canada's east coast (**right**), Nova Scotia flanks one of the wonders of the world, the Bay of Fundy. Its tides—earth's highest—sometimes reach 53 feet. The phenomenon sends a tidal bore racing up the Salmon River near Truro (**left**).

A man-made marvel came into being in the Strait of Canso when Nova Scotians built a causeway linking their mainland to Cape Breton Island. The barrier blocks ice drifting from the northwest, creating a year-round harbor on the southern side. In 1970 Gulf Oil Canada Limited opened here a deep-water port for supertankers, capable of handling ships with a 2.5-million-barrel capacity. The *Takaoka Maru* (**below**) will offload Iranian crude for refining. The smaller tanker carries refined oil products to the United States.

Nova Scotia



For a larger map of Nova Scotia, see the wall-size supplement, "Close-up: U.S.A."—Maine, with Canada's Maritime Provinces, distributed with this issue.

one Lunenburg man was picked up off Gloucester after days adrift. He lived, but they buried his partner in Massachusetts.

I looked at Lawrence Tanner's gnarled hands. "Working in dories," he said, "I froze all my fingers right down to the second joint. Some people ask if I *liked* it. I can't answer that; it was what we had and all we had. Liking didn't enter into it."

There was a pause while both men thought. "Looking back," said Capt. Lawrence Tanner, "I wonder how we went out to the Grand Banks, how we did it. But when you saw all the schooners coming back in the fall of the year, saw the sails—why, it was a nice feeling."

Hardship and accomplishment. Those have been the themes of life in Nova Scotia. They are written in the history of this land and engraved on the memory of its people.

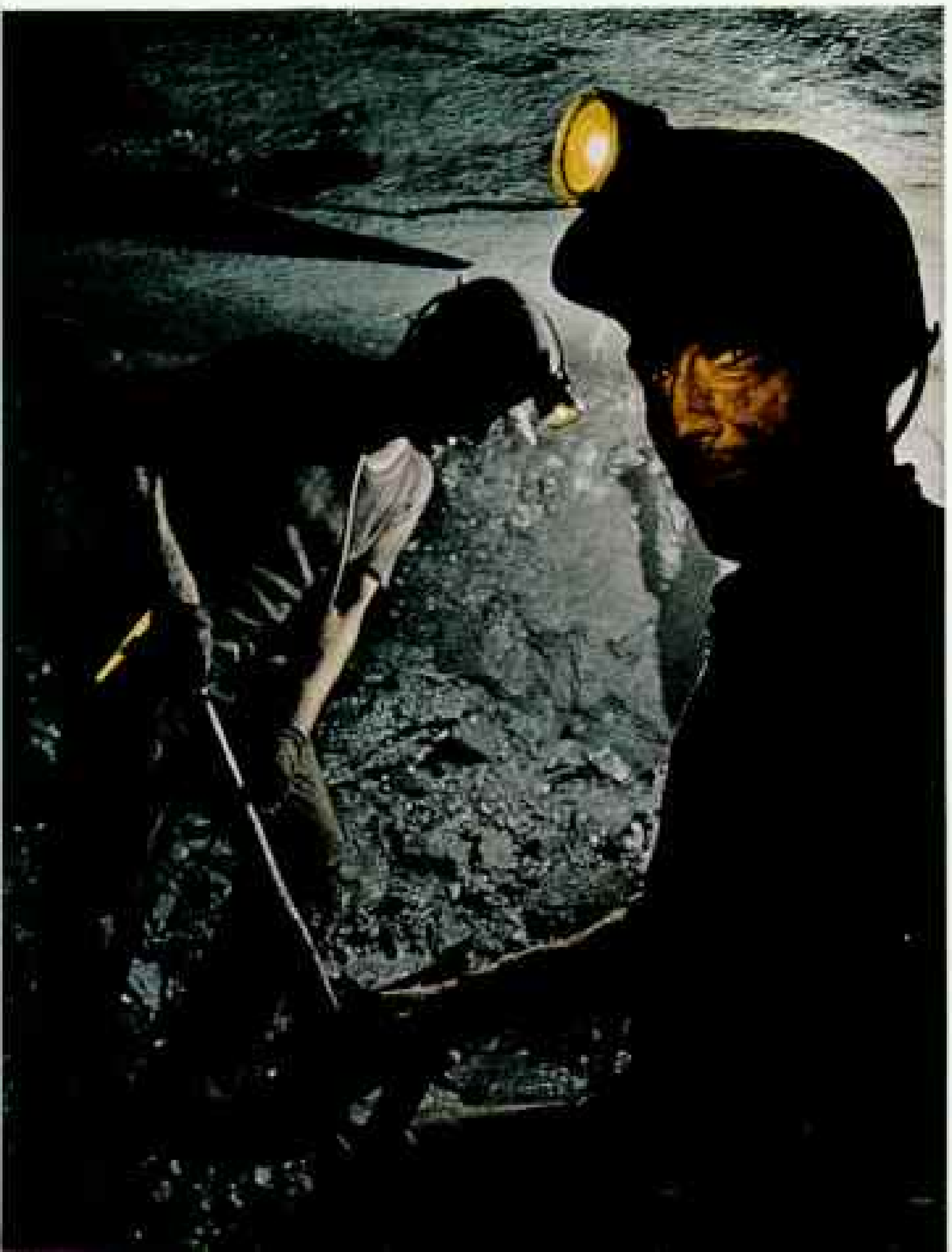
"My ancestors were German farmers who came to Lunenburg early in the 19th century to join the other 'Dutch' here," one man told me. "They soon turned their backs on the land and farmed the sea instead. They found that wasn't easy, but what was?"

Far to the northeast, on Cape Breton Island, others went down in the coal mines—next to fish, coal was the province's greatest source of wealth. Some seams extended under the sea floor, so men worked beneath hundreds of feet of earth with hundreds of feet of wild water on top of that.

Blossoms Relieve the Gloom Below

"You always think it might come in on you," a retired miner at the Glace Bay museum told me, leading me through part of a mine that has been turned into a tourist attraction. "But look here," he added as we came to a small garden lighted by sunlamps, "we've got flowers growing down here. The men did that in the old mines, you know, to have some color and life instead of just the dark."

The past is closer in Nova Scotia than in most lands I've visited—the Tanners were going to sea in sailing ships only 30 years ago,



Moling into a dank netherworld, coal miners open a tunnel 600 feet down at Evans Coal Mines near Inverness. Here on Cape Breton in 1720, the French worked the first commercial coal mine in North America; it supplied Louisbourg fortress

and there's many a family that lives—and speaks—pretty much as their ancestors did.

In the streets of Sydney, Nova Scotia's industrial center and third largest city (after Halifax and Dartmouth), I overheard a teenage boy and girl speaking a tongue I did not recognize. "It's the Gaelic," said the boy, with a glare, when I asked. His girl, though, gave me a sunny smile. "You must be a stranger if you've not heard the Gaelic before," she said, and added, "It's a bonny tongue when the right laddie speaks it!"

I heard other Nova Scotians speaking Acadian French, a charming but baffling mixture of ancient French grammar and adopted English words that scamper through this unique patois like blue-eyed orphans in berets. And in the speech all through the province I heard the faraway music of Scotland and Ireland, Cornwall and Germany, Massachusetts and the Carolinas.

The dominant accent of early Nova Scotian history was French. In 1605 France's first significant New World settlement was planted on the mainland of Nova Scotia. Its founder was Pierre Du Gua, Sieur de Monts, who had been granted a fur-trading monopoly by the King of France.

De Monts and his lieutenants, among them Samuel de Champlain, discovered Boston and Plymouth harbors, but considered neither suitable for colonization. Instead De Monts established a small colony at Port Royal, on a sheltered basin inside the mouth of the Annapolis River.

New World Home Boasted Old Comforts

The colonists built a fortified four-sided structure that was, as nearly as they could make it, a microcosm of France, including a kitchen, a bakery, a forge, and an apothecary. Champlain formed a dining society for gentlemen called *L'Ordre de Bon Temps*, The Order of the Good Time. Ever mindful of the cultural graces, the colonists entertained themselves by performing their own drama in

and later the hearths of Boston. Now coal fuels an island steel mill and an electrical power station. At the Evans washhouse (**below**), after an eight-hour shift in the pits, miners "swap backs." Camaraderie increases as coal dust disappears.

costume—all this in 1605-07, two months' sail from the coast of France, surrounded by a howling wilderness.

The Habitation, as the complex was called, was burned by an expedition of Englishmen from Jamestown who, in 1613, set out to destroy all French colonies in America. Today it stands much as it was 370 years ago, reconstructed on its original foundations.

I learned more about this remarkable reconstruction from Gerald R. Bowen, superintendent of the Port Royal National Historic Park. Mr. Bowen's aim is authenticity, right down to hinges, and clasp knives used in the Indian trade. He took me through a sail loft, where, after much effort, he'd managed to install some old-fashioned tarred rope. "I wanted another dimension; the tar in here re-creates the odor of the old ship's storeroom," he said with satisfaction.

Here Franco-Anglo Friction Flared

The burning of the Habitation was only the beginning of long conflict between French and English in Nova Scotia. There is no more fascinating reminder of those bloody days than Louisbourg, on Cape Breton Island.

On a point commanding the approaches to the mouth of the St. Lawrence River, and thus vital to the defense of Canada, two great fortresses have risen. Each is a wonder of its time. The first was begun in 1719 by Louis XV of France. The second is a reconstruction being built by an enthusiastic Canadian civil servant named Dr. John Lunn, superintendent of the Fortress of Louisbourg National Historic Park (following pages).

"I begin with superlatives," Dr. Lunn told me with a smile when I dropped in on him. "You are in the largest of Canada's national historic parks, 13,000 acres, with a jewel in one corner—the fortress. In the works since 1961, it's budgeted at 20 to 25 million dollars —one of the largest historical reconstruction projects now going on in the world."

The original Louisbourg, consisting of seven great forts and some 500 buildings, surpassed Quebec in commercial and strategic importance. It was thought by the French to be impregnable, and by the British colonists in New England to be an intolerable threat.

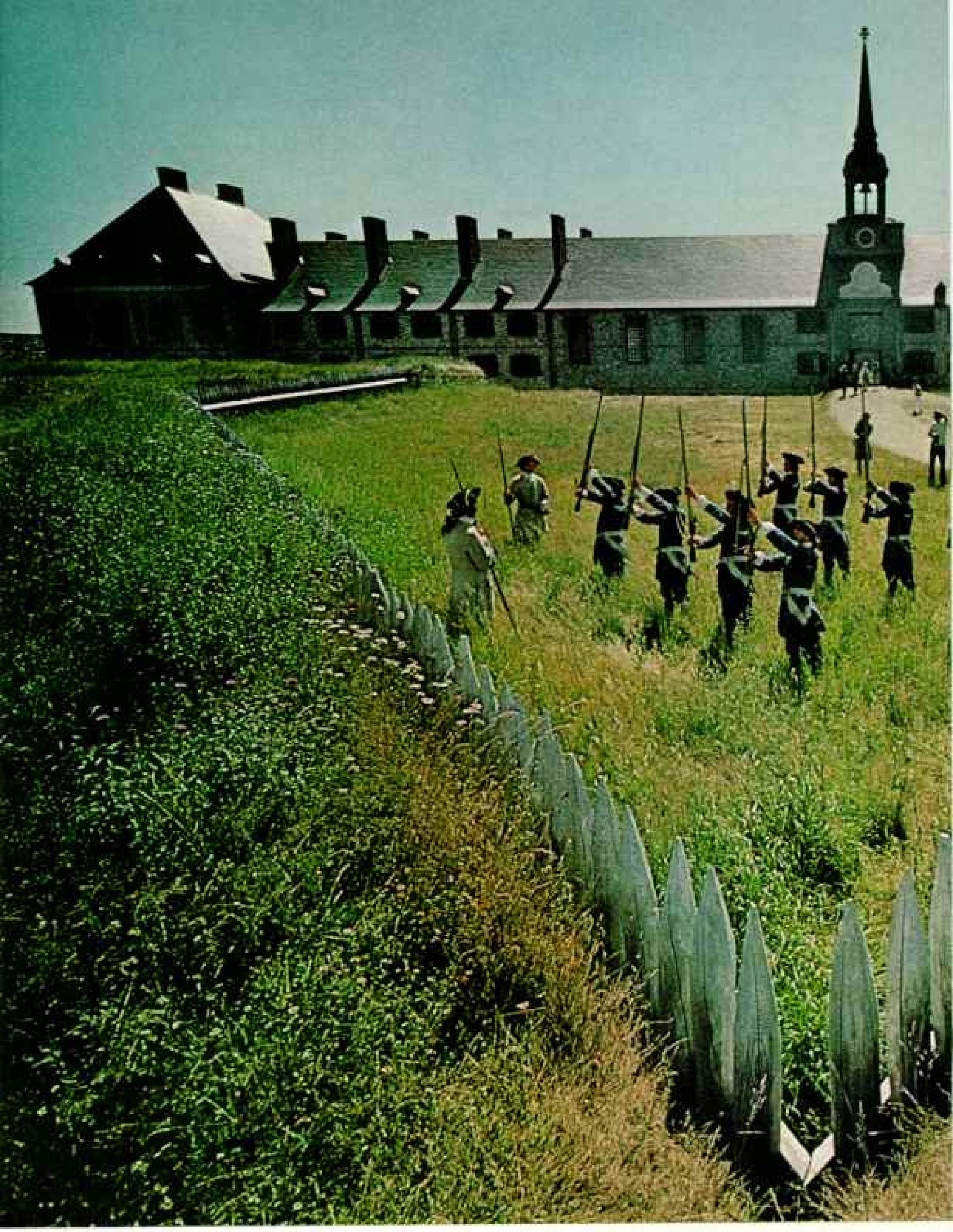
In 1745 an expedition of 8,400 Yankees and British aboard a hundred ships captured Louisbourg. Three years later it was returned to France by treaty. In 1758 it changed hands again, but in 1760 it was abandoned and its fortifications destroyed. For the next 200 years the town was little more than a source of stone for nearby settlements.

"Now we have completed the King's Bastion and its barracks and about thirty other buildings," said Dr. Lunn. "We plan to reconstruct about fifty buildings exactly as they were in 1745 before the first siege. When we are through, the Fortress of Louisbourg will live and breathe once more.

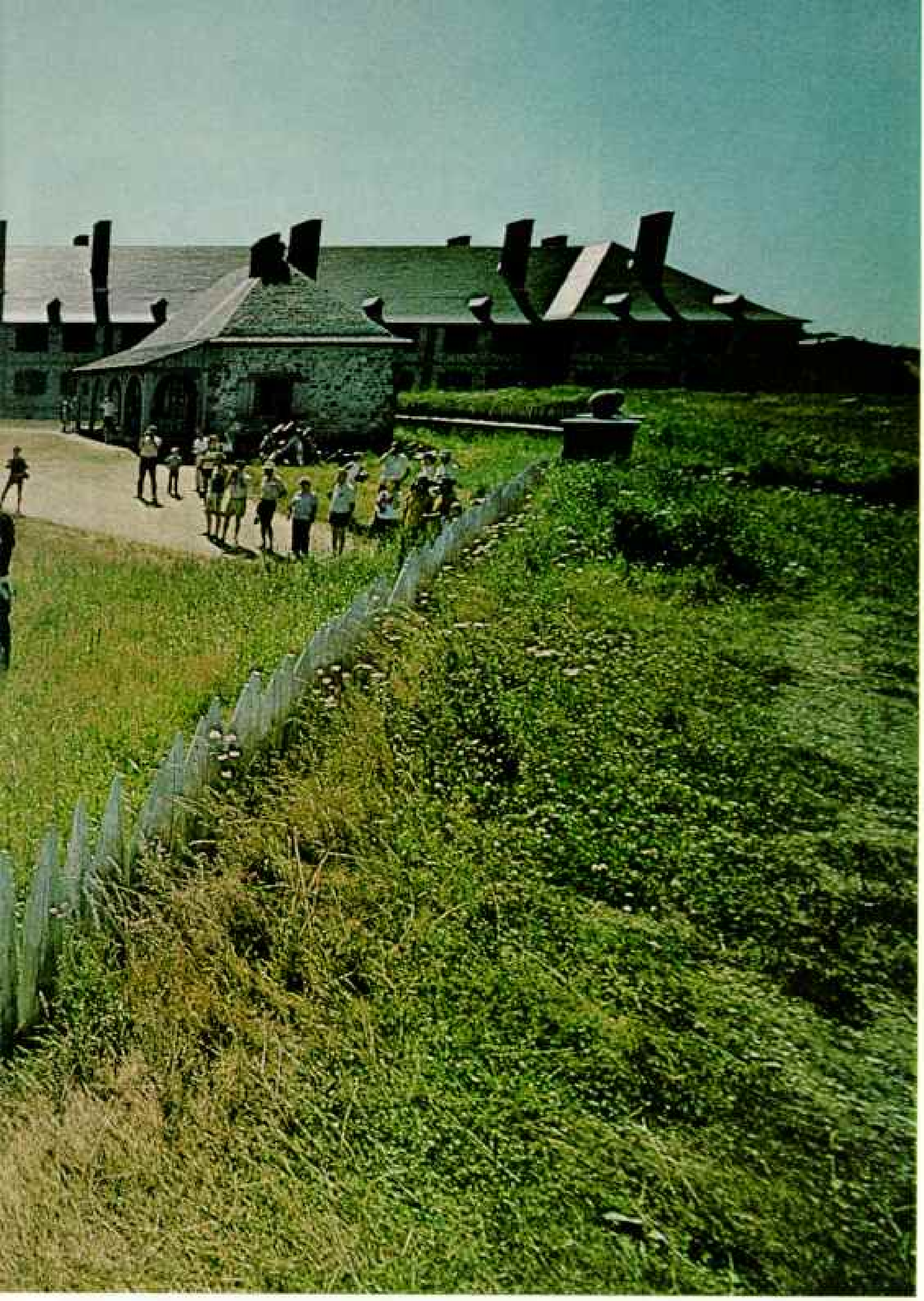
"Every brick, board, tile, nail, and hinge

Sword-leaping lassies with names like MacLeod and Dundas glorify Scottish Highland ancestors who came to tame the wilderness more than a century ago. The girls keep custom alive at St. Anns.

One of the world's great harbors (**facing page**) earlier lured the British, who settled Halifax in 1749. Here containerized cargo from world-ranging freighters is loaded onto railway cars bound for Toronto and Chicago.



"*Posez vos armes à terre*—**Ground your arms!**" A sergeant drills marines with French commands to recapture 18th-century life at Fortress of Louisbourg National Historic Park. King Louis XV poured millions of dollars into creating the formidable stronghold to guard the sea gate to the St. Lawrence River. The Barracks of the King's Bastion,



background, was among the largest buildings in North America. But the British demolished the settlement in 1760. Now Canada has earmarked more than twenty million dollars for long-range reconstruction that has already given jobs to hundreds of Cape Bretoners, and draws visitors from around the world.

The school bell rules the world of childhood at one of a dozen one-room schools left in Nova Scotia. Mrs. Annie MacLean summons her pupils after recess, but bars a four-legged friend (**right**). Offering individual attention, she guides 17 children, ages 6 to 13 (**below**), through the eighth grade. After graduation the youngsters will ride a bus to high school at Sydney River, even as their parents, part-time farmers, commute to factory jobs in town.

that we use is made in our own workshops," Dr. Lunn said. "We even try to reproduce funny little peculiarities we've found in the work of the various 18th-century builders."

In summer the fortress is peopled by university students and others, dressed in period costumes. To achieve the effect of a living town, Dr. Lunn forbids the summer soldiers and kitchen wenches to bathe and launder too often.

"The soldiers of old Louisbourg were scruffy, unshaven, and even a bit smelly; it was a smelly century," he explains. "Our people can't be *too* authentic, but we want each visitor to take a step back in time when he enters the fortress, so that everywhere his eye falls, he will see the 18th century. That's our dream!"

Acadian French Mingles Two Tongues

Wandering through the fortress, I overheard evidence that the past is still very much alive in bicultural Canada. Among Louisbourg's authentic touches is a pen full of pigs at one end of the parade ground inside the King's Bastion. A Quebecois father pointed out the grunting animals to his young son. "*Regardez, là-bas,*" he said with a chuckle, "*des prisonniers anglais!*"

A few days later I was at the other end of Nova Scotia, sailing past the bell buoy off Cape St. Mary, in total darkness in a driving rain, with a couple of amiable chaps who asked politely if I understood French and, when I said I did, addressed me in a French that no Frenchman now alive has ever spoken. Bruce Le Blanc, captain of the *French Angel*, and his one-man crew, a university student named David Doucet, are Acadians —descendants of Nova Scotia's earliest European settlers.

We met at 4 a.m. and set out for St. Marys Bay to watch Canadians and nine foreign teams fish for the great bluefin tuna in the 25th International Tuna Cup Match. It was the last day of the match, and the spirits of the fishermen were high; several of the big game fish had been caught earlier in the week. The year before, not one large fish had been landed. I asked Captain Le Blanc what it was like to catch a giant bluefin. He grinned. "*C'est exactement comme pulling une grande pièce de concrete into le boat,*" he replied, in splendid Acadian French.

By day's end several big tuna had been gaffed, including a 790-pounder aboard a boat nearby. I watched the fisherman, who wore a tremendous grin, stroke its great gray flank. The dead tuna's dorsal fin still moved in reflex action; its blood still stained the water. The team from the British Caribbean won the five-day tournament, catching three tuna with a total weight of 2,418 pounds.

While fishing for sport, Bruce Le Blanc and David Doucet told me what it was like to fish for a living in modern-day Nova Scotia. Le Blanc's *French Angel* is a fine example of the high-prowed, shallow-draft, tremendously seaworthy Cape Island boat that originated on Cape Sable Island, Nova Scotia. Le Blanc operates the craft out of Wedgeport, on the western coast below Yarmouth. The captain is a lobsterman, and he has a lot of company in his profession.

"From December to May," he said, "you can *walk* on lobster-trap buoys for miles along this coast and out to sea. Two hundred boats, with as many as 375 traps each, work these waters, the best lobstering in the world. We take two million pounds in the first weeks, and still the lobsters come, year after year."

Foreign Competition Threatens Livelihood

A good boat will clear $30,000 in six months. What does a fisherman do with the rest of his time?

"Talk about last year, think about next year," said Captain Le Blanc. Unfortunately, when Nova Scotia fishermen think about next year, they tend to worry. Fisheries account for a third of all Nova Scotian exports, but lately the sea-fish catch is getting smaller—795 million pounds in 1968; 633 million in 1972; 616 million in 1973.

Fishermen believe they know the reason: The huge trawlers that arrive in droves off the coasts and the Grand Banks and, with their superlative technology, suck up everything that swims. Some weeks as many as a hundred Soviet trawlers operate in waters off Nova Scotia.

"Ten years ago the draggers would come into Lunenburg harbor with 400,000 or 500,000 pounds of fish aboard, but now they have to do a lot of scraping to come in with 100,000," Gilbert Tanner told me. "If they go on like they're going, it'll be all over, the sea will be empty.

"What we did years ago, and what the Portuguese do now, that never would hurt anything. But the trawlers! They pull in everything. So now there are quotas. We used to stand on shore and watch the tuna schooling

and schooling. But you don't see that sort of thing anymore."

Government officials are less assertive about the problem of the trawlers, perhaps because of diplomacy. But Nova Scotia's Minister of Fisheries, A. M. (Sandy) Cameron, did tell me, "I think we're standing on the threshold of a glorious future for our fisheries—*if* we can get our fishing territory extended to the proposed 200-mile limit." Without such an international agreement to manage offshore fisheries, many Nova Scotians may not be fishing for a living much longer.

Landscape Recalls Acadians' Trials

As for the Acadians, they have not always been fishermen, though many of them are now. The ancestors of men such as Bruce Le Blanc and David Doucet were farmers from the west of France who settled on lands along the Bay of Fundy and the Annapolis River in the 17th century. They built dikes, reclaiming fertile land from the Fundy tides, and creating what remains the loveliest and most productive land in Nova Scotia: mile after mile of meadow and orchard, garden and pasture.

Gazing down upon it from a hill above Bridgetown, I found myself remembering my childhood, and the feelings I had when I learned of the plight of the Acadians. How I used to wish that Evangeline, torn from the arms of her bridegroom on her wedding day, would find her Gabriel. But no matter how often my mother read me to sleep with Longfellow's *Evangeline*, these tragic lovers were never reunited until it was too late.

The Acadians were consistently at odds with those who spoke English. When a band of French and Indians from Quebec staged a bloody attack on Deerfield in 1704, my ancestors' neighbors from Massachusetts retaliated with a raid on the Acadians in Nova Scotia. They spoke French, didn't they?

When, after the first fall of Louisbourg, the Acadians refused to swear allegiance to the British King, they were dispossessed of their lands and expelled from Nova Scotia. In the year 1755, at least 6,500 were scattered.

When the Seven Years' War ended, the victorious British permitted the Acadians to return. One group of 900 *walked* from Boston through the wilderness. By that time their lands, the best in Nova Scotia then as now, had been occupied by colonists from Britain and New England. Some families of returning Acadians settled on rugged Cape Breton Island where, somehow, they got by.

Historically, Nova Scotians have "got by" less well than most other Canadians, and Cape Breton Island is less well off economically than the rest of the province. Per capita income in Nova Scotia stood at $3,333 in 1973, about 20 percent below the national average. In mid-1974, unemployment for Nova Scotia as a whole was 7 percent; on Cape Breton Island, 12.1 percent.

Cutting a mean furrow, William Keddy shows off his prized oxen in a contest at Ross Farm. This agricultural museum at New Ross displays such traditional crafts as barrel making, blacksmithing, and butter churning. In Nova Scotia oxen and horses can still be seen pulling plows and wagons.

Tourism provides about 10,000 jobs and brings 70 million dollars into Nova Scotia yearly, most of it between mid-June and mid-September. More than one and a half million people from outside Nova Scotia visited the province in 1974.

The Plan: Cautious Progress

Because Nova Scotia has a big defense establishment and an excellent system of social services, government is a major employer. Population, employment, income, output are all on the rise, though, and Premier Regan sees a broader-based economy in the future.

His government is active in attracting industry and in creating jobs. "We want maximum growth," Mr. Regan told me, "so long as the price we have to pay is not too great in terms of the change we'd have to accept in the nature of our province."

One example of the sort of thing that's happening in Nova Scotia is the refinery and supertanker terminal operated by Gulf Oil Canada Limited at Point Tupper in the Strait of Canso (pages 342-3). A road and rail causeway closed this strait between mainland Nova Scotia and Cape Breton Island in 1955, taming the swift currents and blocking the ice floes that used to drift down from the Gulf of St. Lawrence.

The result is an ice-free channel, more than a hundred feet deep, with a dock capable of handling supertankers as large as 350,000 tons. These huge vessels cut back their engines at the entrance to Canso channel, then tugboats assist them for the 14 miles to Gulf's

Sweet smells of harvest drift over the fertile Minas Basin, at the northern end of the Annapolis-Cornwallis Valley. Many farmers here also hold seasonal town jobs, and others combine tilling with fishing and lumbering, but the valley remains famous for its fruits and vegetables. Some find their way to tables in Great Britain and the U. S.

"Until the storm, things were looking good," commented apple grower George Foote about the early snow that ruined a third of his crop last October. A seasonal worker (**below**) salvages the damaged Courtlands for juice; they brought only a third the price of dessert apples. "That took all the fun out of it," said Mr. Foote.

terminal. There, their automated high-speed pumps unload the cargo in thirty hours.

The whole operation—the terminal and a refinery that can handle 100,000 barrels a day—employs about 190 men. In the process control room I asked Frank Purkis, the master operator, how a man could ever control the baffling array of dials and push buttons that he was monitoring.

"You get the feel," he said, his sharp eyes never leaving the panel. "To a stranger it's one big roar, but to me it's trouble or music."

Another kind of music, a siren's song, has been sung by Cape Breton Island to many a man and woman whose forebears never spoke a word of French. Here many Highland Scots, seeing worn hills and blue lakes and moss and fir that mimicked the contours and colors of their native land, chose to settle.

Many left Scotland in the early decades of the 19th century, when the lairds found more profit in grazing sheep than in renting their lands to peasant crofters. Others came seeking freedom to worship as they pleased. They paid for it by enduring bleak Cape Breton winters while toiling for years to carve tidy farmsteads out of the vast forest wilderness that still dominates the landscape.

Good Man in a Crunch

In this setting it's not surprising that you'll hear tall tales of sturdy Scotsmen—men like Angus (The Giant) MacAskill, who approached eight feet in height, weighed 425 pounds, and had brawn enough to lift an anchor weighing a ton.

Once, it's said, an American pugilist challenged MacAskill to a few rounds, and Angus politely accepted. "But first," he suggested, "we must shake hands." The prizefighter foolishly agreed, and The Giant MacAskill crushed every bone in his fist.

The Scottish culture is firmly preserved at the Gaelic College at St. Anns. There, on a bright morning, I heard a regiment of teenage bagpipers render "Scotland the Brave" with such spirit that the upland air, had it been real and not metaphorical crystal, would most certainly have shattered.

The head of the college, Leonard Jones, explained that it had been founded in 1939 by the Reverend A. W. R. MacKenzie, on land granted for one of the earliest Scottish settlements in Nova Scotia.

The college offers summer courses in Gaelic and in Scottish music and dance and

crafts such as the weaving of tartan. Mr. Jones, himself of Welsh origin, saw nothing strange in the fact that the student body has included Chinese and blacks, Poles and Jews among its bagpipers, drummers, and dancers. "The Scottish heritage is universal," he explained. "The Scots have always shared everything; they've been the nation builders."

It was Scots from St. Anns who helped mold yet another nation half a world away. In 1851 the Reverend Norman MacLeod, who had brought a group of pioneers to Cape Breton, led some of them on a 13,000-mile voyage to settle in New Zealand.

You'll see very few grand houses on Cape Breton Island—the cottages, beaten by wind and weather, are as plain as Presbyterian prayers—but you'll hear a lot of grand talk.

Cape Bretoners have what might be called a definite sense of place. They call the rest of Nova Scotia the Mainland. As one explained: "A man from this island is Scottish, or whatever his ancestors may happen to have been, first. Second, he's a Cape Breton Islander. Third, he's a Nova Scotian. And fourth, if at all, he's a Canadian."

Island Trail a Magnet for Tourists

It would be an insensitive and dishonest outsider who did not agree with the Cape Breton Islanders that their portion of Nova Scotia is more beautiful than many other parts of the province.

Every summer hundreds of thousands of

Sparkling waters of Bras D'Or Lake probe the heart of Cape Breton Island in this view, 7½ miles wide in the foreground, that stretches 50 miles to the Atlantic. Sailors delight in the fog-free expanse, slipping through the Grand Narrows railway bridge at right center to wander among the islands and peninsulas of Malagawatch, closest to the camera. Ocean vessels maneuver through the main channel to load gypsum for export —Nova Scotia provides 70 percent of Canada's output—and spruce for pulpwood. Most of the local timber, though, is consumed by the province's pulp and paper industry.

outsiders, in buses, campers, and cars, drink in the beauties along Cape Breton's Cabot Trail, 184 miles of seascape and wilderness looping around the steep northern end of the island.

My 12-year-old son Caleb and I made our way along this famous route, pausing to walk on the splendid beaches near Ingonish (and to count the jellyfish that teem in Nova Scotian waters, keeping all but the unheeding out of the chilly surf). We gazed through an early morning fog at the pleasing composition of a spare white church against a sun-shot rainstorm at Bay St. Lawrence. We told and retold stories we'd heard about this lovely but ungiving country.

Our informant was kindly Dr. C. Lamont MacMillan of Baddeck. Dr. MacMillan, for almost forty years, was the only doctor between Baddeck and Sydney. "I began practice in Baddeck on August 17, 1928," Dr. MacMillan told me, "and if I forget, I have only to ask a young woman here whom I brought into the world that day."

That was almost fifty years ago, when roads were few and rough in summer. And in winter nonexistent. "If you wanted to go someplace after the snow fell and the water froze, you'd go over the ice of Bras D'Or Lake with a horse sleigh," said Dr. MacMillan.

Bras D'Or, pronounced like the last two syllables of Labrador, is the great saltwater lake that forms the heart of Cape Breton Island. It reminds the Scots of the lochs, and the Irish of their own changeable sea, and the Acadians, who have known it longest, of itself, which is quite enough when the sun burns off the mist and the lake is revealed, blue and clear and stirred by a sailor's wind.

Dr. MacMillan and another man and a horse fell through the ice on an April day in 1937. "This other fellow couldn't even swim, I discovered too late," says Doc. "He grabbed at me and I thought we'd go down together. He was doing some hollering. There was a low fog on the ice so people couldn't see us, but they heard the noise. They came looking for us, but a moment before they got there the horse reared up and went under the ice and drowned. It was a borrowed horse, so the embarrassment was greater."

It was on the Bras D'Or waters that a genius who truly loved the lake attempted to give man wings. Here Alexander Graham Bell lived in the summer from 1886 until his death in 1922. Here, with his wife, he lies buried on a mountaintop with Bras D'Or Lake spread out below. This was Bell's Beinn Bhreagh, or Beautiful Mountain, where he spent quiet

moments contemplating a view of haze and cloud and purple hills that reminded him of his native Scotland.

Alexander Graham Bell described himself as a teacher of the deaf. He directed Helen Keller's education, and the methods he devised ended the awful imprisonment of silence for thousands. The world regards Bell as the inventor of the telephone. He was the inventor of much else, as a visit to the Alexander Graham Bell Museum will confirm.

Here is displayed the work of a brilliant and far-reaching mind—the telephone, of course, discovered in the course of experiments to graph sounds as visible patterns. But also the photophone, a device that would transmit speech in the form of light waves. And the graphophone, which improved on Edison's invention by discovering and developing the recording qualities of the wax cylinder and disk; the iron lung; the hydrofoil; the kites that Bell believed would enable man to fly.

Kite Flying Brings New Knowledge

Along one wall, mounted on panels so that visitors may, in a sense, touch Bell, are scores of enormous photographs—"unquestionably the most popular display in the museum," Superintendent John Stephens told me. "You can see that people feel that they are close to Bell, for the pictures—almost all of them made by Bell's son-in-law Gilbert Hovey Grosvenor—capture his humanity so perfectly. I don't think that there is a more brilliant record of the life of a great man."

Bell's grandchildren, who still summer at Beinn Bhreagh, appear windblown and sunburned in some of the old family photographs. They still remember very well Bell's experiments with flight. His tetrahedral cells (geometric figures with four triangular faces) were pyramided together to form a light, strong surface, and incorporated into many kites, which Bell flew over Bras D'Or Lake.

"Of course a lot of people thought it was a bit odd for a grown man to be playing with kites all the day long," recalls Dr. Melville Grosvenor, Bell's grandson and now Editor-in-Chief of NATIONAL GEOGRAPHIC, "but Grandfather persisted."

Finally, in 1907, the great tetrahedral kite *Cygnet*, towed by a steamboat over Baddeck Bay, rose to a height of 168 feet, carrying Lt. Thomas E. Selfridge of the U. S. Army. Bell, in proving that a kite constructed of

Frozen on course, tetrahedral kites and a hydrofoil boat hang in the Alexander Graham Bell Museum at Baddeck (**above**). The boat, a 1/10-scale model of a 70-foot vessel, was built by F. W. (Casey) Baldwin after Bell's death, but the design was perfected during the inventor's lifetime. After developing the tetrahedral kite as a vehicle for flight, Bell applied aeronautic principles to watercraft.

The inventor of the telephone displayed one of several models of his hydrofoil (**left**) in 1912. The hull of the cigar-shaped *HD-4* (**right**) rose out of the water on ladderlike strips of metal. Though weighing more than 10,000 pounds, it sped across Bras D'Or Lake at 70.86 miles an hour, a world's record in 1919 and for 10 years thereafter. It was a beautiful sight, recorded Dr. Bell, to see a hydrofoil "flashing past the houses and trees on shore."

GILBERT HOVEY GROSVENOR (BELOW) AND © BELL FAMILY (LEFT)

tetrahedral cells could carry a man in flight, had also learned that this form of construction, immensely strong and light though it was, created too much wind resistance to be practical for powered flight.

Later, the Aerial Experiment Association, inspired and financially supported by Mrs. Bell, developed several flyable aircraft. On February 23, 1909, a Bell disciple named J. A. D. McCurdy piloted the fourth of these planes, the *Silver Dart*, for half a mile, 30 feet above the bay. The work of the Aerial Experiment Association contributed, among other advances, to the development of the aileron and the tricycle landing gear.

Inventor Foresaw Energy Crisis

The waters of Bras D'Or Lake were the proving ground of yet another momentous experiment. Together with F. W. (Casey) Baldwin, Bell developed a hydrofoil boat, the *HD-4*, which achieved a speed of 70.86 mph on Baddeck Bay in 1919 (page 359). The record stood for 10 years.

Bell clearly foresaw today's energy shortage as early as 1922, when he wrote: "The world's consumption of fuel has become so enormous as to show that our present supplies cannot possibly last for many generations more. Coal and oil are strictly limited in quantity and can never be replaced when once removed from the earth. . . ."

As an alternative he suggested alcohol: ". . . a beautifully clean and efficient fuel, which can be produced from vegetable matter of almost any kind. The waste products of our farms are all available, and even the garbage of our cities."

More than 280,000 visitors a year now view the record of Bell's achievements, aptly memorialized in a museum that suggests the fleet, strong, and airy shape of a tetrahedron.

Museum superintendent Stephens is sure he has the best job in the world.

"Bell lived a life of almost complete virtue," Stephens told me, as we watched a crowd of visitors, hushed by what they saw, move among Bell's works. "He was a truly good man—and what a pleasure it is to hold

Beating a stubborn retreat, February fog relinquishes the rugged shore at Prospect, southwest of Halifax, to the conquering sun. Villagers consider their life facing the stormy Atlantic to be "right good."

up that life as an example to the people who come here."

The famous inventor, who spent many years in the attempt to produce a superior strain of sheep through selective breeding, would doubtless have been fascinated with the work of a bearded biologist I encountered in Baddeck. Dr. Roy Drinnan likes lonely places and practical problems. With funding from the Cape Breton Development Corporation, a government organization that provides capital for such projects, Drinnan is attempting to establish that Bras D'Or Lake is a good place for raising cash crops of oysters, trout, and other seafoods.

In the East Bay of Bras D'Or Lake, the techniques of this type of aquiculture were pioneered, on the basis of Dr. Drinnan's work, by the Micmac Indians, with headquarters in the Indian Reserve at Eskasoni.

A young Micmac named Charley Dennis gave me a taste of the results one misty afternoon. We went by motorboat to a sheltered place in Crane Cove, where oysters were almost ready for harvest. Charley opened a box in which 2- and 3-year-old oysters were maturing a few feet under the mild waters. He plucked out a handful of gnarled gray shells, slipped a knife blade into the hinge of one of them, and handed me the half shell.

At the first taste—slightly metallic, slightly salty, wholly delicious—I heard once again the accordions of Paris and saw that city in winter, for I had never tasted a better oyster outside the capital of France.

Oysters Respond to Pampered Life

That oyster was not only very tasty, it had had a remarkable life. Its foster parent, so to speak, was a scallop. Dr. Drinnan explained it to me at Portage Creek, an inlet of Bras D'Or Lake, where he and his son Philip raise oysters. All around us lay scallop shells, strung on long wires and separated by bits of tubing.

"Normally oyster spat, as the larvae are called, will attach themselves to rocks," Roy said. "But they will cling to any clean surface. We tie strings of scallop shells to anchored rafts, 100 strings to a raft. When the water warms up in July, the larvae latch on to the scallop shells, as many as thirty to a shell.

"On the muddy sea bottom, oysters take six to eight years to mature, and are difficult to harvest. In this warm, clear water you can have a marketable oyster, worth as much as a quarter to the oyster farmer, in three or four years."

Roy has high hopes, too, for the future of trout farming here. He marketed thirty thousand pounds last year from the saltwater Bras D'Or Lake.

The Future? A Welcome Challenge

If there's one thing a Nova Scotian understands, it's the possibilities of the sea, so Roy Drinnan and all the others who are trying to change the ways of Nova Scotia without changing her nature may have a chance.

Nova Scotians have done just about everything: built the *Bluenose*, perhaps the fastest fishing schooner that ever sailed the Atlantic; taken in all sorts of people, including a lot of 19th-century slaves who became free men when they crossed over the U.S. border. Nova Scotians have cut the forests, tilled the soil, gone underground for coal and even gold (1,139,000 ounces of it before the last mine closed in 1950).

Whatever they've done, it hasn't been easy, but they've gone right on doing it in spite of everything. Something there is in his history that tells a Nova Scotian he's different, and that that's a good way to be.

I kept thinking of Gilbert Tanner, who went to sea like all the boys he knew, at the age of 12, and worked from three in the morning till midnight six days a week, in all seasons.

"In winter," he told me, smiling, "well, at times it was chilly. A ship would freeze up pretty well. We'd slow her down and pound the ice off, then give it to her again. I've seen schooners come into port looking like a stone, sails and all. But you stayed until you had everything the ship would bring. Otherwise, why leave land?"

With *that* behind them, Nova Scotians ought to be able to deal with whatever lies ahead. Many people there told me Nova Scotia was entering a new day. May it begin with a brightness. □

Backbreaking effort brings a worthless haul to fishermen of Big Tancook Island, who find dead mackerel and herring entangled in nets they could not tend during a three-day storm. Nova Scotia's men of the sea spend as much as 18 hours a day on rough, icy waters in what remains the province's most characteristic occupation.

The Kurds of Iraq risk their lives daily in a desperate struggle for self-determination

"We Who Face Death"

ARTICLE AND PHOTOGRAPHS BY LEROY WOODSON, JR.

CRAMMED into a decrepit Land-Rover, ten Kurdish fighting men and I are racing the dawn for our lives. Above us on the craggy heights, Iraqi Army guns will soon be sighting on anything that moves along the road. The Kurds have been running this lowland corridor only at night, on their way to mountain sanctuaries, but we have overslept. Now the sun's first faint rays spike us with cold fear.

The engine coughs, sputters, and stops, out of gas. We bolt for the nearest ditch. Huddling there, I can look up and see the Iraqi encampment's twinkling fires. Soon, artillery shells will whistle down. The mountain guerrillas with me have earned their name, "Pesh Mergas—*We who face death.*"

The skyline takes dim shape, silhouetting trees on the slopes and our useless Rover on the plain. Several Kurdish vehicles dash for safety past our frantically signaling driver. Finally a huge truck, dangerously overloaded with bandoliered men bearing rifles and light machine guns, grinds to a halt. From it appear a five-gallon can of fuel and a hose.

We roar away to safety as the sun begins to climb above the rim of the mountains. A new day has come to this troubled land.

Trouble is an old story to the Kurds, but only recently has the world taken notice of the cruel civil war that resumed a year ago this month in northern Iraq.

Why are they fighting? The Kurds, a proud and fiercely independent people, have been divided by the boundaries of Turkey, Iran, Iraq, Syria, and the Soviet Union. For much of this century, many of these handsome, fair-skinned people have dreamed of an independent Kurdistan.

For the hundreds of thousands of Kurds in Syria and the U.S.S.R., and the three million in Turkey, the dream remains only that. In Iran there was a flash of hope in 1946 when the Republic of Mahabad was founded, only to collapse within a year as Tehran reimposed its governmental authority over the region.

Of all the Kurds, then, only the two million in Iraq are now at war. The fighting began in 1961 following the failure of negotiations for recognition of the Kurds' national rights. In March of 1970 a truce between the Baath Party, which rules Iraq, and the Kurdistan Democratic Party ended the fighting. It was agreed then to fix the boundaries of Iraqi Kurdistan and to establish by census the size and distribution of the Kurdish population.

Backs to the wall, Kurdish guerrillas crouch in a mountain hideout near Dahuk. Some eight million of these people dwell in a Wyoming-size area that spans five nations, but only Iraq's two million fight for autonomy. In a sporadic civil war that flared anew a year ago, they are locked in bitter stalemate. They have been unable to defeat Iraq's well-armed troops, and the Iraqis have failed to rout the Kurds from their lofty redoubts.

Longest day for these wounded Kurdish soldiers includes an agonizing 16-hour struggle from a skirmish near Raniyah to waiting Land-Rovers that will take them to a hospital in Iran. The commandos had to cross a 6,000-foot mountain to reach the

surefooted mules and donkeys that here carry them down rocky slopes. One rider uses his turban, called a *jamadani*, as a sling.

But there was another factor as well, one familiar to all Middle East scenarios—oil. The Kurdistan Democratic Party demanded a proportionate share of all oil royalties from fields in Kurdish territory. Iraq's oil revenues are estimated at seven billion dollars annually, with the largest fields in the Kurdish area of Kirkuk.

The Baath-controlled regime never took the census and insisted on control of Kirkuk. Last March the fighting broke out again, an uprising that has sent more than 100,000 refugees, mostly women and children, streaming across the border into Iran.

Iran, itself involved in border clashes with Iraq and outspokenly critical of the Baathist Government in Baghdad, supports the Kurdish conflict as a matter of self-interest—the uprising ties down large numbers of Iraqi troops. The Kurds, like the Persians of Iran, are Moslems but not Arabs (both are of Indo-European stock) and speak much the same language as the Persians.

Journey to War Begins in a Taxi

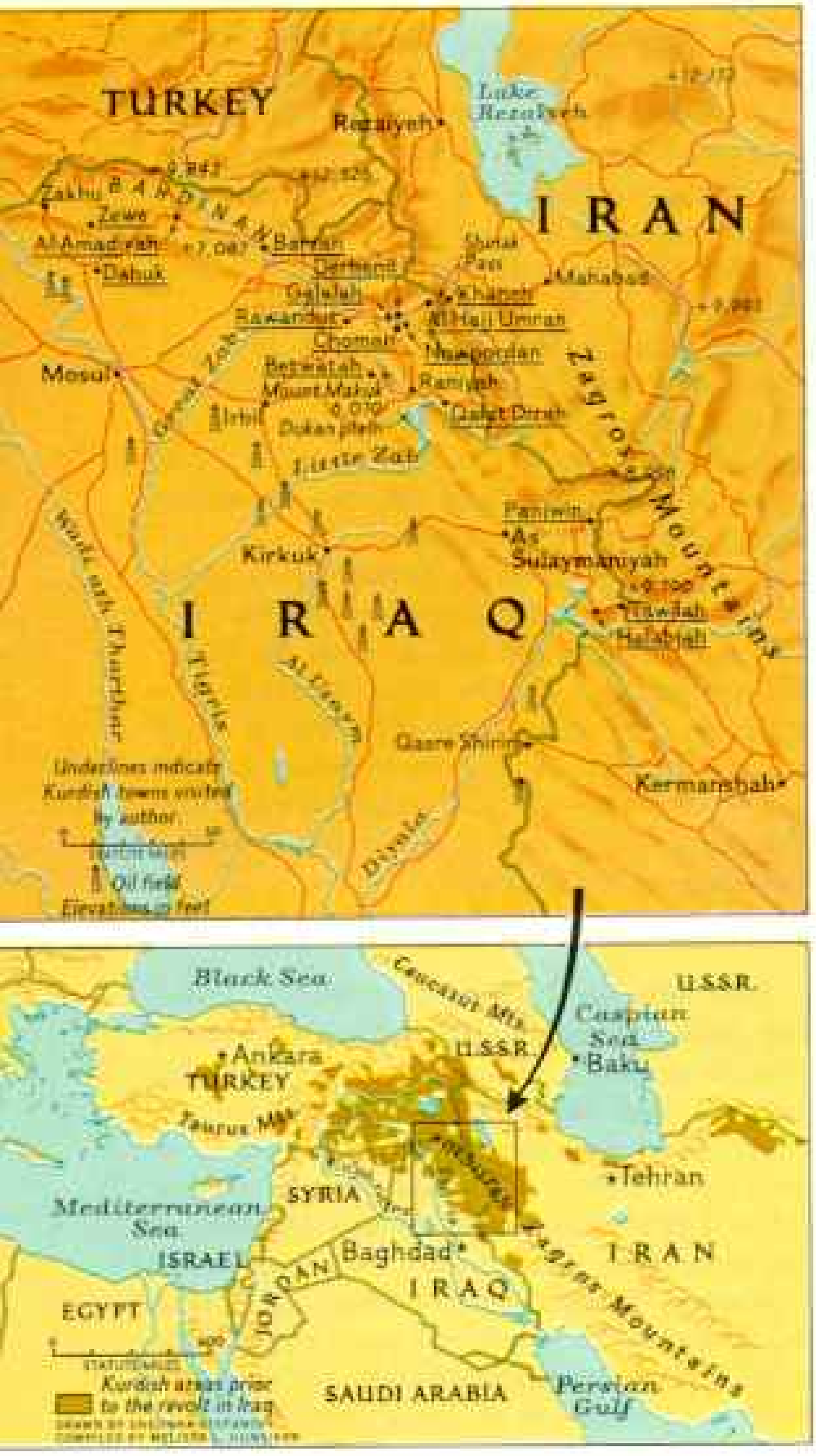
Last summer I spent nine weeks among the intensely nationalistic Kurds of Iraq's remote northern mountains. Iranian secret police helped me cross into northern Iraq.

By prearrangement, two polite men in well-cut business suits took me in charge when I landed at Rezaiyeh, near the lake of the same name in northwest Iran, close by the borders of Turkey and Iraq (map, next page). Immediately they ushered me to a waiting taxi. The driver already had his instructions.

In the orange sun of late afternoon, I could make out our destination—the snow-tipped Zagros Mountains on the southern horizon. The Iranian countryside flashed past as we careened around blind corners, narrowly avoiding collisions with goats and cattle.

It was Friday, the Moslem day of rest and prayer. Women and children walked along the roadside, garbed in colorful fabrics and heavily laden with gold and silver jewelry. Strolling men talked animatedly and smoked cigarettes in long holders. Picnickers lunched beside a cascading stream in the shade of swaying poplars. They waved cheerily at our noisy intrusion, unoffended by the huge column of dust that trailed us.

The land we were crossing had been fought over down the centuries by the Seleucids, the Parthians, the Persian Sassanians. In the Middle Ages the Arab caliphs, the Turkomans,



Flickering lantern glow bathes the face of Gen. Mulla Mustafa Barzani, who at 72 leads his people as dauntlessly as another mighty Kurd, Saladin, rallied all Islam against 12th-century Crusaders. Barzani's forces fight from the mountainous north, to which many Kurds have fled from lowland cities (**upper left**). They and other Kurds in Turkey, Iran, Syria, and the U.S.S.R. form Kurdistan (**left**), a country without borders but united by a common Indo-European tongue. The Kurds were promised a nation of their own in the 1920 Treaty of Sèvres, signed by the Allies and Turks, but the terms were never carried out.

and the Mongols invaded. The Ottoman Turks gained control in the 16th century and remained until after World War I.

Now strife tore Kurdistan once more. My taxi ride ended in the Kurdish town of Khaneh, a few miles from the Iraqi border, before a shop full of Pesh Mergas in baggy uniforms, but without weapons, drinking tea from tiny glasses. A man in his early twenties greeted me with a warm handshake and a frown.

"You're late," he said. "The driver who was to take you across the border has left. We were beginning to worry about you. Ah, well. I, Muhammed, shall take you across myself, *Inshallah*—if God wills it."

From the outset Muhammed and I were on a first-name basis, in the Kurdish fashion. Soon we were off in an ancient Russian Volga, climbing the tortuous Shinak Pass with its sheer drop-offs and hairpin switchbacks.

"Don't worry," said Muhammed. "This is a good car. It belonged to our Student Union at the university in Baghdad. When the fighting began, we commandeered it to join the revolution. How do you like my driving?"

"Fine." He was steering with caution and blowing the horn to warn unseen traffic.

"This is only the fourth time I have ever driven in my life," Muhammed confessed, pleased with himself.

In late afternoon, at the Iranian Army outpost on the frontier with Iraq, a young soldier studied our credentials and waved us through. We charged down the old Hamilton Road,

also called the Rawanduz Road, a two-lane track built by British engineers half a century ago. It serves as the Kurds' main supply route from Iran. Our Volga wound through the Choman valley, passing fields of wheat and barley and tree-enclosed tea gardens and open-air hotels with beds under the stars. Mules brayed beyond the road, and 12,000-foot-high mountains loomed at either side.

As the main link from Iran to the Kurdish town of Rawanduz (seized by a surprise Iraqi tank assault last August), the Hamilton Road hummed with activity. A people in flight moved along it—refugee families and their pitiful belongings, bound for sanctuary. Afoot, on mules and horses, packed into rattling relics of cars, they headed for a dozen sprawling tent camps in Iran.

We rested briefly in the town of Al Hajj Umran, a major headquarters of the Pesh Mergas. One-story mud-walled buildings and makeshift stalls lined the main street. The stalls were festooned with aluminum pots and pans, fabrics, flashlights, and can openers. Vendors hawked their goods, and small boys peddled cigarettes. Carcasses of goats and sheep hung amid swarms of flies. Herds of goats and flocks of sheep competed for space with mule trains bearing supplies for mountain hamlets and the battlefronts.

Small Arms Versus Jet Planes

Every man in sight—and an occasional boy—carried a weapon. Rifles and machine guns were as much a part of their dress as their turbans.

In this bizarre war the Kurds have pitted daggers, small arms, and a few pieces of artillery against Iraq's planes, tanks, and armored personnel carriers. The conflict sometimes approaches the tragicomic. One night I listened as two Kurdish commanders held council around an oil lamp. They discussed shifting a brigade's only cannon to the next mountain. The main consideration: After disassembling the weapon, how many mules would be needed to pack it across?

On some fronts guerrillas are honor-bound to fight to the death. Yet in the terrible irony of war, a military solution seems unlikely.

Gen. Mulla Mustafa Barzani leads an estimated 50,000 to 60,000 Pesh Mergas, and has perhaps 50,000 Kurdish irregulars available. Iraq musters more than 90,000 troops, supported by 1,200 tanks and 200 jet planes.

Iraq's sophisticated weaponry, most of it made in the U.S.S.R., has been largely ineffective in the mountainous areas held by the Kurds. On the other hand, the Pesh Mergas have been unable to contest the Iraqis on the plains since they lacked the missiles to knock out tanks and aircraft. The main Kurdish cities—Kirkuk, As Sulaymaniyah, Irbil, Dahuk, and Zakhu—stand on open terrain, and thus came under Iraqi control without contest as the uprising resumed. "Only God and the mountains are on our side," say the rebels.

"The Kurds Have No Friends"

We drove on. It was dark by the time we arrived at Qasr as-Salaam (Castle of Peace), the concrete-block compound for foreign guests. I was welcomed by several enthusiastic guides and interpreters who carried flashlights and oil lamps to see this visitor from the United States. (Electricity had been turned off because of night bombing attacks.)

As a black American, I was received with great curiosity in most of the places I visited, particularly the more remote villages. People said, "You look like Muhammad Ali."

But in this guerrilla center, pleasantries were limited. I called on stocky, quiet-spoken Dara Taufiq, the Kurds' director of information, in his office-bedroom—a small tent set three feet into a hillside, with a dirt floor and walls flapping in the wind.

"You are free to go anywhere and see everything while you are with us," he told me. "The situation is not good; many people are fleeing because of the bombing. There is a saying that goes, 'The Kurds have no friends.' So it would appear—our cries for help seem mostly to fall on deaf ears. All we want is the right to conduct our own affairs within a free and democratic state of Iraq."

I would hear this refrain throughout my journey, from farmers in isolated hamlets and U. S.-educated university professors alike.

A few days later, in a terraced village named Derbend, I met a group of professors who with their students had left the university at As Sulaymaniyah after that Kurdish city came under Iraqi control.

"We decided to move the university to the town of Qalat Dizah," said Dr. Jamal Fuad, whose American wife and four children had returned to the U. S. for safety. "We traveled through the mountains in groups of thirty, most on foot, some by jeep, others by mule or horse. We were wet and shivering and without enough food. People in the villages clothed

Enemies within, enemies without: Snakes and scorpions share the leaf-camouflaged cave home of a Kurdish family (**left**), who gesture angrily as an Iraqi Tupolev 16 bomber whines overhead. At Halabjah (**below**) death and destruction rained from above when Iraqi pilots plummeted out of the sun and raked the town at treetop level, reportedly killing 43 and wounding 57. Chronically short of antiaircraft guns, the Kurds often set up imitations in deserted areas—look-alike lengths of pipe—a ruse that prompts Iraqi pilots to attack and waste their bombs.

and fed us, and we slept in the mosques."

A week before the university was to open at Qalat Dizah, Iraqi Sukhoi 7 fighter-bombers attacked the town with 550-pound bombs and rockets, Dr. Jamal said. In minutes more than 130 people lay dead, including children slain in school. More than 200 were wounded.

Dr. Jamal recalled the attack. "It was a sight nobody should see. We were defenseless. The planes struck us at will, their bombs erupting like sudden thunder. Next day the students and professors abandoned plans for the university and everybody joined the Pesh Mergas."

Qalat Dizah later fell to the Iraqi forces. The Kurds closed all their schools to avoid further bombing tragedies. One school I visited did manage to hold final examinations—high above town in a sheltered rock formation. Some pupils used boulders for desks.

On muleback I headed for the mountains above the Hamilton Road near Rawanduz. There, heavily camouflaged, stood the headquarters of the Balik Brigade, whose 5,000 guerrillas were allowed no retreat. Late at night I climbed five hours to reach a brigade command post, lungs threatening to burst in the thin air. An assault force of 35 Pesh Mergas sprawled on the bare ground beside machine guns and grenade launchers. Soon after daybreak they would raid an Iraqi position less than a mile away.

Confident on the Eve of Battle

Abdulla Pishderi, commander of the Balik Brigade, greeted me. "You can rest here one hour. Then we leave for the top of the mountain. The battle begins at 5:30 a.m."

Exhausted, I fell asleep immediately. The fragrance of hot tea and fresh bread roused me. The guerrillas were checking their weapons before moving out. They were subdued but confident; Pesh Mergas bow to no one in fighting ability. *(Continued on page 376)*

"THE ROAR AND HISS OF FOAM, *the shrill song of the brook,*" *a Kurdish poet wrote of life beneath the snow-capped peaks. In an arid land, such mountain torrents not only lift the spirit but also nourish the green of life-sustaining crops on irrigated lowland fields.*

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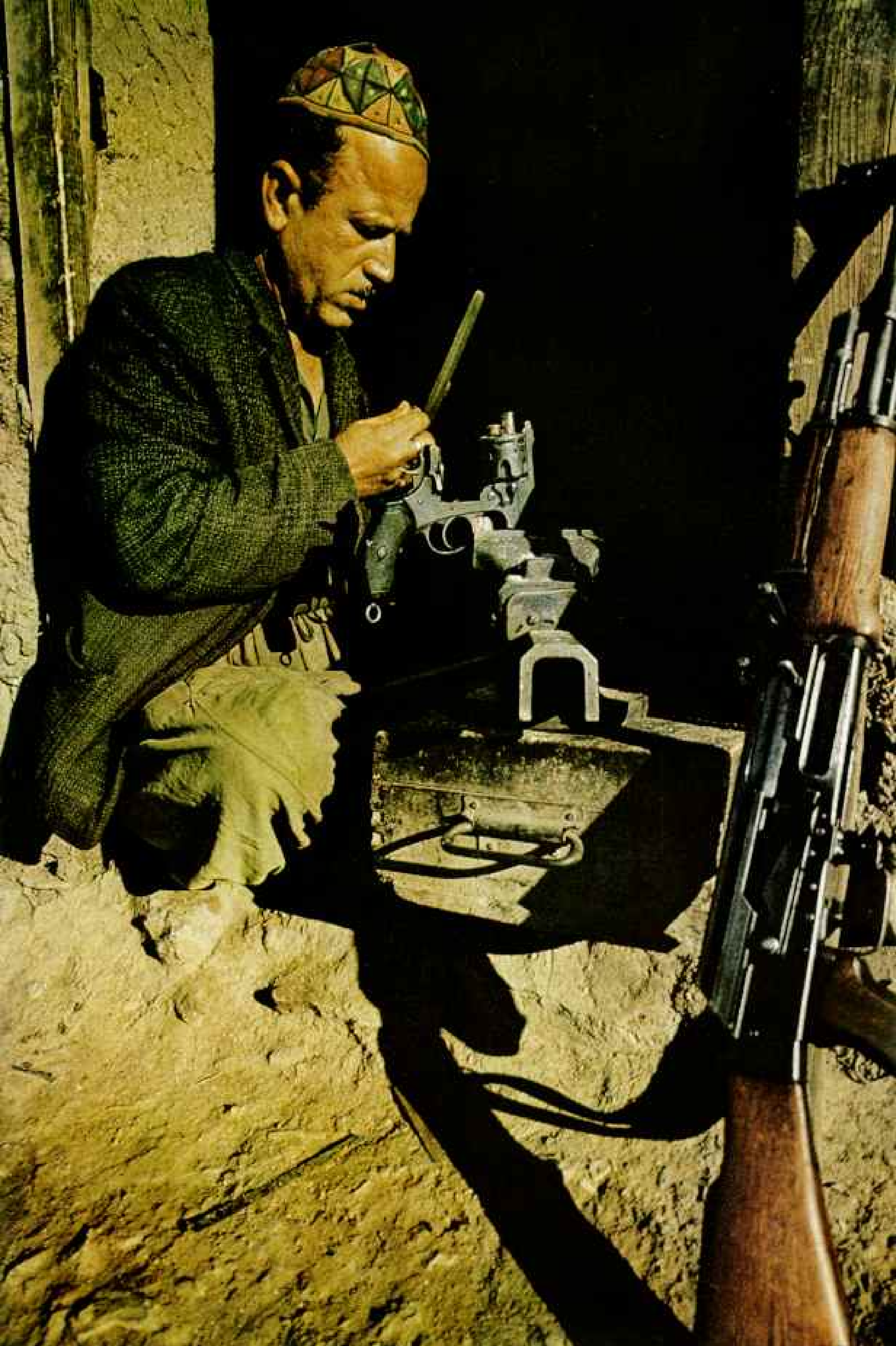
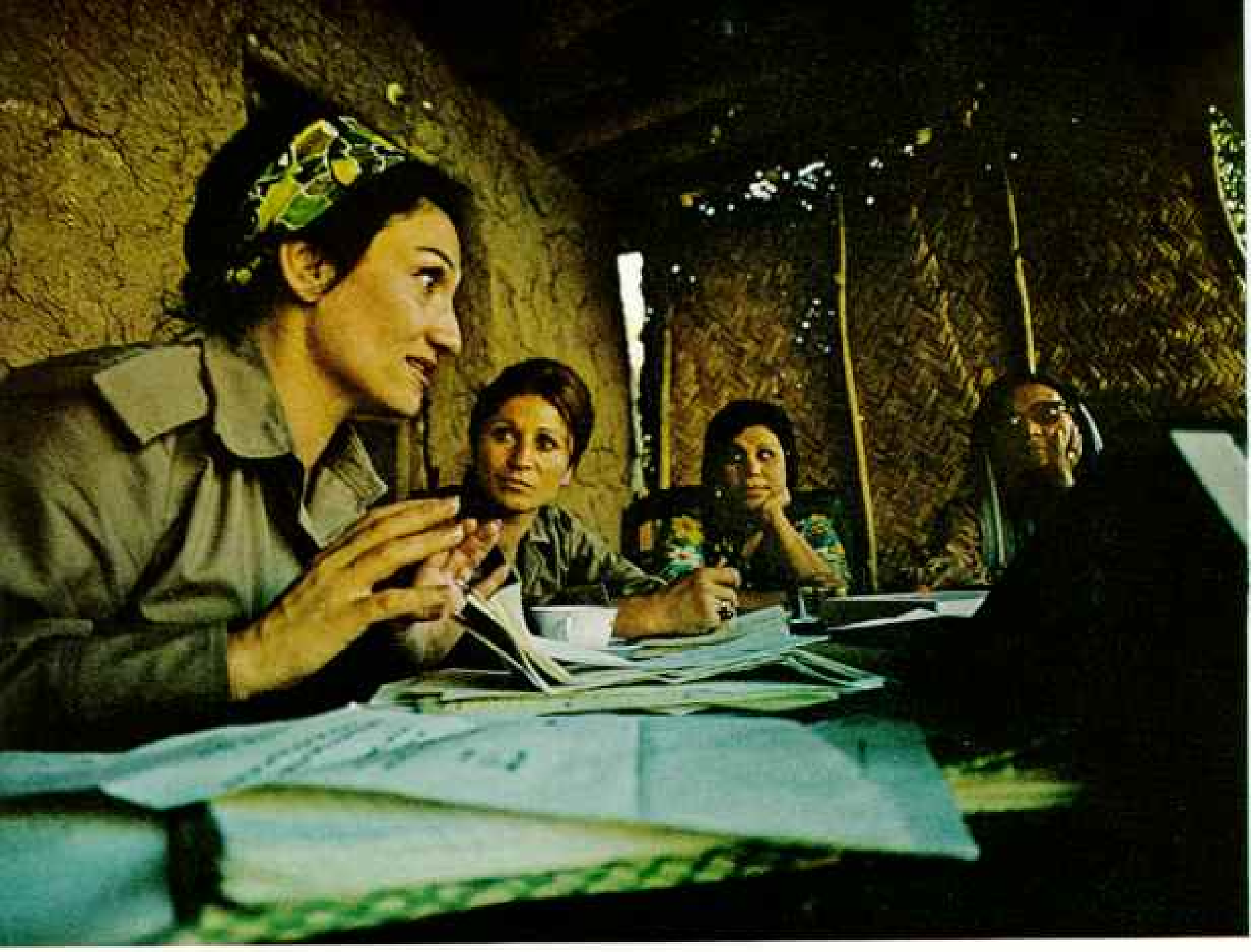


Unsung heroes of the revolution make sure that triggers work and hungry bellies are filled. The indispensable village gunsmith repairs a much-used revolver (**left**), while a Russian AK-47 automatic rifle captured from Iraqi troops awaits his attention.

Swathed in crimson, a girl in one of the Kurdish army's brigade headquarters rolls dough with a *tiroq* (**above**). The pancake-thin bread bakes in clay ovens, some of which are buried in the ground. A new oven is shaped by another woman (**right**), whose light skin and hair reflect her people's Indo-European stock. She toils before the wall of a home built of gasoline cans cut apart and flattened.

The Kurds' passion for color in their dress finds echo in the tale of a Kurdish bandit offered a last request before his execution. After careful thought he replied, "I should like to be hanged with a red-and-green rope."



"We stand firm with our brothers, the Pesh Mergas," avows Mrs. Zakia Haqui, head of the Kurdistan Women's Federation. The group aids the war effort by educating village women—and by clandestine means. One sister avoided a search by Iraqi soldiers by feigning pregnancy. Later she delivered her "bundle of joy"—ammunition—to the Pesh Mergas.

Crackling rifle fire and the staccato of machine guns announced the guerrillas' attack. Soon it was over. They overran the position, suffered no casualties, and collected about thirty AK-47 automatic rifles, a grenade launcher, several portable radios, and some ammunition. Then they destroyed the post. Pesh Mergas do not hold a position after taking it; the Iraqi Air Force can dislodge them.

Kurdish leaders later told me that they had lost about 600 men since the fighting began in March 1974. They estimated the number of Iraqi dead at 5,260.

Next day I visited Central Hospital, a collection of two mud-walled buildings and fifteen tents in the hills above the Hamilton Road. Most of the patients were civilians. Severe casualties were sent to hospitals in Iran, where better treatment was available.

Dr. Kamal Abdullah Naji, the youthful chief physician, gave me a tour. We dashed for shelters in the hillside as a lone Tupolev 16 medium bomber, targeting on the nearby town of Galalah, dropped 1,000-pounders harmlessly on the mountains. Patients on crutches emerged from the shelters laughing and hooting at the inaccurate bombing.

"We desperately need a blood bank, plasma, surgical instruments, and more surgeons and nurses," Dr. Kamal said. "We can handle only 24 inpatients, and we also serve the fifteen miles between here and the Iranian border. We have seven doctors, four nurses, and twelve dressers. Most are in the field."

Villagers Still Live by Nature's Clock

While the war has disrupted every aspect of Kurdish life, I found that in some isolated villages the cycle of the seasons still turns. Using oxen, farm families tend fields of rice,

Doctor and patient exchange "aaaahs" in a Kurdish medical facility near Nowjordan. A handful of physicians in earthen buildings and tents treat all patients within a 25-mile radius. In an appeal for United Nations intervention, the Kurds claimed Iraqi bombs killed or wounded more than 5,000 civilians during two months last year.

wheat, barley, corn, and tobacco. Peaches, pears, apples, melons, plums, blueberries, and grapes also thrive in the warm climate.

The women's work seemed endless. At sunrise they gathered in small groups and crouched, chattering, to knead and flatten dough into thin pancakes, which they baked in clay ovens buried in the ground (page 375).

Other women milked sheep, goats, and cows. They heated milk, added a little of yesterday's yogurt, and let the mixture turn to fresh yogurt. They rocked yogurt in goatskin bags until there was butter. At the same time, graceful figures carried five-gallon cans of water from the creek far below.

Men usually eat first, served by the women. Shoes are left outside the single-story mud, stone, and wattle houses, which contain no furniture; dirt floors are covered with rugs; the men sit on foam-rubber pads. Affluent families can afford Persian carpets and long rectangular cushions.

The Kurds eat from aluminum pots and pans, which they pass around. When the men finish, boys take their turn. Women and girls eat what remains. There is enough, I should add; no one goes hungry. The diet revolves around rice, the main starch, which is often served wrapped in grape leaves, with shish kebab. Rice also accompanies grilled mutton or stews of boiled goat meat or fowl, fortified with tomatoes, okra, onions, and green beans.

No meal is complete without thickly sugared tea. The women bring it in relays from ancient brass samovars; they pour glass after glass. It is the Kurds' national drink.

I soon came to admire the handsome, hard-working, uncomplaining Kurdish women, who enjoy more freedom than their Arab sisters. They liked being photographed—

rarely do they veil their faces—and soon became friendly enough to chat and banter with me. Late one afternoon, amid the popping of distant artillery, a plump, blond matron smilingly chided me. "Before I will serve you supper," she said, "you must make them stop the bombing."

I liked the Kurdish men for their warmhearted hospitality. Physically strong and animated, they sang and danced with verve and passion. They were both great talkers and devout Moslems—a combination that proved disconcerting when, in midsentence, they would face Mecca, bow, and pray.

Sharing a Cave With Rats and Snakes

Villages untouched by the fighting are the exception, however. In the Bahdinan region, near the Turkish border, war has made life a round of misery. I received permission to visit that contested area and rode a mule over mountains for two days to reach the ancient city of Al Amadiyah, a Kurdish stronghold for more than 500 years.

Not long ago a busy marketplace that drew thousands, it now was virtually deserted. Cars had disappeared from the streets, and many families had fled to the nearby hill village of Zewe, where I found them living in caves. Panting my way up the steep slopes, I came to the cave of a farmer named Tahir Ahmed, who was off fighting. His wife, an auburn-haired woman in her early thirties, led me into the dark, low-ceilinged interior. When my vision became adjusted, I made out blankets, straw mats, and a sewing machine. Children scampered in and out—eight youngsters lived in the cave.

Tahir Ahmed's wife said: "Most of us are ill. The cave is very damp and full of mosquitoes, flies, and rats. We've killed three vipers so far—we just found another one in the next cave." She shook her head.

"Whenever we come inside, we're afraid of the snakes and scorpions. When we go out, we're afraid of airplanes. If it weren't for the children, we would join our husbands and brothers at the front. We haven't used guns, but we are ready to learn. We are ready to do whatever General Barzani asks."

Somewhere beyond the hills a jet airplane screamed. Women and children scurried to snuff out the cooking fires in front of the caves, lest they be spotted.

Ominous puffs of dust writhe above the Dukan plain (**right**) as Iraqi tanks prepare to pummel Kurdish positions. Atop Mount Makuk, Kurd Commander Rashid Sindi (**above**) radios for artillery fire. From such peaks his ancestors harried the Greek "Ten Thousand" 24 centuries ago. After seven days' fighting, Xenophon, a leader of the Greeks, noted that they "had suffered worse things than all the [Persian] king had done to them."

The Bahdinan region, which borders Turkey from the mountains of Barzan to the city of Zakhu, provided rich harvests of rice, wheat, barley, and fruit—until Iraqi planes burned out the fields with firebombs.

"The fighting has severely crippled our food distribution," Muhammed Shali, the regional administrator, told me. He received me in his office, a low enclosure made of tree trunks with a dirt floor and a ceiling of leafy branches. On a gray metal desk sat a field telephone and an oil lamp. He used a battery-powered bell to summon aides, handing them documents he had signed.

One Cannon Replies to 300 Tanks

We talked as he conducted his affairs. "Not only have the Iraqis destroyed many of our crops," he said, "but it is difficult to receive food from Iran because it must come on muleback over the mountains. Turkey has closed its borders to us. Winter will soon be here, and that will be even worse for us. Snow will block the passes."

I received word of a major Iraqi offensive on the Betwatah-Raniyah front. After some arduous travel, I reached the headquarters of Ali Shaban, commander of the Betwatah Brigade. A small, graying man in his late fifties, he calmly outlined the situation. "The Iraqis are attacking with two divisions and perhaps three hundred tanks. It is the most determined assault they have made. If only we had antitank weapons, we could stop them. But we must stay back."

The main Kurdish positions rested atop Mount Makuk, at 6,070 feet one of the highest peaks overlooking the Dukan plain. We climbed Makuk's steep limestone face and looked out on the flatland beneath us. The white tents of the Iraqi Army shimmered there in the intense sunlight. Black toylike vehicles deployed toward Mount Makuk, kicking up rooster tails of dust, to pound away at Kurdish positions on the lower ridges.

Rashid Sindi (facing page), who commanded five Kurdish brigades in this region, ordered an artillery strike in retaliation. A handsome, strongly built man of 45 or so, he had learned English as a young Iraqi Army lieutenant. Rashid had been in the forefront of the Kurdish uprising since it began in 1961. His artillery consisted of one British 25-pounder of World War II vintage.

A wounded Kurd, helped by his companions, limps across a bombed-out but still-used bridge. It forms part of the Hamilton Road, carved through the mountains by British engineers in 1928-32. Some 300 enemy sorties, the Kurds claim, failed to knock out the bridge. Finally, a hail of thousand-pound bombs succeeded last June. Timbers temporarily rejoined the two halves until a bulldozer built a fill of earth and rock across the sagging center, out of view at left.

To reach the gun, about ten of us set out single file—Rashid leading—across a valley. The area was deserted, its farms untended and crops unharvested. As we crossed an open rock bed, two Sukhoi 7 fighter-bombers suddenly winged in, cannon blazing at us with the sound of jackhammers.

We dived for safety. The planes swung around and came at us again, this time firing rockets. Their marksmanship was far off. After several more passes, they gave up.

We resumed the march, now making our way up precipitous slopes. Rashid, himself rugged as a mountain goat, considerately tried to take my mind off the arduous climb by pointing out various rocks, flowers, and even butterflies, giving me the Kurdish names.

The Kurds' shelling began as we reached the summit. Through field glasses I clearly made out the white-tented Iraqi host with its tanks parked alongside; exploding shells sent columns of black smoke rising from the encampment's midst. With ammunition always in short supply, the Pesh Mergas must make each round count. They enjoy a deserved reputation for accuracy.

Soon the Iraqi artillery returned fire. Their shells struck a few hundred yards away with the fury of a hundred kettledrums in a subway. An aide courteously extended a handful of dates to me from a binocular case. I was munching these when the Kurds' bombardment ended. The guerrillas had expended all their shells—50 rounds.

At dusk an aged tractor arrived to take the gun and us in tow. We sat on a flat trailer behind it and chugged along the road. The clandestine radio station of the Kurds, the Voice of Kurdistan, blared the latest news from several transistor radios and followed it with a stirring John Philip Sousa march. I looked out into a moonless night, my eyes trailing a passing satellite as it outran the stars across the sky. How strange and extraordinary all this was, I thought. How sad.

City Dwellers Flee to the Hills

One defiant refrain echoed throughout my travels in the Kurd-controlled area of Iraq: "I have come to join the revolution." Many who proclaimed this had been city dwellers. When the Kurdish cities on the plains came under Iraqi control, a major exodus resulted among Kurds who were fearful of reprisals. Some estimates place the number who fled to the mountains at 250,000.

Double-timing at dawn, Pesh Merga recruits at Choman (**above**) train lungs and legs for scrambling over mountain terrain. The revolutionaries say they could double their forces if they had the arms to equip fresh volunteers. Nevertheless, many students have joined the revolution, and all Kurdish schools have closed. A jeepload of enlistees head for target practice (**right**), led by a former Kurdish pilot in the Iraqi Air Force, center, who deserted when his commanders grounded him. Now he commands antiaircraft artillery around Choman. His wife, at far left, proved the best sharpshooter of the day.

Supper cackling in his arms, a Kurdish lad heads home from the mill, his donkey burdened with flour and a large mixing pan (**above**). Despite the undertow of war, life appears almost normal in Tawilah (**facing page**), a village near the Iranian border.

This only added to the massive logistics problem faced by the Kurds' governing body, the Kurdistan Democratic Party. I called one day on Ali Abdulla, chief of finance for the KDP, at his tent office hidden in the hills. "How are you paying for the revolution?" I asked. "Where does the money come from?"

The rotund official replied without hesitation. "Most of our income comes from abroad, contributed by organizations I cannot name. Iran provides us with substantial financial aid as well. These sources give us about 2,400,000 dinars a month [about eight million dollars].

"We receive about 600,000 dinars more a month [about two million dollars] from tobacco and other crops, taxes, and duties on land. We can afford to fight on until we win our freedom, no matter how long it takes."

Talent for Smuggling Aids the Cause

I inquired how food and supplies were obtained, for I had been told that the Iraqis had set up checkpoints on every road leading into the contested area of Kurdistan.

"We have established an underground network in Iraqi-controlled areas," said Ali. "Food, machine parts, oil, cigarettes, and soap are smuggled to us. And we buy much food from Iran." The quantities, he went on, were inadequate, but improving. "As time goes by, the blockade will loosen. The people who are responsible for it are tired of enforcing it."

The official pounded his fist in his hand when I mentioned the refugees I had seen only that day. They had straggled over high hills, driving their cows, goats, and sheep. Some had been on the move for a week or more. They were short of food. Women and children had cried with joy when they saw Land-Rovers waiting at the collection point to carry them to Iran and safety.

"Ah, they are our most serious problem," said Ali. "We do not have enough money to keep them in Kurdistan, and so we must send them to camps in Iran, to be fed and cared for by Iran's Red Lion and Sun Society, the equivalent of your Red Cross. Who can say when they will be able to return?"

Next morning I left for Pesh Merga headquarters at Al Hajj Umran. My nine-week stay in Kurdistan was coming to an end, and I had finally arranged an interview with the Kurds' legendary leader, Mulla Mustafa Barzani. Now 72, General Barzani not only directs military operations but also heads the Kurdistan Democratic Party. He has been

a leader of Kurdish rebellions since 1931.

Late that night, after an hour's drive without lights along a high, tortuous track, my Land-Rover pulled up at the general's quarters, a low cinder-block building perched on a steep slope. Security was tight—two attempts on his life have been made in the 1970's. Heavily armed Pesh Mergas, wearing greatcoats against the chill, watched carefully as Barzani greeted me on the steps with a nod and a firm handshake.

I followed him into a large, spare room lighted by small oil lamps. The room's two windows were smeared with mud. The general seated himself in a tubular aluminum armchair, adjusted the sheathed, curved dagger in his cummerbund, and motioned me to a chair across from him. He wore a soiled turban, crumpled brown jacket, and baggy trousers drawn snug at the ankles—the Pesh Merga uniform (page 368). His briar pipe required constant attention.

"I Will Die With My People"

We talked for an hour, ranging over the turbulent history of the revolution and the prospects for a settlement. General Barzani was not optimistic.

"If only someone like America would give us weapons to fight in the plains," he said in a strong, gruff voice, "we would know how to use them. Many Kurds have served in the Iraqi armed forces—they can drive tanks and handle missiles. We need antitank artillery and antiaircraft missiles. It is in the United States' interest to help us. We have oil . . . you need it."

The shaggy-browed old revolutionary fixed piercing brown eyes on me. The Kurds, he declared, were struggling not only for their own freedom but also for that of everyone in Iraq. The Baathist Government in Baghdad, he went on, was the Kurds' only foe. "We want nothing more than an autonomous Kurdistan within a democratic Iraq. We are used to the hardships of war. We will continue to fight until the very last Kurd."

An aide entered softly, carrying a large tray of peaches, sliced honeydew melon and watermelon, plums, and grapes. We sipped tea and shared the delicious fruit. As I prepared to leave, I remembered the present I had brought. Before entering northern Iraq, I had heard that the Kurds feared the possibility of a gas attack. Now I gave my gas mask to the general.

To my surprise, he seemed taken aback. Then he explained. "If the time ever comes when I might need this mask, I could never use it. I will die with my people."

Iraqis Tell of Efforts for Accord

A few days later I left northern Iraq and flew to Washington, D. C., where I spoke with Dr. Salim Mansoor, the Iraqi Government's highest official in Washington. Iraq severed diplomatic relations with the United States during the 1967 Arab-Israeli war, but maintains a Washington office. I asked Dr. Mansoor to describe the situation as his government saw it.

"We have given the Kurds a great deal of freedom," he told me. "They have their own schools, where both Arabic and Kurdish are taught. They have a university, and we have appointed six Kurdish men to high government posts, including one of our two vice-presidencies. Several Kurds represent Iraq as ambassadors to foreign countries. In the past four years we have spent more than a billion U. S. dollars on the Kurds.

"This rebellion is basically a tribal affair. General Barzani's tribe is seeking to control all the Kurds.

"He is not the real leader of the Kurds or the true representative of the Kurdistan Democratic Party. The profits from the oil fields of Kirkuk are to be shared by all Iraqis. We did not ask for this war, but we have the power to resolve it."

Now the first hint of spring is stealing into the mountains. The bitter winds and deep snows of winter will soon pass. The Kurds will be celebrating *Neteroz*, or New Day, heralding once more the coming of spring. Again they will burn fires on the mountaintops and dance all night to the *dihool* and *zirna*—drum and pipe.

Will the year ahead bring the Kurds continuing strife, or the dawn of peace? □

Hand bloodied during a bombing, a woman cradles her sleeping daughter. They are part of an exodus of more than 100,000 Kurds to refugee camps in Iran. Stubbornly, the fighting men they leave behind put their faith in the Pesh Merga slogan: "Kurdistan or death."

Hidden Worlds in the Heart of a Plant

ARTICLE AND PHOTOGRAPHS BY
PAUL A. ZAHL, Ph.D.
NATIONAL GEOGRAPHIC SENIOR SCIENTIST

NOT EVEN the softest exhalation of the tropic wind touches the surface of the hidden forest pool. Its waters lie still and dark as onyx, with no sign of life.

Curious . . . for I know that this pond, only a cup-size well in the heart of a bromeliad plant, nurtures an astonishing range of living things, many of which spend their entire lives in its confines. A colorful medley of insects, slugs, snakes, lizards, and a wealth of lesser creatures all frequent such reservoirs—tiny worlds among the myriad worlds of this Brazilian jungle. I scan the surface once more, expecting telltale movement . . . nothing.

"Well, let's empty it," I say to Eric La Gasa, a Peace Corps volunteer helping me in my investigation of bromeliads—those hardy plants that draw much of their food and moisture from the atmosphere.

Carefully we tilt the plant, trying not to disturb the naked roots that anchor it to the trunk of a jungle hardwood. A stream of tea-colored water gurgles from the chalicelike center and flows into the collecting net.

Now I see abundant life! The mesh holds a brown, oozy mush alive with mosquito wrigglers, beetles, a pencil-slim millipede with candy-stick markings, a grass-green katydid too scared to jump—even a belligerent scorpion, whose arched tail brandishes a dangerous hypodermic needle.

Later that day Eric and I peer into bromeliads as big as beer kegs and others no larger than 25-cent pieces. In the pool of a lemon-and-brown *Vriesea* we startle an almond-size tree frog (**left**), carrying on its back more than a dozen transparent eggs, each with a visible embryo. These will become tadpoles, living in the water until they metamorphose into tiny frogs themselves. And even then they may never stray far from their home in the water hole.

Save for a single species found on the west coast of Africa, bromeliads are native only to the Western Hemisphere—the southern United States, the Caribbean, and Central and South America. The familiar pineapple is one of 2,000 species, and so is the bearded Spanish moss. But the most intriguing to me are those that contain entire mini-kingdoms, where bacteria, algae, and protozoans support insects that, in turn, feed frogs and spiders. Even man has drunk from the bromeliad's well. Early explorers of Florida's Everglades reportedly survived droughts by sipping from the plant.

Siphoning a living pool, the author uses an aspirator to drain rainwater from the well of a *Neoregelia* bromeliad. Having explored the natural world from fireflies to gorillas and giant redwoods, Dr. Zahl recently journeyed to Brazil, Costa Rica, and central Florida to study and photograph these natural water tanks—homes for a host of tiny creatures.

TREE FROG (*PHYLLOMEDUSA SOLOLUS*) (ABOVE RIGHT)

Lilliputian lake in the heart of a *Neoregelia* bristles with life. Ferocious dragonfly nymphs lurk just beneath the surface, and rafts of mosquito eggs, one of their favorite meals, drift above them. Hundreds of hatched mosquito larvae pepper the water. A pink blossom decorates the center of the tank, wreathed by the green peaks of buds. Leakproof walls of scarlet leaves enfold the teeming reservoir, the surface dappled with reflections of the photographer's lights. In the depths creatures prey, flee, and reproduce.

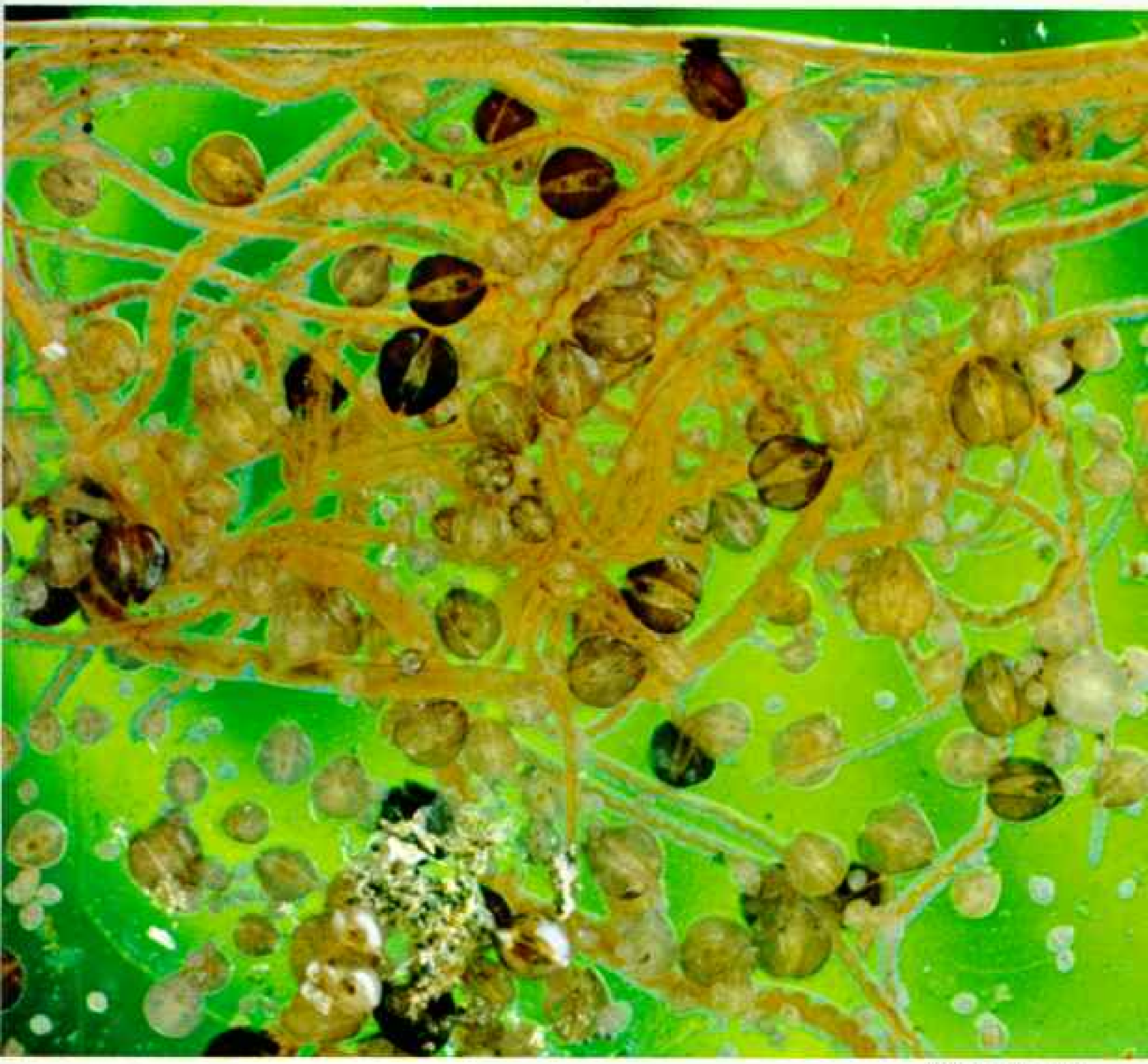
The delicately balanced ecosystem begins its cycle as showers fill and replenish the wells. Leaves, airborne dust, and excrement from thirsty

animal visitors fall in and sink to the bottom, stimulating growth of bacteria. Small algae and protozoans use bacterial by-products and in turn are eaten by larger protozoans. These simple life forms are introduced to the pool by a variety of animals, including birds, insects, rodents, and amphibians—all regular callers at bromeliad oases.

Shaped like artillery shells, mosquito eggs incubate for several days and then burst into larval stage (**bottom**). Built-in snorkels let the wrigglers breathe as they hang upside down from the surface of a bromeliad well.

DRAGONFLY: ORDER ODONATA

GENUS CULEX



WORMS, CLASS OLIGOCHAETA

SEED SHRIMP

Swirl of aquatic earthworms seems to ensnare ostracods, or seed shrimp, in a microscope-slide view of bromeliad water (**above**). Actually, both are scavengers in or near the bottom ooze of the well. They don't attack one another, but become fair game for hungry predators. The seed shrimp (**right**) is an ever-present bromeliad tenant; it moves in the water by wiggling its antennae and a footlike appendage. How these shrimp in clams' clothing reach the hidden lagoons remains a mystery.

PAINTING BY NATIONAL GEOGRAPHIC ARTIST WILLIAM H. BOND

Bromeliad cup of plenty, shown in cross section, serves spider, frog, snail, crab, and a hodgepodge of unseen inhabitants. Pockets of water flank the flooded inner chamber, where buds and blossoms strain toward the sunlight.

CLAUS TUBELLARIA

Bold racing stripe belies the sluggishness of an inch-long worm that depends on a bromeliad tank to keep its soft body damp.

Perched on a poolside balcony, a nickel-size marine crab eyes its cool, moist bromeliad home on the dry Brazilian seacoast.

GENUS SESARMA

Lying in wait at the local water hole, a spindly harvestman (above) balances on a *Neoregelia* bract. He and his cousins the spiders prowl the peripheries for food. A salamander climbs pigment-spotted leaves of a *Guzmania* (**upper right**); another, partially obscured, coils around the plant's core. The amphibian hunters dine on unwary insect lodgers and their young. Snakes, some poisonous, also frequent the cool depths of the larger plants.

Bromeliads large and small have been delighting greenhouse gardeners for many years. Technically herbs, since they lack woody tissues, they present an assortment of weird forms, colors, and habitats. Though most bromeliads prefer a warm, humid climate, others thrive in desert areas, soaking up the air's scant moisture through microscopic scales that coat their leaves.

Prepared for anything, University of Costa Rica biologist Dr. Douglas C. Robinson gingerly parts the leaves of a *Vriesea imperialis*, one of the largest known species. The author transplanted one bromeliad whose well held almost 12 gallons of water.

HARVESTMAN: ORDER OPILIONES

SALAMANDER: BOLITOGLOSSA SUBPALMATA

Tapping a bromeliad reservoir, Eric La Gasa strains the contents through a net. The plants cling to the most precarious perches on sheer cliffs and towering trees. Occasionally, the added weight of rain-filled wells weakens their hold, and they plummet to earth. Other species, such as the pineapple, prefer to have their feet firmly in the ground.

Formidable spikes fortify the radiating leaves of an *Orthophytum* (**above**). Asked the purpose of such armor, found on many species, bromeliad expert Dr. Lyman B. Smith of the Smithsonian Institution said, "Probably to keep botanists from collecting them!"

HUMMINGBIRD: BENOIT FAUTHOUX

Masked raider, a hermit hummingbird slakes its thirst with nectar from an *Aechmea*'s bloom. Below, in the crowded world of the leafwell, a cast of smaller creatures plays out its complex dramas of life and death. □


E. KUBOTA
1064

Hawaii, Island of Fire and Flowers

By GORDON YOUNG

Photographs by ROBERT W. MADDEN

BOTH NATIONAL GEOGRAPHIC STAFF

Orchids bloom in unexpected places in Hawaii, even on the tree-fern stump supporting this mailbox in the city of Hilo. On the "Big Island"—largest in the archipelago—nature offers alluring extremes: volcanoes that may spew incandescent lava or wear mantles of snow, seas that vary from mirror calm to driving surf.

FIRE AND BRIMSTONE. The active vent of the volcano called Kilauea glowed red 60 feet beneath our helicopter. Steam clouds swirled up to fill the Plexiglas cabin with the stench of sulphur.

We clattered on, out of those reeking clouds, until the sky became brilliant blue and below lay the gorgeous greenery of Hawaii. Perdition to paradise in ten seconds.

Perhaps paradise is too extravagant a term. I'll settle for Mark Twain's description of this island and its sisters in the Hawaiian chain—"the loveliest fleet of islands that lies anchored in any ocean."

In size Hawaii surely ranks as flagship of that fleet, for the triangular island's 4,000 square miles make up almost two-thirds of the Hawaiian archipelago. No other member of the chain has so much natural variety. The "Big Island," as it is known, embraces rain forests and deserts, orchids and cactuses, snow-covered mountains and gleaming beaches—golden beaches, black beaches, even green beaches. Before the Europeans came, this island enjoyed the favor of kings and gods. Kamehameha the Great, who unified the archipelago, lived here. And so, they say, did Pele, goddess of volcanic fires. I have met Hawaiians who say she lives here still.

But the center of power has shifted 200 miles away, to Honolulu on Oahu, where mainlanders and foreign visitors flock by the millions. Relatively few spend much time on the Big Island.

And with that, I am content. While they loll on the populated sands of Waikiki, munching their quick-order hamburgers, I experience the pleasure of having a beach all to myself on Hawaii. To the delight of visitors, if not resort owners, most of Hawaii's pleasuring places are comparatively uncrowded.

Visitors who do come usually cast a brief glance at Hilo—the island's one city, population 30,000—before heading west to the Kona coast (map, page 405). A mistake, for Hilo deserves a second look. Its street names are Hawaiian, but the stone lanterns and arched bridges in its city park are pure Japan. Hilo supermarkets carry mainland brands and produce—but also poi and octopus tentacles.

I'd been cautioned in advance not to refer to my mainland home as "back in the United States." It was difficult to heed that warning while roaming Hilo. When I stopped for a haircut, for example, the Japanese barber finished his job by pummeling my shoulders in the Oriental way to relax them.

My hotel, too, had a nonmainland look. It was a 12-acre complex of high-peaked Polynesian buildings, waterways, and winding, flower-flanked paths. Fittingly the telephone in my room announced calls not with a ring but with a birdlike trill.

It is intriguing, though unsettling, to open the island telephone book and find four pages of tsunami

Glowing luridly against the night sky, Mauna Ulu, a vent of Kilauea, belches lava a hundred feet in the air (**above**). The molten rock spills over the lip of the crater in a river of fire. In nearby Pauahi Crater (**right**) a previous eruption's lava—still boiling hot—turns the patter of rain into the hiss of steam. Heavy boots shield a surveyor's feet.

Hawaii's lava mountains erupt awesomely but usually without explosive fury, allowing entranced viewers to watch in safety.

inundation maps, charting areas of Hawaii that may be swept by seismic sea waves.

In the past half a century, more than 50 of those awesome waves have struck the island. One of the most destructive arrived on May 23, 1960, triggered by earthquakes along Chile's coast or perhaps on the ocean floor nearby. Such planetary muscle-flexing raised heaving mountains of water.

One wave shattered the southern coast of Chile. The other wave raced northwest, at a speed of more than 440 miles an hour, toward the Hawaiian chain. Hilo took the brunt of it.

Island Anxiously Awaited Its Fate

Myron O. Isherwood, Sr., the island's civil-defense administrator, told me of that terrible day when the tsunami hit.

"We knew it was coming," he said, "because the Honolulu Magnetic Observatory alerted us. But the situation seemed under control. The wave was only a foot high when it passed Christmas Island, 1,300 miles south of here. Even if it grew larger, we hoped that Hawaii's southern tip would split the wave and perhaps lessen its force."

Mr. Isherwood unrolled a map on his desk. "The tsunami was a lot more than just a one-foot wave when it reached us. The segment that roared up this eastern shore hit the upper rim of Hilo Bay and veered back toward town. It was 35 feet high."

He spread news pictures out on the map, and I could appreciate the wave's power: shattered buildings, cars wrapped around coconut palms, parking meters bent flat.

"Actually, we were hit by three waves," Mr. Isherwood said. "Each one chewed farther into town, and its backwash carried debris—and in some cases people—out to

Hotfooting it over lava only hours old, Robin Holcomb of the Hawaiian Volcano Observatory has just collected a sample of fresh spatter. Mauna Ulu's fires rise behind —actually 200 feet away in this telephoto view. The lava-scorched sign (**right**) once bordered a road on Kilauea's rim.

On land a volcano built (**above right**), new streets await new houses. About 150 families have already settled in Hawaiian Ocean View Estates, where 11,000 one-acre lots have been sold. Most have soil and trees, but some buyers chose rough, recent lava like this; one owner posted a facetious sign: KEEP OFF THE GRASS. Others have brought in soil for lawns and gardens.

Heritage of three lands blends in song. Japanese-American women strumming ukuleles—first brought to the island by Portuguese—learn the soft magic of Hawaiian music in a senior citizens' center in Hilo. The workshop serves the elderly of all backgrounds; Japanese predominate, since they make up 38 percent of the island's population. Others of Filipino and Chinese descent help spice the tropical potpourri.

Island of perpetual June—and part-time winter on the summits of its mountains—Hawaii was built over the eons by lava flows welling up from the ocean floor. Mauna Kea, or White Mountain, among the loftiest peaks in the Pacific, rises 13,796 feet from sea level.

sea. There were 61 deaths and well over 20 million dollars damage."

Hilo is less vulnerable to tsunamis now. Most of that low-lying waterfront is a park. Building is restricted in tsunami-prone areas, and the warning system has been refined.

Another kind of inundation has threatened the island: land speculators, resort developers, condominium builders, and mainland citizens who dream of retiring to paradise someday. I talked to Sidney M. Fuke, the island's deputy director of planning, about the problem.

In the late 1950's and early 1960's, thousands of lots lacking public water systems were sold to mainlanders, sight unseen.

"We have clamped down on that type of subdivision, of course," Mr. Fuke told me. "We could carve this island into one-acre lots and sell them," he said, "but our responsibility is to current residents. Investors must live with our new, tighter zoning laws. A resort developer has to prove that there really is a need for his development, and that the environmental impact will be good, before he'll get zoning approval."

A few evenings later I met a mainlander who had had land dealings on Hawaii. He brought up another problem that a real estate man faces: "Whether you're buying, selling, or trying to get a building permit, you're

usually dealing with Orientals here. Japanese-Americans are the island's largest group. Great people: ethical, and very easy to talk to."

Then he puffed out his cheeks in a sigh. "But—well, subtle. I don't know how many times I've finished a business meeting wondering if the man had said yes, no, or maybe."

Not unlike other islanders, I noted. People seem to be in less of a hurry here.

Orchid Trail Leads to Dancing Rainbows

The planners have something worth protecting in the island's beautiful countryside. One day I went to Akaka Falls State Park, some fifteen miles north of town. The tourist path there wound through jungle, past thick stands of tall bamboo and bushes bright with wild orchids.

Then it skirted a valley. On the other side Akaka Falls sent its waters plummeting 420 feet to explode on the valley floor in bursts of spray where rainbows danced (page 423).

Beyond Akaka the coastal road twists and dips another 40 miles. At its end is one of the most beautiful vistas I've ever seen: the Waipio Valley. Steep wooded hillsides stretch down to the valley half a mile below, where a river winds its way between patches of taro —the plant from which poi is made.

A century ago thousands of people lived in

the valley, but only a few remain; the fear of tsunamis has driven most people out.

Hawaii has been rightly called the "Orchid Island." Thousands of the exotic plants are flown to the mainland each year, and millions of blossoms—usually a type of vanda—go into the famous Hawaiian leis (page 410).

I lunched one day with Takumi Kono, a quiet Japanese-American whose love affair with orchids started forty years ago. Mr. Kono has developed many orchid varieties.

"Only three orchids are indigenous to these islands," he told me, "*Liparis hawaiiensis*, *Vrydagzenea sandwicensis*, and *Habenaria holochila*." He paused, grinned at the pencil I had poised over my notebook, and spelled the names for me.

The orchid list is much longer today, because many species and hybrids have been imported: cattleyas, phalaenopsids, vandas, and, in the cool highlands, cymbidiums. The bright anthurium has become a staple export. Though exotic flowers thrive on Orchid Island, growers must fight insects and fungi. Once the battle was against molten lava.

"In the 1960 flank eruption of Kilauea," Mr. Kono said, "the village of Kapoho was buried. Nearby orchid farms stood in the path of the lava flow. We members of the Hilo Florists and Shippers Association rushed over to save as many plants as possible."

He smiled. "Never before had I used a chain saw to cut orchid plants from the posts they grow on. It was a bit like doing an archeological dig with a bulldozer."

Trials by Fire Mark the Land

And the Orchid Island has another name: the "Volcano Island." It is all volcanic, in fact, and in an hour's drive from Hilo on almost any road you will pass fresh lava fields. Some are virtually smooth sheets, called *pahoehoe* by volcanologists; others called *aa* (ah-ah) are composed of rough, crumbly pieces.

In Lava Tree State Monument, south of Hilo, once-molten rock contains curious standing cylinders. Thick sheets of lava poured through during an eruption, encasing trees in their path. The lava cooled and molded around some trunks before the wood burned, creating the hollow columns.

I stood on tiptoe to peer down into one of those columns. The pattern of bark still showed, captured in hardened stone.

Centuries ago a lava flow reached the sea at Kaimu's Black Sand Beach, on the southeast shore. Molten rock, chilled by seawater, shattered into fragments, and the patient waves began eroding and polishing them. Today the fine lava grains feel silky underfoot.

Strolling barefoot there, I realized that what Hawaiians say—"Yes, sir, this is the fastest growing state in the Union"—may be literally true. It is certainly the *only* state having its boundaries extended by lava flows.

Rimside Seat for a Spectacular Show

Not until I took that helicopter flight over Kilauea could I grasp the immensity and violence of a volcano. The crater—properly called a caldera—is more than two miles across, and its walls rise as much as 400 feet. The caldera has been filling since the first Europeans saw it in the 1820's, and more than 500 feet of new lava has been added.

Violent? Spectacular? Surely a volcano that can send fountains of lava 1,900 feet into the sky rates those terms. But Hawaii's volcanoes are normally well behaved.

For proof, look at Volcano House, the latest in a succession of hotels that have perched on Kilauea's rim for more than a century. Never are the hotel's rooms more in demand than when the mountain erupts.

Consider the Hawaiian Volcano Observatory. It also perches on the caldera's rim. I paid a call on Dr. Donald Peterson, the scientist in charge, and got a fast education in volcanology. As we talked, I could look out his window and see the smoke of Halemaumau, whose fiery breath I'd felt from the helicopter.

"Five volcanoes make up the island," Dr. Peterson told me. "Kohala last erupted about 70,000 years ago and is probably extinct. Mauna Kea and Hualalai have some potential for future activity. Mauna Loa has been resting since 1950, but it's been one of the world's most active volcanoes and almost certainly will erupt again. Kilauea has had more than two dozen eruptions in 20 years."

The observatory's prime functions include interpretation and prediction. Staring out at Halemaumau's menacing smoke, I found myself most interested in prediction. Could the

Hanging gardens of the Kona Hilton in Kailua offer guests their own greenery-framed terraces and balconies. Once a playground for Hawaiian royalty, the Kona coast today lures visitors with championship golf courses, marlin-rich waters, and relaxed sunbathing.

Ice has replaced the fiery breath of Mauna Kea, asleep for 3,600 years. One of its many

cones, snow sheathed in winter months, draws these skiers for a three-day February meet.

observatory tell exactly when it might become active?

"Not precisely," Dr. Peterson said. "But the earth tremor patterns picked up on our seismographs give us a good clue. So do our deformation studies. Tilt meters measure slope changes of the ground. Before most eruptions, the summit region will bulge upward from the pressure of magma beneath its surface.

"But we can't pick the hour, and we can't be sure of just where the eruption will break out. The lava may flow from fissures or vents in the summit area or from one of the two major rift zones that extend down the volcano's flanks."

I asked about the possibility of tapping a volcano's heat as a power source, and I found that the issue is a complex one. Lava flows can be scattered across many miles, and an energy plant could find itself stranded when the heat source moved elsewhere, or, worse, buried beneath new flows.

Kilauea Destroys the King's Foes

Considering the frequency and volume of Hawaii's eruptions, loss of life and property has been remarkably low. There have been no fatalities since 1924, though almost two centuries ago Kilauea belched a cloud of suffocating gas that destroyed part of an army marching against King Kamehameha.

Only two villages—one of them Kapoho, scene of that 1960 orchid rescue—have been engulfed by lava. More recently, lava flows have closed a paved highway that runs from Kilauea to the sea.

"**Orchid Capital of the World,**" boasts the region around Hilo, where a woman harvests vandas from nursery fields. During a busy week, the city flies a million blossoms to the other Hawaiian Islands, the Far East, and the United States mainland.

I flew over the highway. Below, the road abruptly disappeared under a sheet of gray stone. Farther on it appeared again, vanished, then surfaced once more. A Park Service vehicle still lies buried on one section of that intermittent highway.

While Dr. Peterson and his volcanologists probe downward, scientists on another mountain look toward the stars.

The mountain is 13,796-foot Mauna Kea. "This is an ideal site for an observatory," William F. McCready, who runs the Mauna Kea facility, told me. "It's the highest major astronomical observatory in the world. It's above 90 percent of atmospheric water vapor —in fact, above 40 percent of the atmosphere itself. The nearest metropolis, Honolulu, is 200 miles away, so there's virtually no light-reflection problem and little radio interference. No air-pollution problems either."

Ice Storm Hampers Stargazers

Are there any drawbacks? Call them inconveniences. A scientist's problem-solving ability slows somewhat in the rarefied atmosphere. Astronomers, to remain acclimated, spend their nights at a halfway house down the slope, rather than returning to sea level.

Mr. McCready pointed out another inconvenience. "We had an ice storm at the site yesterday—with 70-mile winds. I'll bet you never expected to see *horizontal* icicles two feet long!"

Far below us the Saddle Road traversed the high valley between the slopes of Mauna Loa and Mauna Kea. It is the only road that crosses the center of the mountainous island. Though my car-rental contract stated in block letters that the risk would be mine alone, I drove the Saddle Road. There were dips and bends and teeth-jarring potholes, but I found no other perils.

Only loneliness, for signs of man were few. Often the road wound through lava fields of chocolate brown—solidified rivers that had poured down the mountain slopes back in the mid-1800's. Though more than a century had passed, few green things had been able to push through to grow there.

Halfway across the saddle, Pohakuloa offered a respite from the desolation. A beautiful, unique species of goose called the nene (nay-nay) was being brought back from near extinction here.

Biologists believe that a few migrating Canada or brant geese must have landed on the island hundreds of thousands of years ago and evolved into the nene. Tall, with long legs and abbreviated webs on its feet, the goose lost its migratory urge. Once it was common on Hawaii and Maui. But the nene was too easily caught—and too delicious.*

It was breeding time when I visited the area, so I could only peer at the nene from a distance, through the wire of a breeding pen. Perhaps there is more satisfaction from that view, for there were eggs in the nest. The nene is on the way back.

I left Pohakuloa and drove on across a saddle that gradually became less of a barren moonscape. Cactus and scrub grass appeared, and soon lush, cattle-dotted pastures of the

*See "Saving the Nene, World's Rarest Goose," by S. Dillon Ripley, NATIONAL GEOGRAPHIC, November 1965.

Sunbaked years of picking coffee beans and bananas tint the face of a Filipino-Hawaiian, tending his daughter at an art fair.

huge Parker Ranch. Covering much of Mauna Kea's eastern, southern, and western slopes, the 222,000-acre spread ranks as one of the world's largest family-owned ranches. It provides a fifth of all beef eaten in the State of Hawaii, even after paring off some of its vast expanse for development. Will all its wilds one day sprout asphalt?

"No," vows Richard Smart, who heads the ranching enterprise. "We want development, but we also want cattle—and some pure, uncluttered space."

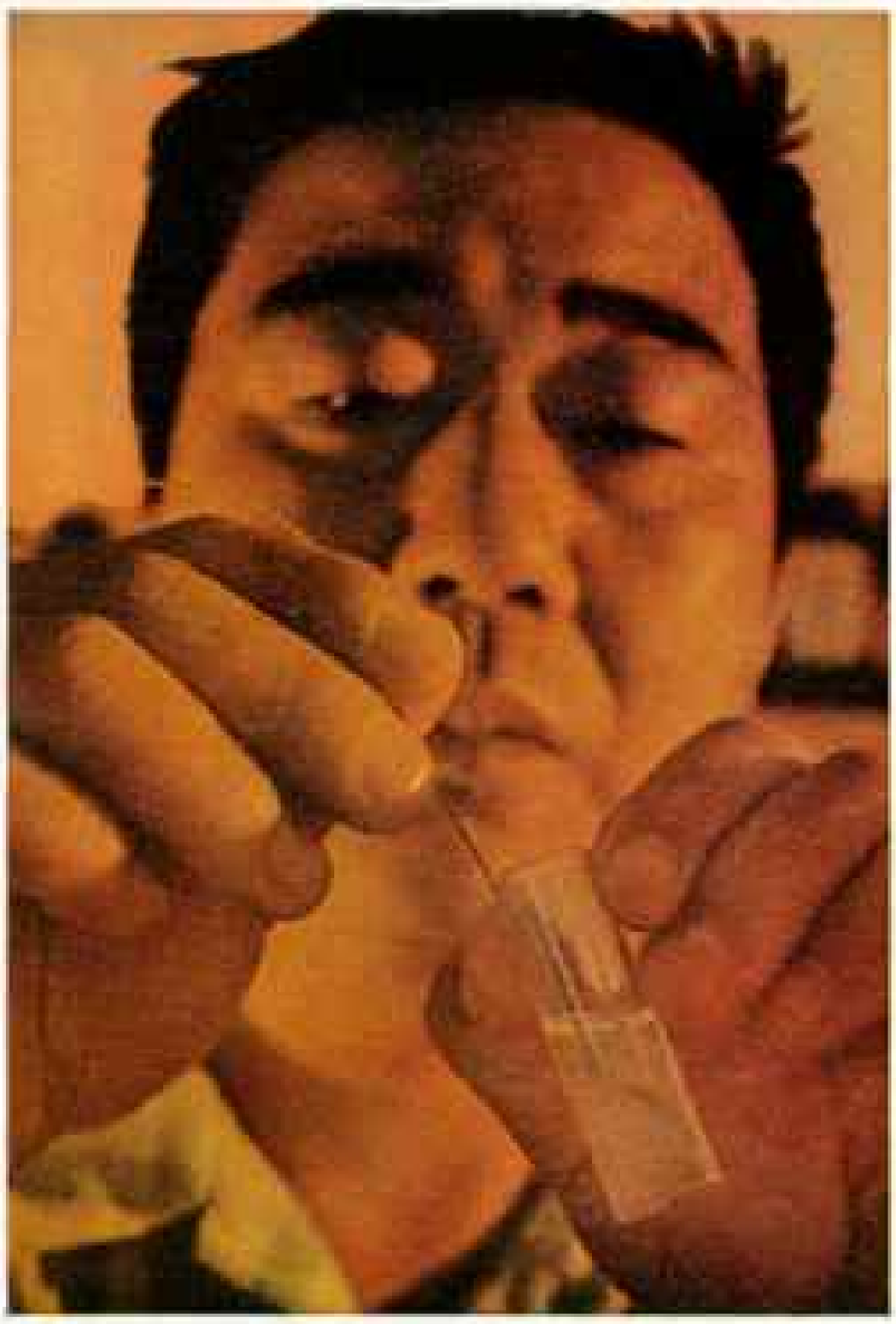
A left turn at Waimea, then down to the sea. Down to one of the least barren spots I've ever visited: the Mauna Kea Beach Hotel, on land once part of the ranch.

Before the hotel rose here, only a forbidding volcanic wasteland swept down to a lonely crescent beach. But there was beauty and tranquility in this barren solitude, and it has become a unique resort for restoring jangled spirits. No room or balcony looks out on another but frames therapeutic sweeps of sand and sea, gardens and green fairways, or the often snow-mantled volcano itself. A protective cove gentles the surf and lures snorkelers. A thousand art objects from over the Pacific populate the rooms and halls; ukuleles and dancers do not.

Still, the dancers and ukuleles are not far away. Farther down the Kona coast—Kona means "leeward," for this is the sheltered side of the island—lies the tourist strip. The town of Kailua is its epicenter.

And so it has been for centuries. Before the foreigners came, this coast was Hawaii's vacationland. There's a royal residence in Kailua: Hulihee Palace, ancient vacation home of Hawaiian monarchs.

I went there to view a quietly impressive



Sweetening up mother nature, an analyst tests a sugarcane solution to see if the crop needs a copper-enriched fertilizer. Hawaiian technology has boosted the sugar yield from four to eleven tons an acre since 1900. In early days field hands brought in from the Orient, Portugal, Spain, and Puerto Rico swelled plantation towns like Honomu (**right**). Now machines have taken over.

collection of relics—a feathered cloak, faded monochromes of kings and queens, and massive furniture carved to suit royal tastes. All of it was informative, and I honor the Daughters of Hawaii who protect it with loving care.

But even more I honor a living link with old Hawaii: Iolani Luahine, the palace curator (page 424). Few tourists who pass through the building realize that the shy, gray-haired woman who may be their guide is herself a Hawaiian treasure.

Her great-aunt was a royal dancer in King Kalakaua's court. Iolani is an authority on the traditional hula and its music. But it is clear that islanders give her other honors. Virtually everyone we met on Kailua's streets —teenagers, fishermen, truck drivers—had a smile of special warmth for Iolani.

She can pacify Pele, goddess of volcanoes, one Hawaiian told me. She has the power to talk with wild creatures, another said.

But as we lunched, Iolani instructed me in more down-to-earth things. "There is one-finger poi and two-finger poi," she said. "For in the traditional way, poi is dipped up and eaten from the fingers. If it is thick enough, one can twirl a mouthful around one finger." She gestured at the bowl of purplish gruel beside my plate. "This restaurant poi is too watery; two-finger poi."

Failure to Act Like a God Proves Fatal

Hawaiians refer to foreigners as *haoles*, and Iolani told me what the term meant.

"When the Europeans began to arrive, our priests decided that their own gods were more powerful than the strangers' god," Iolani said. "So they called the strangers *haoles*, the empty, or powerless ones."

Beneath the furrowed brow of the Kohala Mountains, horses graze on a cattle ranch.

More than 400 of these island spreads raise 20 million pounds of beef a year.

Living off the land means building in the treetops for one Waipio Valley resident. Few people now dwell in the lush gorge, where in 1946 a tsunami—a seismic sea wave—flooded homes and taro fields.

The first haole, of course, was Capt. James Cook, the explorer. He landed on Kauai in the Hawaiian chain on January 20, 1778, provisioned his ship, and sailed away to continue his search for an Arctic passage to Europe.

He failed to find it and returned this time to the island of Hawaii. Native priests announced that he was the god Lono and feted him accordingly.

He left once more, but a storm drove him back into Kealakekua Bay. There were doubters among the natives now. Surely Lono could have controlled a mere storm.

A mortal Captain Cook went ashore with a squad of marines to retrieve a ship's boat that had been stolen. In the squabble that followed, he was killed.

In those days of kings, islanders lived by an intricate system of rules. It could mean death to break a *kapu*—by eating a certain type of fish reserved for royalty, or by passing within the shadow of a king or his possessions.

All men's hands were turned against a kapu breaker. If he went unpunished, surely some disaster, a tidal wave, a volcanic eruption, would occur.

But if the culprit managed to reach a place designated as a refuge, he was safe. All who sought entry there were admitted, vanquished warriors and noncombatants as well as kapu breakers. When they left, the protection of the sanctuary went with them.

Ability to Swim Aided Refuge Seeker

One such place lies on the south Kona coast: City of Refuge National Historical Park. I toured it with Edmund Ladd, a Park Service archeologist.

"It took a nimble or very lucky kapu breaker to reach this sanctuary," he said. "I doubt if many managed to avoid capture coming overland." He gestured at the lava wall on the landward side, then pointed to the sea. "Most of them probably swam across the bay."

A thatched temple has been reconstructed on one of the original stone platforms. Grimacing wooden statues surround it.

"Each figure represents an aspect of Lono, god of agriculture," Ed told me. "Lono was one of the four major Hawaiian gods."

Lono? That was also the role Captain Cook had unintentionally played. And the captain's fatal encounter, marked by a stone obelisk, took place only four miles up the coast.

From the City of Refuge I drove south in quest of a geographic distinction. I thought I had attained that goal by visiting Key West, Florida, and sent friends postcard greetings from "the bottom of the 50 United States." But I was wrong. The entire island of Hawaii is nearly 300 miles farther south.

Now I've achieved my inconsequential aim, for I've stood at Ka Lae—South Cape. It is a grassy, windswept place, whose few trees have lived so long with northeast trade winds that they have a uniform tilt to the southwest.

Centuries ago Hawaiians moored their canoes on the cape's sheltered side; the holes they chiseled in the rocks for mooring lines are still visible. But fishing has changed at Ka Lae. Jutting out from the clifftop is a row of small, sturdy platforms.

I asked Roy Toguchi of Naalehu how the platforms are used. In answer, he sketched a small raft in my notebook, a raft with a sail.

Informality breeds contentment. A parking lot rings with song and laughter as young people gather for a sunset sing-along at Kailua Pier, a favorite meeting place. In late afternoon the town's charter fishing boats dock with the day's catch for the game-fish weigh-in. *Malihinis*, as tourists are called, join the *kamaainas*, or old-timers, in celebrating the biggest prize.

"The float fisherman builds a tiny raft, about eighteen inches square, and lowers it from his platform into the sea. Offshore winds carry it out 1,000 feet or so, towing his baited fishing line. If he's lucky, he'll have an 800-pound tuna on a hook when he reels the rig in. That's why the platforms are so sturdy."

Back in Naalehu, at his restaurant, Roy Toguchi gave me a cup of good Kona coffee and a capsule course in Hawaiian.

"The language has only a dozen letters," he said. "The five English vowels, plus h, k, l, m, n, p, and w. Sound every letter, even in a string of vowels. Usually, you'll put the accent on the next-to-last syllable. Do you see?"

I found a phrase in my pocket Hawaiian dictionary and sounded every letter: *Pēlā ku'u mana'o*—I suppose so.

Naalehu's homes and stores would fit into any mainland town. But the breeze is warm, Mauna Loa looms in the background, and the aloha spirit still prevails. I stopped to watch a Hawaiian hoe his garden. Soon his hoe was leaning against the fence while we munched fresh radishes and passed the time of day.

The house next to the garden had been his birthplace. But, like village lads throughout the world, the big city—Honolulu—had lured him. Life was strange there, for haoles ruled, so he came back to Naalehu and was happy.

I let my new friend go back to his garden and, waving a radish in salute, left humming an old song from the 1930's: *I want to go back to my little grass shack in Kealakekua, Hawaii.*

On the cape's windward side, a few miles up from the point, tourists can wiggle their bare toes in olive-green sand. Not many do, for a rough two-mile hike over ankle-twisting

IN AN ANCIENT RHYTHM, *members of the Prince David Kawananakoa Canoe Club drive vigorously toward shore. The thrill of gliding over Hawaii's fabled waters makes paddling a fleet outrigger one of the state's fastest growing sports.*

Like the flaming poinsettia and the spiring evergreen, Holy Rosary Roman Catholic Church stands rooted to the soil near Kalaoa (facing page).

Greeting his flock following worship services, the Reverend David Kaapu stands before Haili Congregational Church in Hilo, begun by the first missionaries there. They arrived in the 1820's, bringing stern New England doctrines to the pleasure-loving Polynesians.

lava lies between the green beach and the nearest parking spot. The sand is olivine, the remnant of a lava flow. I made the hike, and limped back clutching a pill bottle filled with green sand to wave before my doubting friends back home.

Not far from the cape I slowed my car to watch a grayish-brown, long-tailed mongoose glide across the road. When I reached park headquarters at Hawaii Volcanoes National Park, I looked up management ecologist Donald W. Reeser and asked him how the mongoose got from India to Hawaii.

It was imported to control rats, I learned, in a scheme that backfired. The mongoose works days, and rats are active at night, so the latter continue to thrive. But ground-nesting birds have suffered grievously from the mongoose's taste for eggs and nestlings.

Goat Colony Proves to Be a Mistake

From Don I learned how vulnerable island vegetation is to another imported species.

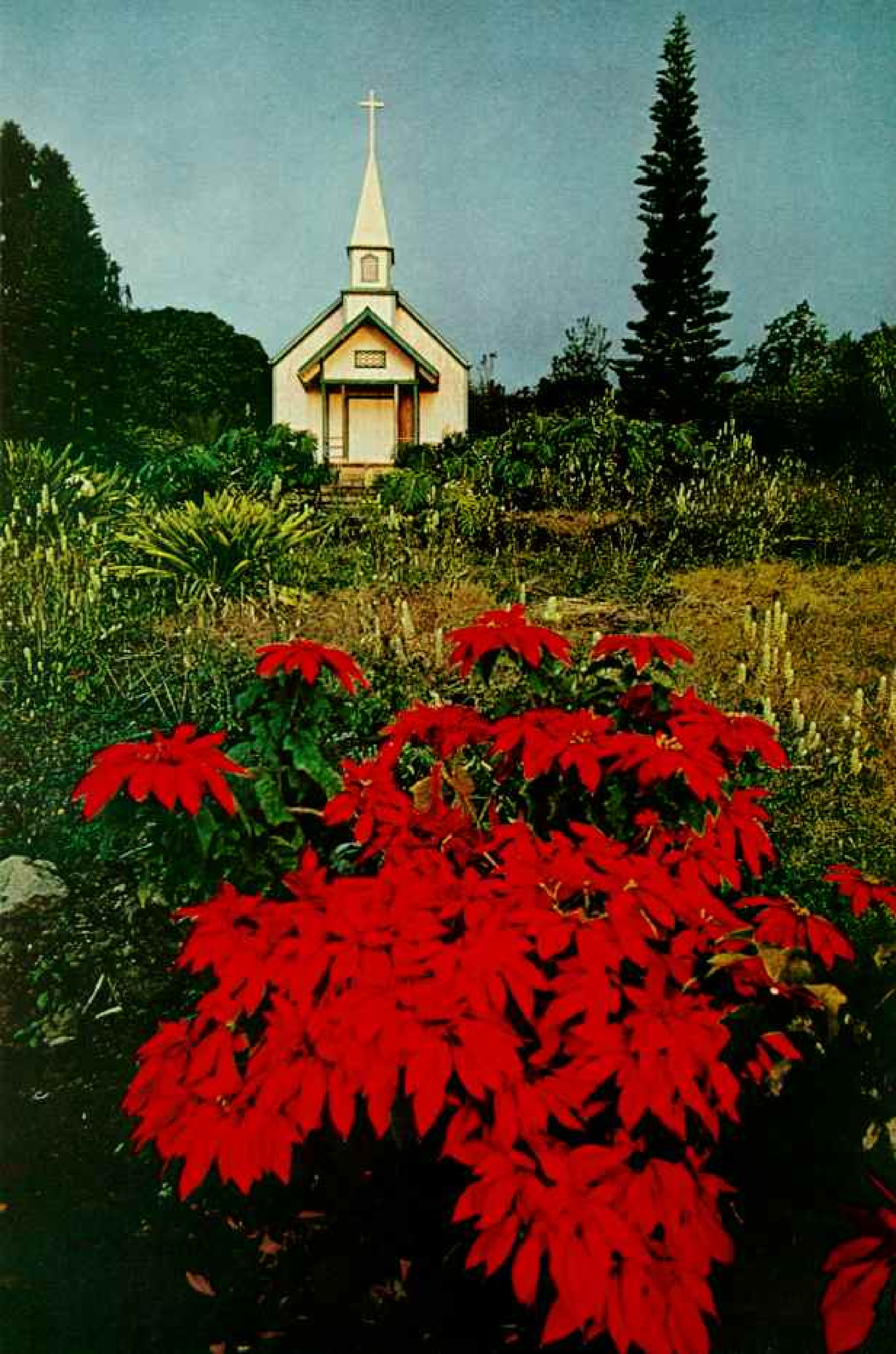
"For millions of years," he said, "things grew here without man's influence. The Hawaiian bat and the monk seal made it here on their own—they were the only mammals. Birds were blown off course to the island. Some seeds arrived on ocean waves; others stuck to the feathers of birds. Spores were carried on the wind. On the average, one species may have arrived each 50,000 years."

He tapped his desk for emphasis. "But there were no grazing animals, so plants here developed largely without thorns or unpleasant tastes. Trees developed without thick, protective bark. When Captain Cook arrived in the islands, he left goats as a future meat supply. So did ship captains who came later. The goats turned wild, and now they're our biggest problem, because our plants and trees are vulnerable."

The park stages periodic goat drives, using helicopters. Local people are deputized to hunt the animals for meat. Much of the park is now fenced, and more fences are abuilding.

Don sighed. "A nanny will drop a set of twins each year, and occasionally two sets, so it's a big control problem. We can round up goats and shoot goats—but what we really need is an absence of goats."

Among Hawaii's more desirable "imports" was ship's officer Charles R. Brewer, who stormed ashore in 1831 after an argument with his captain. His impulsive decision turned out to be a significant one: C. Brewer



and Company, Limited, is now the island's largest business.

Among the firm's diverse holdings is the 108,000-acre Seamountain-Hawaii Ranch—a Brewer property for three-quarters of a century. When I jolted over some of those acres in a truck, I learned that Hawaiian ranching has its unique aspects.

Cowboys are *paniolos*—an early Hawaiian attempt to pronounce *españoles*, for the first cowboys were Mexicans and spoke Spanish.

The ranch runs 17,500 head of Hereford cattle—but there were only nine cowboys, plus an assortment of cow dogs, blue heelers, who have an eerie talent for moving cattle.

I'd never before seen dogs that were even slightly blue, so I asked a paniolo about their parentage.

"Part collie, part Australian dingo, and part whatever else came along," he replied with a grin.

Dirty Task Builds New Land

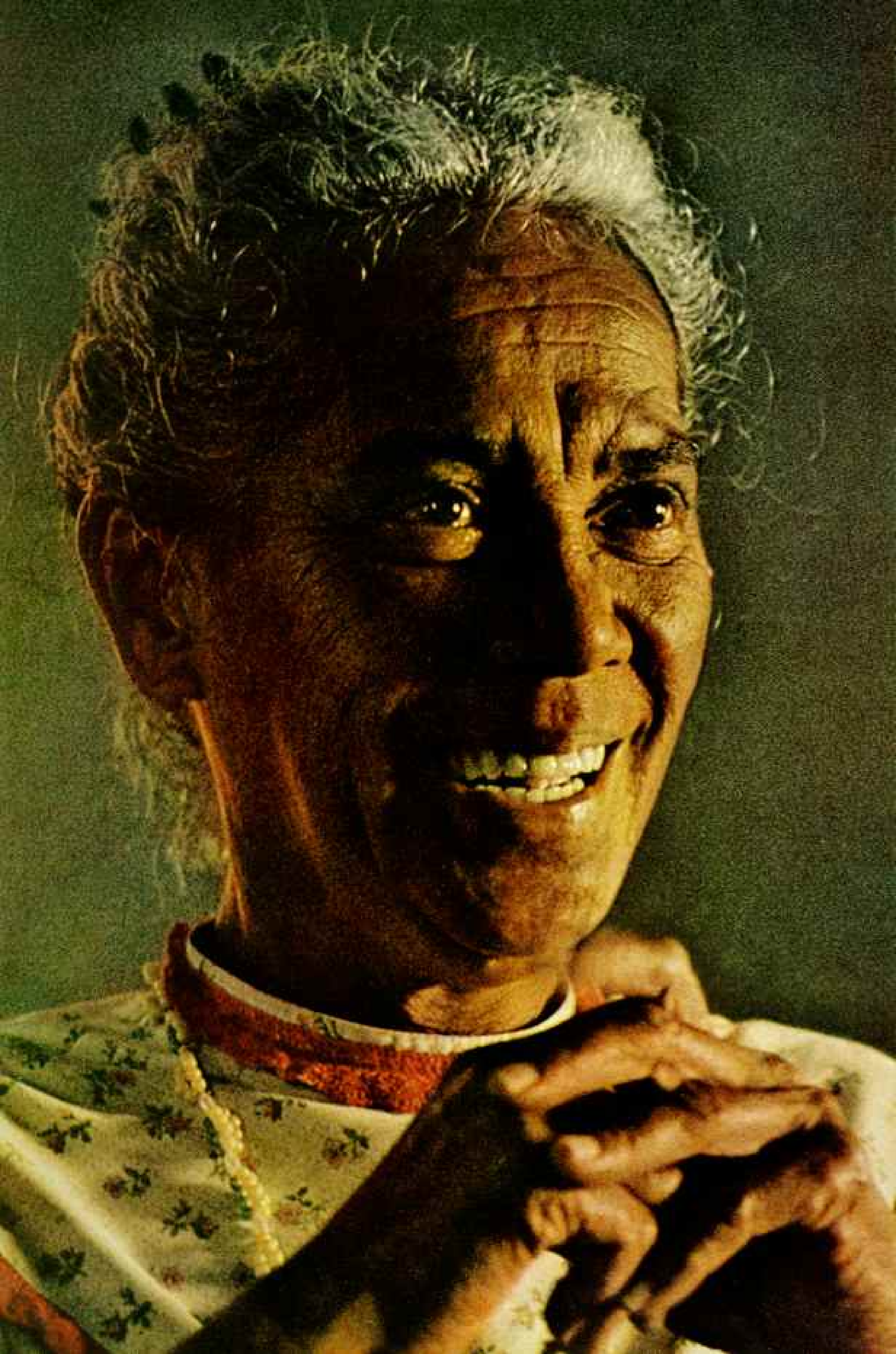
Like Hawaii itself, Seamountain Ranch is growing. Jim Truman, my guide, pointed out a muddy stream. "That's first-wash water, from cleansing raw cane at Brewer's sugar mill, next to the ranch. Usually it's a polluting liability, because it's loaded with dirt. But we channel it onto a lava bed, build dikes to hold it there, and let the water sink down through the lava, leaving the dirt behind. So far, we've turned more than 1,000 acres of bare lava into pastureland that way."

Sugarcane, I learned, is harvested by bulldozer. I watched loads of debris-filled cane drop into the first-wash hopper. Rocks the size of basketballs thundered out with the dirt.

Hawaii's mountains bar much of the island's rain from this leeward side, so the ranch irrigates with well water. One well can furnish 3,600,000 gallons a day. Jim steered the four-wheel-drive truck to an irrigated pasture, where cattle grazed in chest-high grass. "We're putting all the steers we can here," he

Turning bold shoulders to the sea, the windward coast near Niulii shrugs off the relentless surf (**left**). Capt. James Cook first sighted the island in 1778 but found no harbor along this coast.

Evening enshrouds Akaka Falls (**right**). Island legend says it was named for a Hawaiian youth who leapt into the 420-foot chasm after being ridiculed by his friends.



told me. "Otherwise the grass will get so high that we won't be able to find the cattle."

I spent part of my last day with Shunichi Kimura, at that time mayor of the Big Island. He talked of those first years of Hawaii's statehood, when any incoming investment was welcomed, then of the realization that growth for its own sake was not necessarily good, and finally of the stiffening regulations to keep the traditional ways valid.

I asked Mayor Kimura how he would like to see the island's economy develop.

The mayor rocked back in his chair and stared into the future. "I'd like to see all sorts of research organizations here: university branches, technologically oriented firms, think tanks—that sort of thing.

"We have a great number of scientific natural resources to develop. There are pristine coastal waters on our west coast for marine-biology people and ideal locations for more work in volcanology and astronomy on the mountains. There should be organizations here working on problems of tropical agriculture, too."

He paused, then continued: "We're way down here at the end of the island chain, a couple of hundred miles from Oahu, where the action is. That is one reason why think-tank groups would be desirable; we'd avoid problems of shipping bulk materials. Mostly, though, it's a matter of our being blessed with the things the groups would need. And that type of industry here would give islanders more job options than just cattle, agriculture, or tourism."

More Growing Pains in "Paradise"

The next day, en route home, I bought a newspaper in Honolulu's airport and learned that Hawaii was growing again. Pele was active once more. Mauna Ulu (Growing Mountain), actually a vent on Kilauea's flank, was fountaining lava a hundred feet in the air. Before the eruptions subsided, lava had traveled three miles, obliterating most of a trail and invading a parking lot. Haoles and Hawaiians came by the thousands to view the fiery spectacle, and the Goddess Pele once more let them watch in safety.

The damage resulting from Pele's show was not extensive. The tourist trails and parking lots can be relocated. It is a small price to pay for the privilege of living in almost-paradise—in one of the fastest growing states of the U.S.A. □

Fire of her faith shines from the face of Iolani Luahine, curator of Kailua's Hulihee Palace, summer home of Hawaiian royalty. She brings the past to life in her graceful renditions of old Hawaiian dances and chants. Iolani numbers Pele, goddess of volcanoes, as one of her *aumakuas*—guardian spirits—and islanders seek her counsel in contacting the spirits of distinguished forebears. "I am only a tool, a symbol," she says. "Our ancestors listen, and understand."

A Hawaiian artist of old carved the mysterious petroglyph (**above**). The stylized figure of a man holds a paddle aloft.

Six Months Alone in a Cave

ARTICLE AND PHOTOGRAPHS BY
MICHEL SIFFRE

OVERCOME WITH LETHARGY and bitterness, I sit on a rock and stare at my campsite in the bowels of Midnight Cave, near Del Rio, Texas. Behind me lie a hundred days of solitude; ahead loom two and a half more lonely months. But I—a wildly displaced Frenchman—know none of this, for I am living "beyond time," divorced from calendars and clocks, and from sun and moon, to help determine, among other things, the natural rhythms of human life.

The probe and electrodes that monitor my bodily functions lie unused in the tent. Two ideas obsess me: I am wasting my life in this stupid research; I must get out of Midnight Cave *now!* My thoughts, it seems to me, unfold with singular logic and lucidity. Actually, my mind has temporarily collapsed.

It had all begun bravely enough. My associates had spent difficult months in preparing my underground habitat. They had manhandled materials of awesome variety down the tricky 100-foot vertical shaft leading to the floor of Midnight Cave. In a majestic chamber they had constructed a wooden platform and crowned it with a nylon tent. Furniture, scientific equipment, freezers, food, and 780 one-gallon jugs of water had been deployed with scrupulous care.

Shortly after noon on February 14, 1972, I looked across the parched Texas terrain toward the Mexican border, 35 miles away. My eyes turned to the tents housing the impressive array of instruments assembled for this experiment as well as the staunch compatriots who would provide surface support. I summoned a smile for the TV cameras and news photographers, uttered a few banalities, and embraced my mother. Then I kissed Nathalie, my bride of a year.

Scrambling down into the gathering gloom of the shaft, I paused for a last upward glance. Nathalie's face was framed in the irregular opening. Sunbeams played in her hair. It was my last view of daylight and of another human face for half a year.

5TH DAY (FEBRUARY 18, CYCLE 3) Underground: Since February 16 I have been living by cycles rather than days. I measure them from awakening to awakening. Past experience has shown that, in the beginning, at least, these cycles do not differ markedly from mankind's normal 24-hour rhythm.

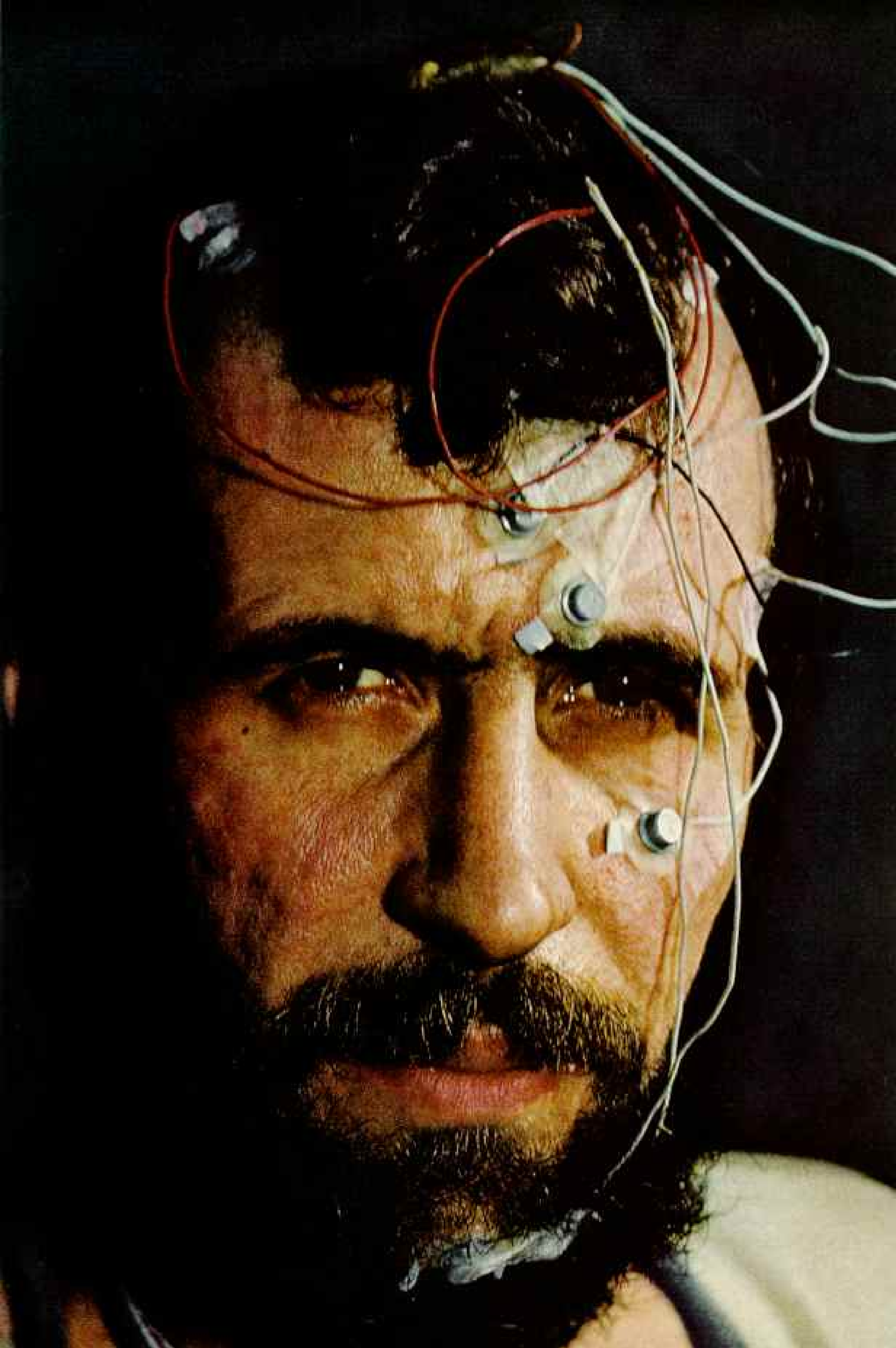
My cave is magnificent, with an unchanging temperature of 70° F. Without human intervention, the darkness is absolute, the silence total.

The first cycles pass in a tempest of activity. Immediately upon awakening, I grope for the telephone and inform the surface team. Our conversations are curt and businesslike —purposely, to prevent my receiving any hint of the actual time. When I call, lights —controlled from above—flood the tent and platform. My "day" includes fixed tests that occupy more than four surface hours.

I record my blood pressure, then I follow

Wired for science, French geologist Michel Siffre bristles with electrodes that monitor heart, brain, and muscle activity. For 177 days he lived alone in a cave's changeless depths, isolated from the sun and other reminders of time's passing. Siffre unconsciously stretched his 24-hour day into cycles lasting as long as 51¾ hours. His experiment may shed light on man's ability to endure long periods of space flight.

GERARD CAPPA, INSTITUT FRANÇAIS DE SPÉLÉOLOGIE



procedures that measure my mental acuity, memory, and manual dexterity. I pump a bicycle machine for a simulated three miles. I fire five rounds from a pellet rifle at a target to test coordination (page 431).

In free time, I sweep energetically. The rocks surrounding my camp are decomposing into a fine white dust that drifts across everything. Mixed with it, like a foul ash, is the guano of a vanished bat colony. Inhaling such dust over an extended period can induce a sometimes fatal pulmonary disease called histoplasmosis. Futilely, I try not to breathe while sweeping. I feel my first flicker of fear. Will a six-month accumulation of this dust infect my lungs?

Earlier Tests Recorded 48-hour Cycles

I am familiar with the risks of life underground. In 1962 I undertook the longest study up to that date of the wake-sleep rhythm beyond time, in the cavern of Scarasson in the French-Italian Maritime Alps. After 63 days of numbing cold, constant dampness, and almost unbearable stress, I emerged as a half-crazed, disjointed marionette.

That initial experiment led to several others that I directed under the auspices of the French Government. These showed that some individuals in isolation tend spontaneously to adopt a 48-hour cycle.

The subjects' perception of two days as one attracts military interest. The phenomenon could, for instance, ease considerably the emotional rigors arising from long stints on nuclear submarines.

I have come a long way from my first crude experiment at Scarasson. In the tents above, perhaps half a million dollars' worth of sophisticated equipment will monitor and store the data transmitted from the cave: A rectal probe registers my temperature; electrodes on my chest capture my cardiac rhythm; others on my head and face record the length and nature of my sleep. Dr. Malcolm Smith of the National Aeronautics and Space Administration—with an eye cocked toward lengthy space flights of the future—supervises my diet.

I have even promised to shave daily for part of the time, preserving the whiskers to be weighed by Professor Franz Halberg of the University of Minnesota. Beard growth is believed to reflect hormonal activity; he wants to determine if men are subject to a pattern similar to the menstrual cycle.

24TH DAY (MARCH 8, CYCLE 20) My periods of wakefulness pass in brisk activity. Unknown to me, I am now living in a 26-hour cycle. My probe cable and the wires of the various electrodes plug into a special belt that, in turn, is connected by a cable to the machine that transmits data to the surface computer. This latter cable, 33 feet long, acts as a kind of leash. Being underground poses a certain risk. Lightning striking the surface can diffuse through the ground and transmit a nasty shock. Dampness could short circuit the equipment in the cave, also producing electric shock.

Twice I disconnect to explore this marvelous grotto. I stride rapidly through the guano dust, but it billows up and the sight disgusts me. In the far reaches of the cavern I find some helictites, wondrously twisted stalactites of singular beauty, and also an array of what seem to be fossil bones.

For the most part, however, my life focuses on the 20 square yards of the platform (pages 432-3). I enjoy luxuries undreamed of at Scarasson. The food, in particular, delights me. Through the good offices of NASA's Dr. Smith, Marriott In-Flite Services has provided me with frozen meals identical to those consumed by the Apollo 16 astronauts just before and after their flight. Dr. Smith wants to determine the effects of changing

physiological rhythms on nutrient utilization.

One grave misfortune: My record player no longer functions. I had counted heavily upon music to sustain me through the lonely months ahead. Now I have only books. And these, attacked by mildew, become exceedingly disagreeable to handle. In fact, mildew spreads everywhere, even to the dials of my scientific equipment. Only the blue nylon of my tent remains immune.

Early in my stay I heard the furtive noises of mice in the darkness. To eradicate this potential source of disease, I set traps. The first "night" I netted a large male and a large female. To date, I have caught four more pairs. Curiously enough, each pair is smaller than the last. A feeding order of some kind? I believe that I have wiped out the whole mouse colony in the cave. I have not heard their tiny stirrings for many cycles.

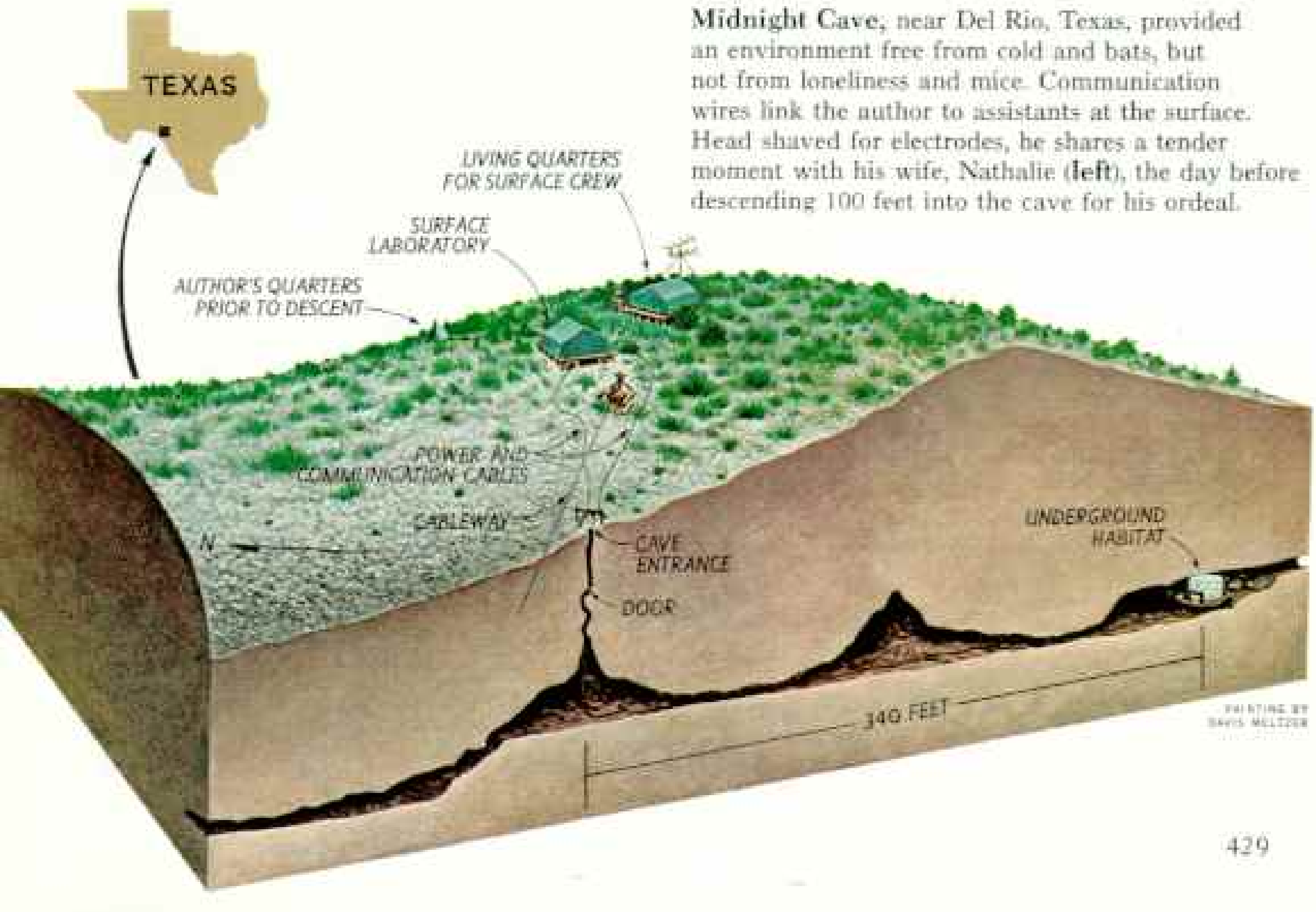
My evenings bring a particularly tedious routine. I must shave and meticulously preserve the whiskers. Then, after carefully cleaning the skin surface, I must apply miniature Beckman electrodes to my head and face: these will record the patterns of deep sleep, light sleep, and dream time.

While investigation of sleep is a relatively young science, much has already been learned. Electroencephalograms show that sleep has several stages. It begins with a light initial slumber called Stage I, and gradually deepens through Stages II and III, lasting roughly 40 minutes, into the profound oblivion of Stage IV. Then, again after a passage through intermediate phases, one begins the stage called REM, for the rapid eye movements that indicate dreaming. The cycle repeats four or five times in a typical night, but in general the deep slow-wave sleep occurs early and the ratio of REM sleep increases toward morning.

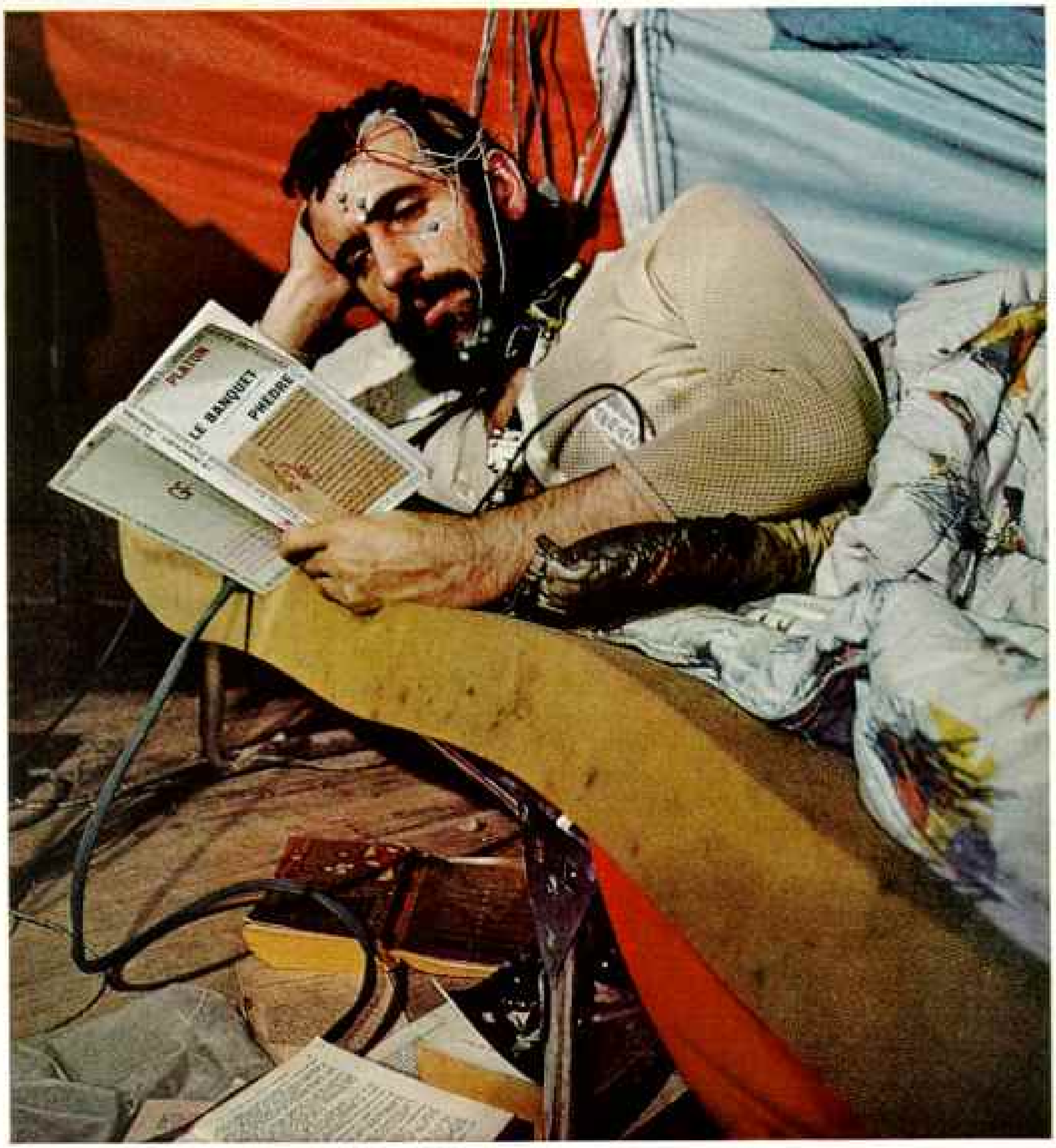
Experiments indicate that the restorative power of sleep stems mainly from Stage IV; although the function of the REM phase is not clearly understood, investigators have found that some subjects, when deprived of it, display irritability and anxiety.

77TH DAY (APRIL 30, CYCLE 63) I have passed a significant mark. In 1962 I spent exactly 63 days in Scarasson, emerging in acute physical and emotional distress. Now, in my 63d cycle in Midnight Cave (I don't realize at the time that my "real" 63d day fell two weeks earlier), I am in excellent form. I notice, though, a fragility of memory. I recall nothing from yesterday. Even events of this morning are lost. If I do not write things down immediately, I forget them.

I also begin to resent the telephone. Far from being a comfort, its presence serves as a malign reminder that I am alone, a captive.

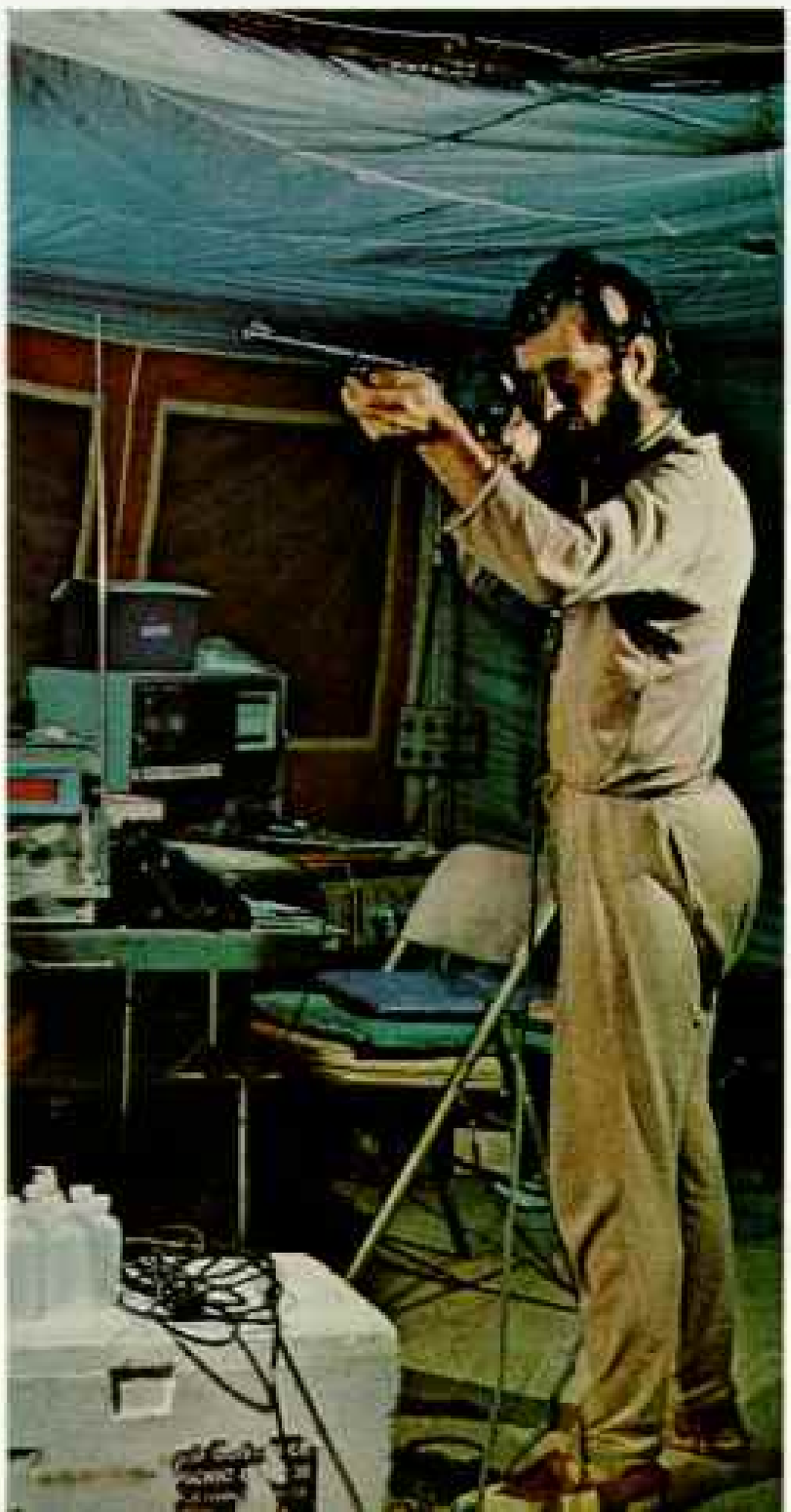


Midnight Cave, near Del Rio, Texas, provided an environment free from cold and bats, but not from loneliness and mice. Communication wires link the author to assistants at the surface. Head shaved for electrodes, he shares a tender moment with his wife, Nathalie (**left**), the day before descending 100 feet into the cave for his ordeal.



Escape into a book relieves the monotonous tasks of weighing (**right**), shaving, and applying electrodes before retiring to record patterns of sleep. Endless measurements of everything from barometric pressure to food intake monopolize Siffre's time. When he feels drowsy, he signals aides at the surface to turn off the lights, and his sunless, clock-free "day" ends.

Underground day begins with an astronaut's meal: filet mignon, spinach, and potatoes (**below**) to ensure proper nutrition. When Siffre awakens, he telephones assistants topside to switch on his lights. Then he performs routine experiments to test blood pressure and pulse, and shoots a pellet rifle to gauge coordination (**bottom**).



79TH DAY (MAY 2, CYCLE 65) My crack-up commences with a few lines in a book by French speleologist Corentin Queffélec. I read how he emerged from an arduous exploration of a cave system 3,850 feet deep and realized that he was 40 years old and could never do that again. My God, I'm 33! Am I really almost washed up?

What am I doing here in this silly experiment while my professional life ebbs away? I telephone the surface. Over and over I say through clenched teeth, *"J'en ai marre!*—I've had enough!"

On the other end, my old friend Gérard Cappa does not reprove me. "Yes, yes," he says reassuringly. "All is well. Everything is going fine."

"J'en ai marre!" I shout one last time and slam down the phone. It does not relieve me. I am still overcome with despair, with feelings of overwhelming self-pity.

Cycle after cycle I stumble to a certain rock at the farthest limit of my electronic umbilical cord and sit motionless. Driven by some vestigial sense of duty, I fight the temptation to disconnect. Futile as it is, the experiment at least will proceed.

I remember a boyhood yearning. Central America! To explore caves there in search of Maya relics and pre-Maya cave paintings. Ah, that has importance. That has grandeur.

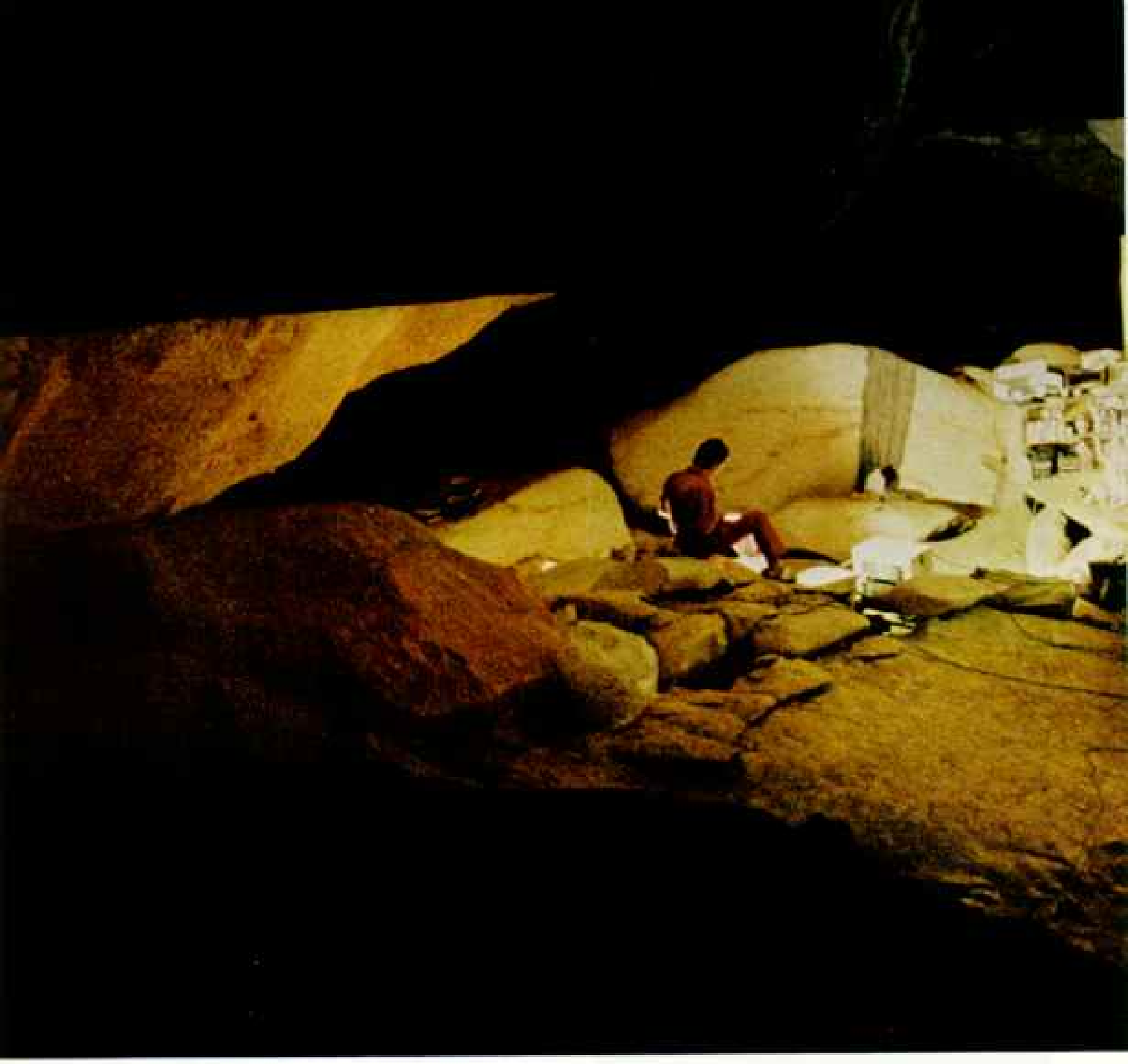
For long hours I try to envision Central America . . . Guatemala. Brilliant sunlight filters through green fronds and the rich earth smells of life and growing things. Monkeys chatter in high branches. And everywhere my dream-eyes scan the monuments of a mighty civilization.

86TH DAY (MAY 9, CYCLE 72) For several cycles I lie prostrate and force myself not to think. Then the perfect solution occurs to me: suicide. I will, of course, make it appear an accident. Nathalie will receive my insurance.

I lay plans guilefully—until a thought crushes my scheme. To finance my experiments over the years, I have contracted considerable debts. My parents would become responsible for them should I die, and my father is a working man.

I abandon the idea.

94TH DAY (MAY 17, CYCLE 79) I disconnect the probe and the electrodes, for I plan a ten-cycle rest to rebuild my confidence. I am living through the nadir of my life. This long



loneliness is beyond all bearing. But guilt overwhelms me. Suppose I am living in 48-hour cycles and robbing my colleagues of vital data? For the sake of my friends and co-workers I will reconnect and see this experiment through; afterward, no matter what the obstacles, I will go to Central America. And I will regain control of my soul.

156TH DAY (JULY 18, CYCLE 130) Panic! Stark, unreasoning panic! Today—what a mockery of a word in this timeless cave!—I scrape the mildew from a magazine and read that bat urine and saliva can transmit rabies through the air. I am in no such danger from the long-vanished bats, but I don't know that at the time. And, for the eternity I have spent in Midnight Cave, I've been absorbing the foul ash of their droppings with every breath.

Preparing for sleep, I discover a rash on my chest, apparently caused by the gel that is used to conduct the signals from my body to the attached electrodes. The mirror reveals an alarming number of new gray hairs in my beard.

In my journal I scrawl this disorganized—but true—sentence: "When you find yourself alone, isolated in a world totally without time, face-to-face with yourself, all the masks that you hide behind—those to preserve your own illusions, those that project them before others—finally fall, sometimes brutally."

1620 DAY (JULY 24, CYCLE 135) I awaken, as always, to blackness and silence. Then I hear a mininoise. A cricket, perhaps even a

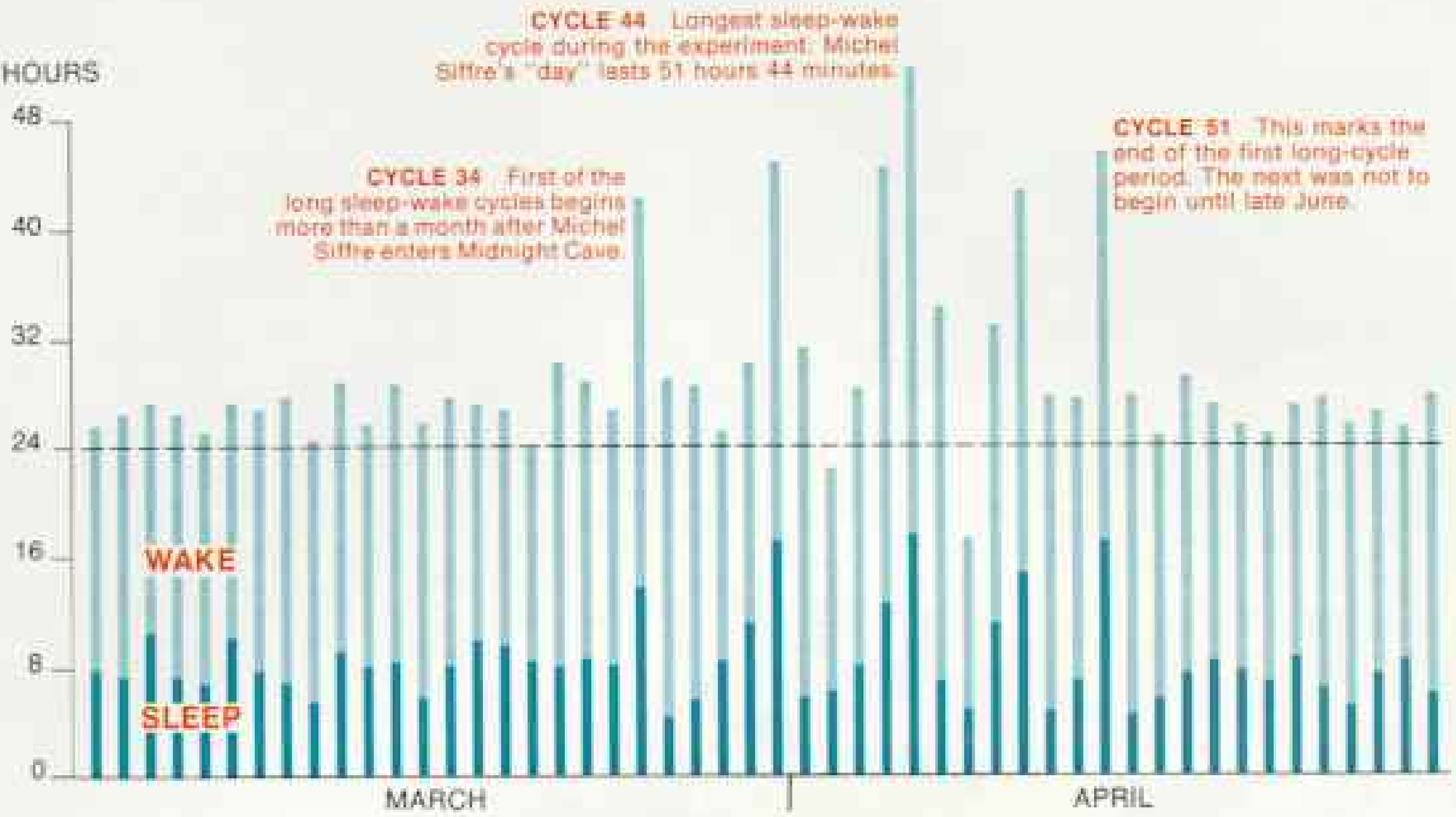
mouse! Stealthily I pick up the phone and report to the surface. As light splashes my platform, I hear the metallic rattle of a can. A mouse is foraging among my supplies. My heart leaps. Another living creature exists in Midnight Cave!

If I trap this rodent, I will have a companion. I formulate a plan. Unobtrusively I place a single pea in a clear spot on the platform. I watch quietly for a long time. Finally the mouse—a very small one—darts out of the darkness. He advances timorously across the platform, seizes the pea, and flees.

163D DAY (JULY 25, CYCLE 136) I spend my day studying the habits and movements of the mouse. My bait is jam. Twice he comes to the platform to nibble. I name him *Mus*, the

Live-in laboratory glows in incandescent light as the author daydreams on a favorite rock. The tent, housing bed and equipment, provides a psychological retreat from the cave's vastness.

Confinement, or isolation, or both, contributed to a grave deterioration of Siffre's mental and manual dexterity. After three months, his hands, slow and clumsy, could no longer string beads, and thoughts not scribbled down were quickly forgotten.



Wild variations from the 24-hour norm mark a two-month period of Siffre's long experiment. Although his wake-sleep cycles varied from roughly 18 to 51¾ hours, each seemed a normal day to the author. Only after his ordeal did he learn exactly how his cycles varied. In similar past studies conducted by Siffre, subjects in isolation have spontaneously entered a sustained 48-hour rhythm—14 hours asleep, 34 awake.

Resurrected from the underworld, Siffre rejoins Nathalie amid a regiment of newsmen. "The sun never looked so good," beamed the veteran cave-sitter, who planned to turn his back on the future and the rigors of space research and begin a journey into the past with a ten-year study of prehistoric cave art in South and Central America.

Latin word for mouse. Time passes rapidly.

166TH DAY (JULY 28, CYCLE 138) Today I strike. I tilt a casserole dish above a smudge of jam, propping it on a book. Then I wait with my pellet rifle. Mus approaches. He samples the jam. I fire at the book supporting the casserole. It tumbles; the dish falls. But Mus scampers safely away.

168TH DAY (JULY 30, CYCLE 140) All day I crouch immobile beside the jam, holding the casserole in my hands. Mus hovers timidly on the edge of the platform.

170TH DAY (AUGUST 1, CYCLE 142) My patience prevails. After much hesitation, Mus edges up to the jam. I admire his little shining eyes, his sleek coat. I slam down the dish. He is captured! At last I will have a companion in my solitude. My heart pounds with excitement. For the first time since entering the cave, I feel a surge of joy. Carefully I inch up the casserole. I hear small squeaks of distress. Mus lies on his side. The edge of the descending dish apparently caught him on the head. I stare at him with swelling grief. The whimpers die away. He is still.

Desolation overwhelms me.

179TH DAY (AUGUST 10, CYCLE 151) Sullenly, mechanically, I stumble through my battery of tests. Just as I finish my laps on the hated bicycle, the telephone rings. Gérard tells me that it is August 10, a stormy day, and the experiment has concluded. I am confused; I believed it to be mid-July. Then, as the truth sinks in, comes a flood of relief. Although I face nearly four more weeks in the cave for other tests, at least the terrible isolation has ended. I will have visits from my colleagues above.

Happy at last, I hurry to my chores. As I jump from the platform, a powerful electric shock blasts me through the heart electrodes. Convulsively, I bound back onto the platform clutching my chest. The pain is excruciating. My God, I think, I've succeeded in the experiment and now I'm going to die. Had lightning struck the surface? Had the equipment shorted? I will never know the answer.

So decayed are my mental processes that I touch my toe to the ground three times—receiving a blast of electricity to the heart each time—before I think to disconnect.

205TH DAY (SEPTEMBER 5, CYCLE 175) It is over. I emerge into the clear air of southwest Texas. My wife and my friends greet me tumultuously. Journalists and photographers surround me. Again I utter the necessary clichés. All the while I inhale the smell of grass, luxuriate in the wind that caresses my face. Later, alone with the surface team, I examine the data we have recorded. This, the longest beyond-time experiment in history, is indeed a success. I weep with happiness.

Our most significant results are still undergoing detailed analysis by physiologists, psychologists, chemists. Miles of tape have been delivered to NASA laboratories where they await computer processing; crateфuls of additional tapes are destined for other labs.

While the graph of my wake-sleep periods traces a jagged, seemingly random pattern, I did tend toward a 48-hour rhythm on two widely spaced occasions. My average cycle in Midnight Cave extended through 28 hours. Curiously, in Scarasson I slept an average of more than ten hours a "night"; in Texas only a bit more than eight.

These new data will be combined with my findings in previous experiments to assist Professor Michel Jouvet of the University of Lyon in perfecting a test that may be capable of determining who can and who cannot adapt to a 48-hour wake-sleep cycle.

I am convinced that final results of this experiment will reveal serious problems confronting future long-range space travelers. Whether because of confinement, solitude, or both, my mental processes and manual dexterity deteriorated gravely and inexorably toward the end of my stay in Midnight Cave.

Now, long after my months in Midnight Cave, I still suffer severe lapses of memory. My eyesight has weakened, and I am victim of a chronic squint. I suffer psychological wounds that I do not understand.

And I dream of Guatemala. □

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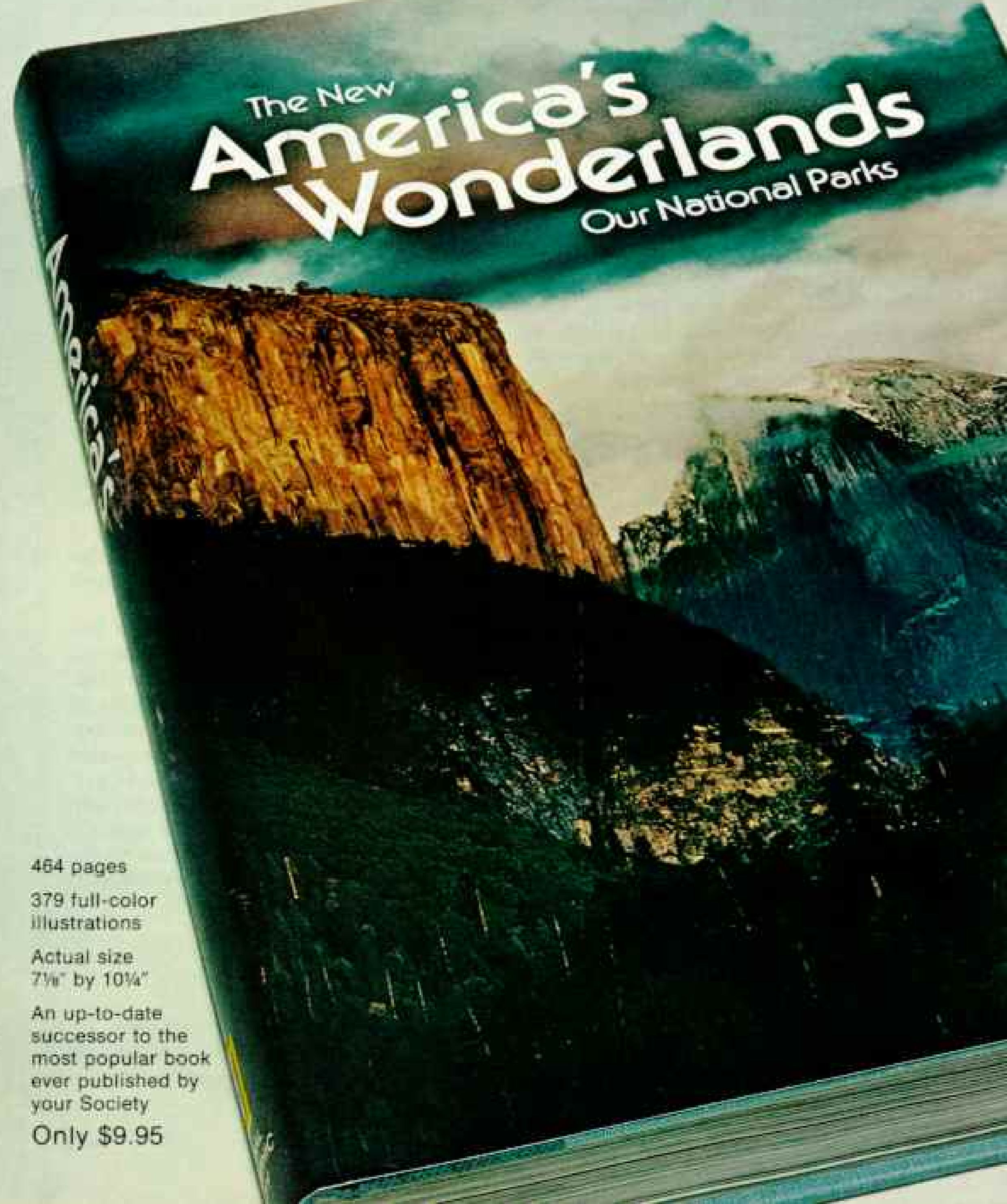

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(More about *The New America's Wonderlands* on the following page.)

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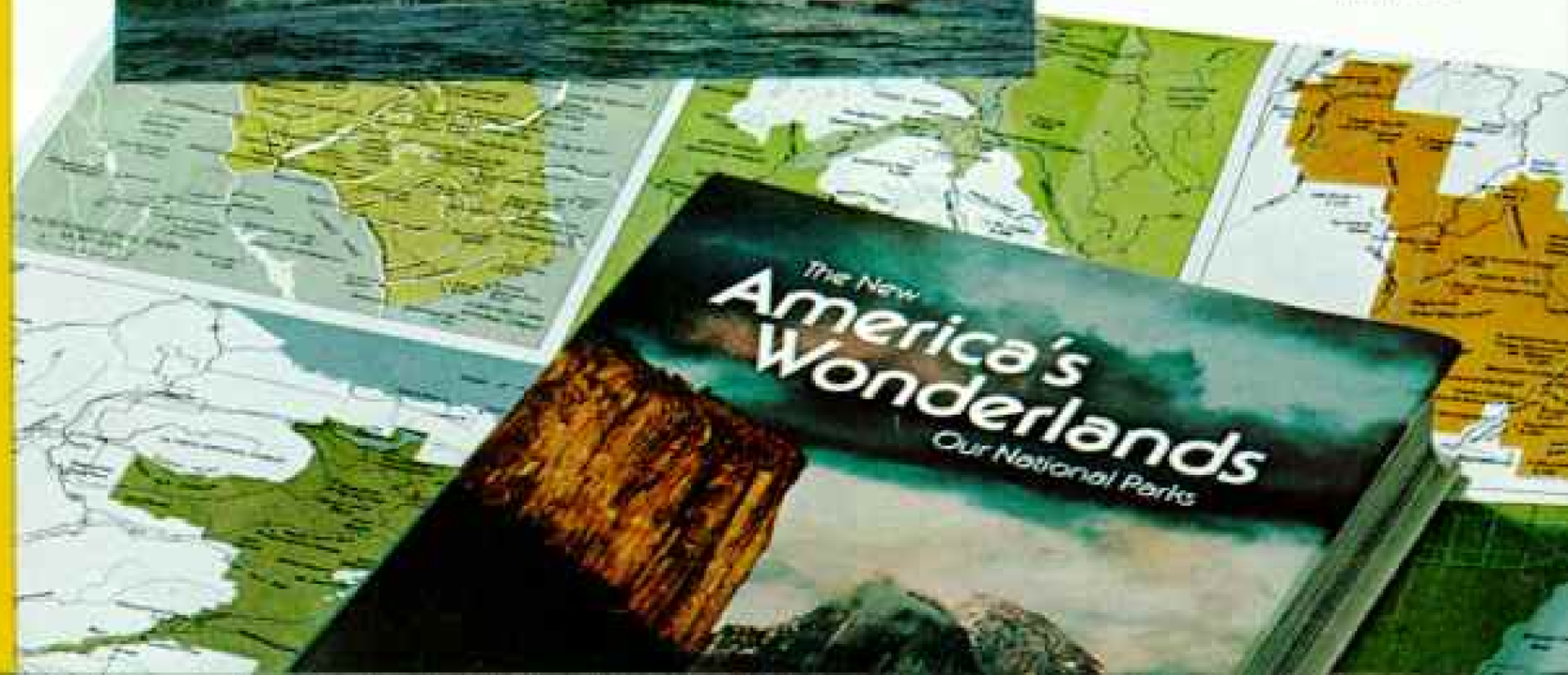

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Its standard V8 could save you $348 in maintenance and 801 gallons of gas.

If you don't enjoy taking your car in for recommended service, you'll enjoy this.

We've found that when you follow the Owner's Manual for recommended service, a '75 Chevelle standard V8 using unleaded gas with the new Chevrolet Efficiency System could save you $3.48 in 50,000 miles (about four years' average use) compared to its 1974 counterpart using leaded gas.

While maintenance costs vary, we used current list prices for parts and $11 an hour for labor to arrive at this figure.

What's more, Chevelle recommended service intervals are longer this year: 6 months or 7,500 miles for oil and lubrication, 22,500 miles for plugs. And no need for points or ignition condenser. Ever.

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801 fewer gallons of gas to go 50,000 miles.

The EPA ran Urban Driving Tests emphasizing stop-and-go city-type driving. We ran GM Proving Ground tests emphasizing suburban-type driving.

They show that a '75 Chevelle standard 350-2 V8 using unleaded fuel could use *801 fewer gallons of gas* to go 50,000 miles than a comparable '74 Chevelle using leaded fuel.

801 gallons. Think about the difference that could make in dollars.

Room you can handle nicely.

Remember, too, that Chevelle efficiency goes far beyond lower maintenance and fuel costs. So, importantly, Chevelle also offers efficiency of *size*.

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We solved coal's problems by turning to clean burning, easily handled oil and natural gas.

Unfortunately, the world supply of those petroleum products is finite and running low. Some experts estimate our country has an eleven year supply of oil and natural gas reserves. We need to prepare for tomorrow by seeking alternatives. That means we have to reexamine the advantages of coal. Mainly that it's abundant. Accessible supplies could last for several hundred years at the current rate of coal consumption.

We've made progress in cleaning up coal smoke pollution. Surface mined lands are being reclaimed and replanted. Deep mines are being made safer, healthier and we're working to make them more efficient to assure growing supplies of essential fuel.

We can minimize coal's disadvantages. We can, and should, use coal to stretch natural gas and petroleum resources. First by using coal to generate electric power wherever possible. Then by perfecting gasification and liquefaction to produce clean burning, easily transportable petroleum substitutes.

Caterpillar is interested in energy solutions involving coal because our machines are used in both mining and reclamation. And because responsible use and management of all our natural resources is vital to the long term, well-being of our nation.

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James Bay's Cree Indians bargain for survival

FRED WARD, BLACK STAR

CAN THE FOLKWAYS of Quebec's 6,000 Cree Indians survive? Their chief, Billy Diamond (**above**), is optimistic. Many of the Indians live much as they always have, hunting and trapping in the boreal forests adjoining Hudson Bay's southernmost arm. Migrating geese provide a twice-yearly bonanza (**right**). Recently, the Quebec Government's plan to build a massive hydroelectric power project on tribal hunting grounds met fierce opposition. A compromise now guarantees compensation to the Crees while promising vital power to cities. Author-photographer Fred Ward reports on this hardy people and their dilemma in next month's GEOGRAPHIC. Help your friends visit such threatened frontier cultures by nominating them for membership below.

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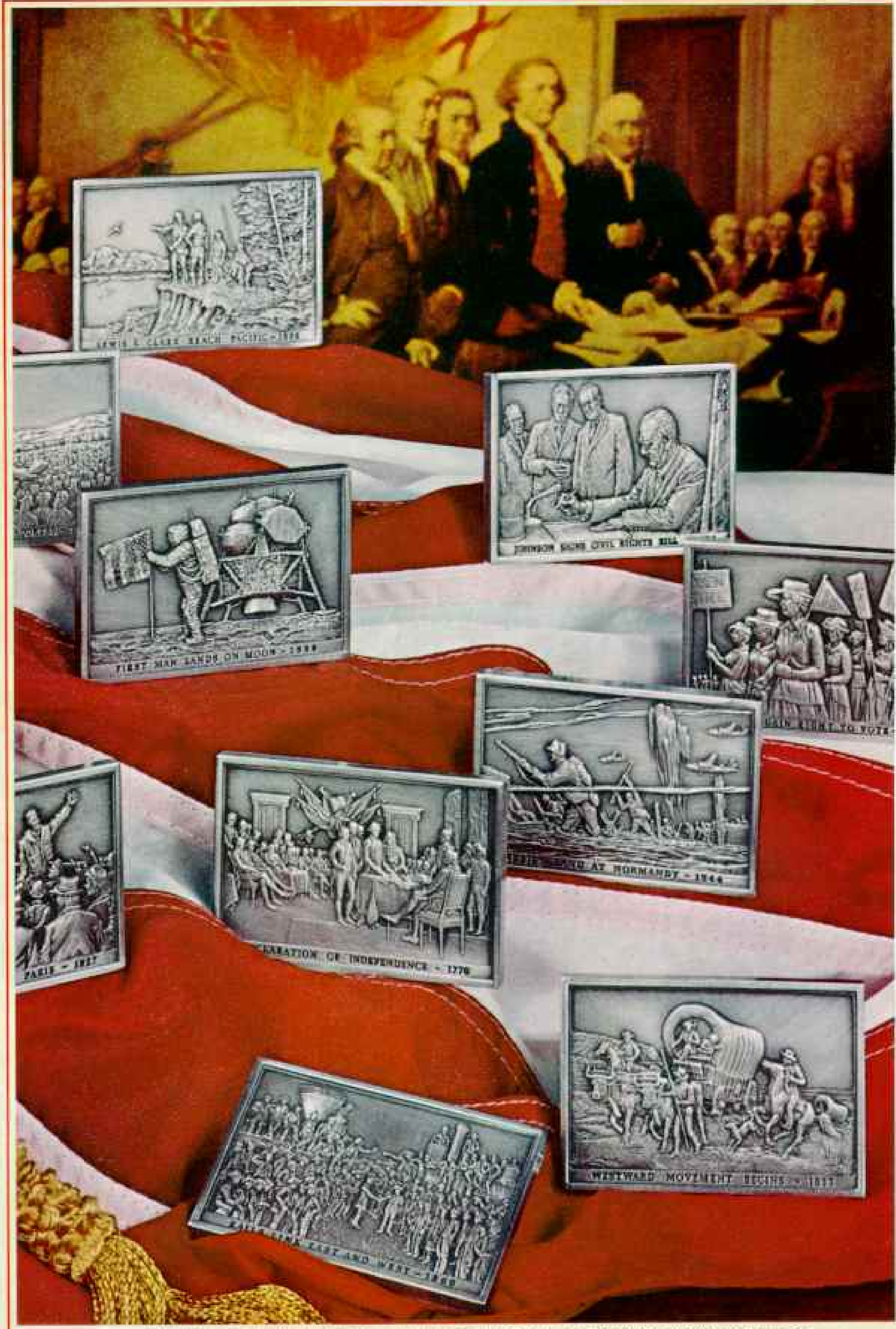

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1776-1976

The American Revolution Bicentennial Administration

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As part of the Bicentennial observance, The American Revolution Bicentennial Administration announces the minting of *The Bicentennial History of the United States*, as an officially recognized commemorative of our nation's 200th Anniversary. The collection of 100 commemorative ingots will be minted in sterling silver and in fine American pewter by The Franklin Mint. Subscriptions should be sent directly to The Franklin Mint, Franklin Center, Pennsylvania 19091.

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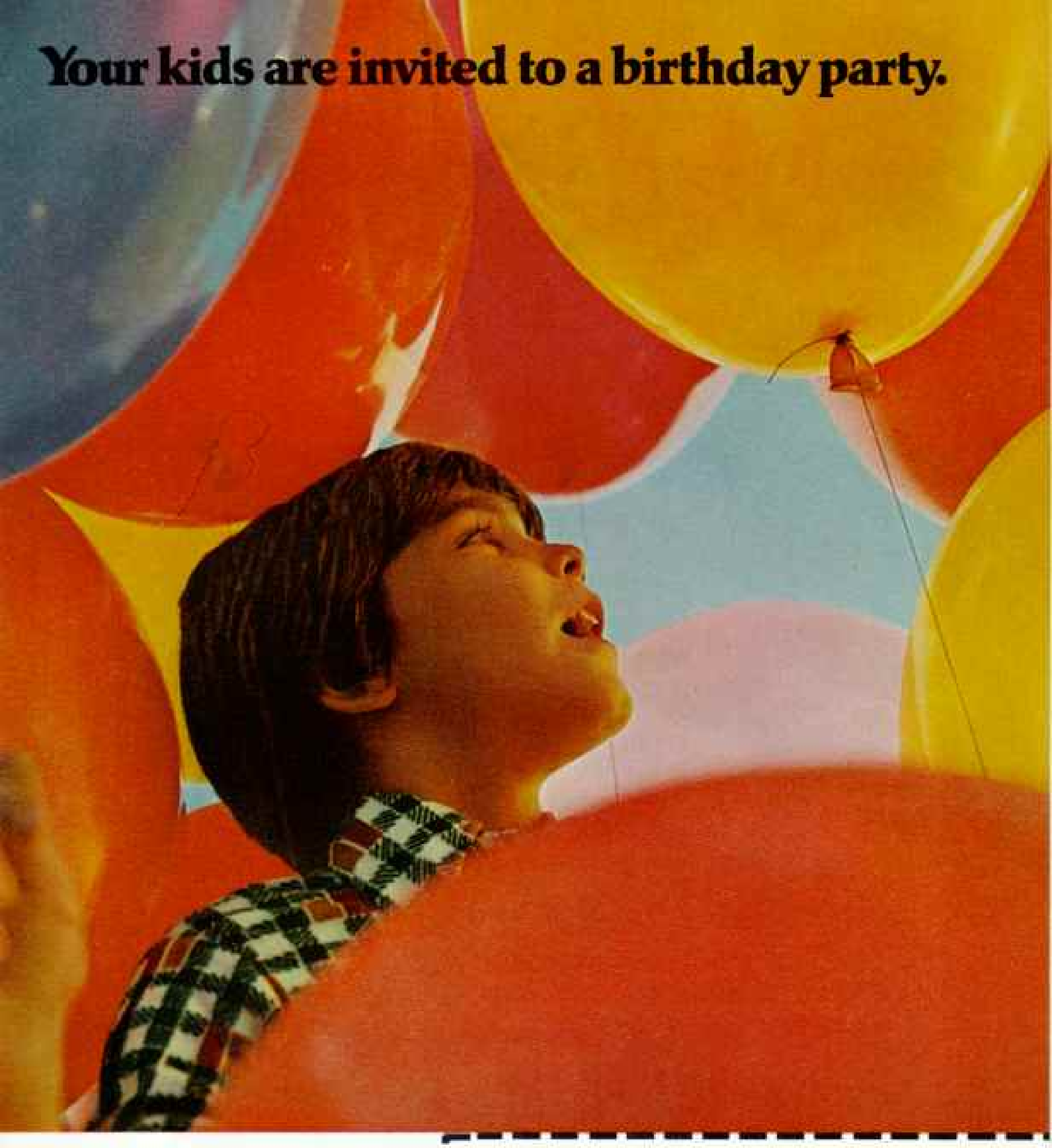

In fact, your whole family is invited. To celebrate the 200th anniversary of America's birth right here in Pennsylvania, where it all happened. With pageantry, parades, and history come alive.

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New Firestone 40,000 mile Steel Radial 500

A child is someone who passes through your life, and then disappears into an adult.

Of all the people and things in your life, children are perhaps the best indicators of how quickly time passes.

All the cliches are true. They *do* grow up before your very eyes. They *are* little girls one moment, and college students the next.

And one day before you know it, your child becomes someone different, a full-fledged person with a life and a future all her own.

Nobody can slow the process down for you. But we can help make sure her future will be a secure one.

At Metropolitan Life, we've spent over a century helping people prepare for the future. Helping them prepare for college and a career and anything else that might arise. And we can do the same for your child as well.

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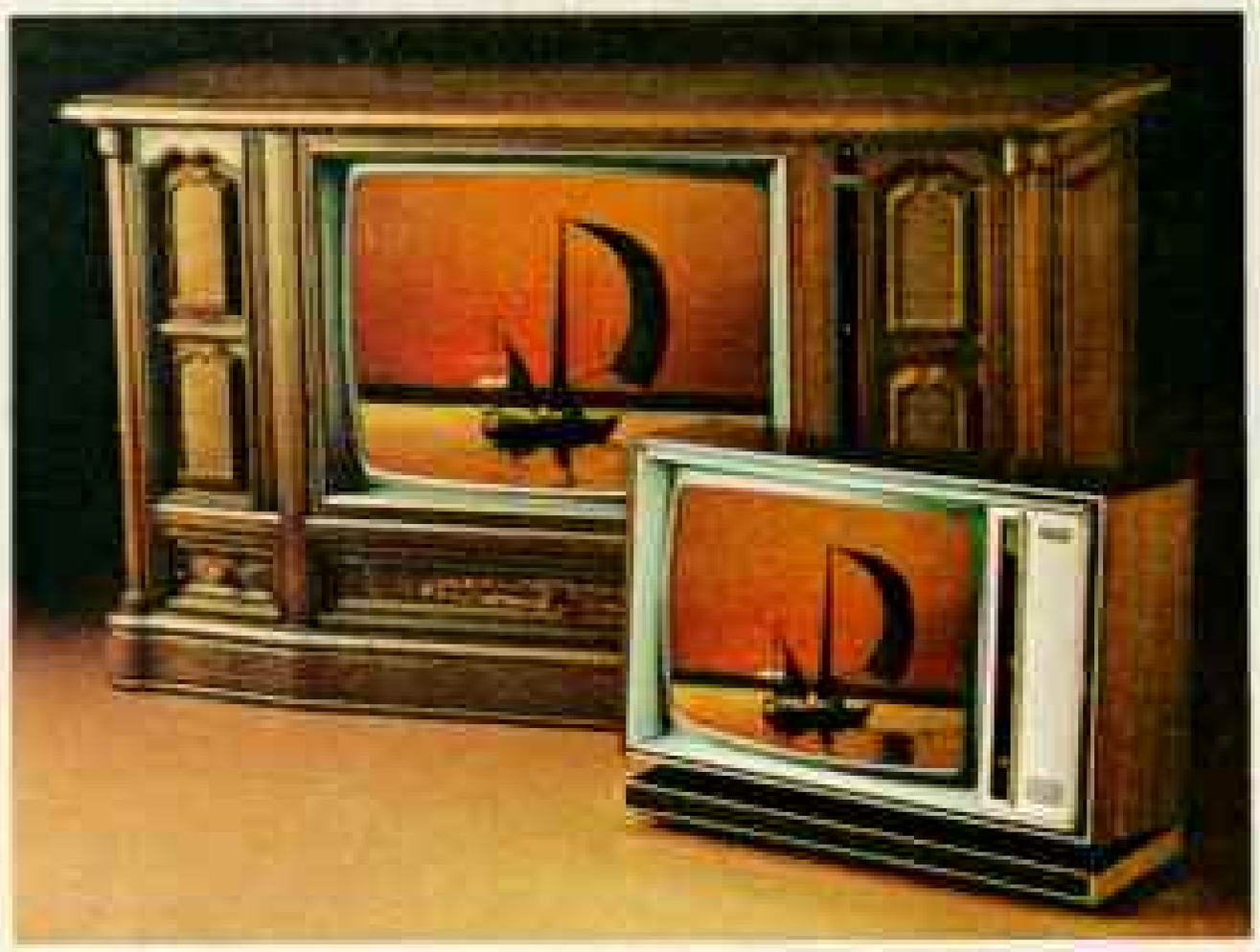
Nice combination.

We look, smell and taste like ground roast.

6 reasons why so many people are buying Zenith. Especially today.



Left: The Columbine, model SF2548R. Right: The Dauphin, model SF1750R. Simulated TV picture.

These days, you're probably more determined than ever to make sure you're getting your money's worth.

So, in times like these, it may make more sense to buy a Zenith color TV than ever before. Here's why:

1. Fewest repairs.

A leading research organization asked independent TV service technicians from coast to coast which color TV needed fewest repairs. For the third straight year, they named Zenith by more than 2 to 1 over the next brand.

Question: In general, of the brands you are familiar with, which one would you say requires the fewest repairs?

Answers:	
Zenith	**34%**
Brand A	15%
Brand B	11%
Brand C	7%
Brand D	4%
Brand E	3%
Brand F	2%
Brand G	2%
Brand H	2%
Brand I	1%
Other Brands	3%
About Equal	16%
Don't Know	8%

Note: Answers total over 100% due to multiple responses.

And whether you buy a giant-screen console or compact portable, today's Zenith solid-state Chromacolor II brings you several important features designed to give you years of good, dependable service.

2. 100% solid-state reliability.

Built into every Chromacolor II set is a rugged 100% solid-state chassis. The most powerful chassis Zenith has ever built, for a brighter, sharper picture. Modular solid-state design keeps it running cool so it lasts longer, makes service easier if it's needed.

And Zenith's patented Power Sentry voltage-regulating system protects components against household voltage variations you can't even see.

3. Saves energy.

Many color sets, 3 or more years old, use about as much power as five 75-watt light bulbs. Chromacolor II actually uses less power than you'd need to light just two of the same bulbs.

The money you save won't pay for your new Zenith. But it'll help.

4. Best picture.

The heart of the Chromacolor II system is Zenith's patented Chromacolor picture tube, with a level of brightness, contrast, and sharp detail that set a new standard for the TV industry. Which may be one reason why independent TV service technicians name Zenith, more than any other brand, as the color TV with the best picture.

5. Owner satisfaction.

For a lot of people, though, the best reason for choosing a Zenith is also the simplest.

They already know Zenith quality because they already own a Zenith.

Fact is, in another recent nationwide survey, more Zenith color TV owners said they'd buy the same brand again than did the owners of any other brand.

And that, we think, says more about the way we build things than anything else.

Question: If you were buying another color TV today would you buy the same brand you bought before?

Answers:	
Zenith	**82%**
Brand A	70%
Brand D	69%
Brand B	66%
Brand E	63%
Brand C	56%
Brand F	51%
Brand J	49%
Brand H	49%
Brand G	47%
Brand I	45%
Other Brands	40%

6. We built it. We back it.

We're proud of our record of building dependable, quality products.

But if it should ever happen that a Zenith product doesn't live up to your expectations—or if you want details of our surveys—write to the Vice President, Consumer Affairs, Zenith Radio Corporation, 1900 North Austin Avenue, Chicago, IL 60639.

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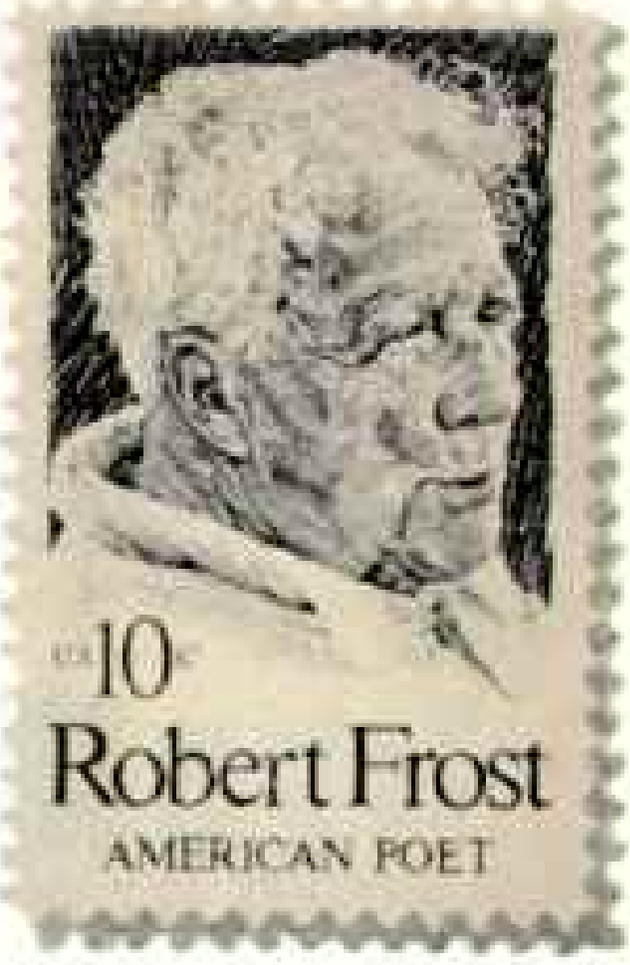

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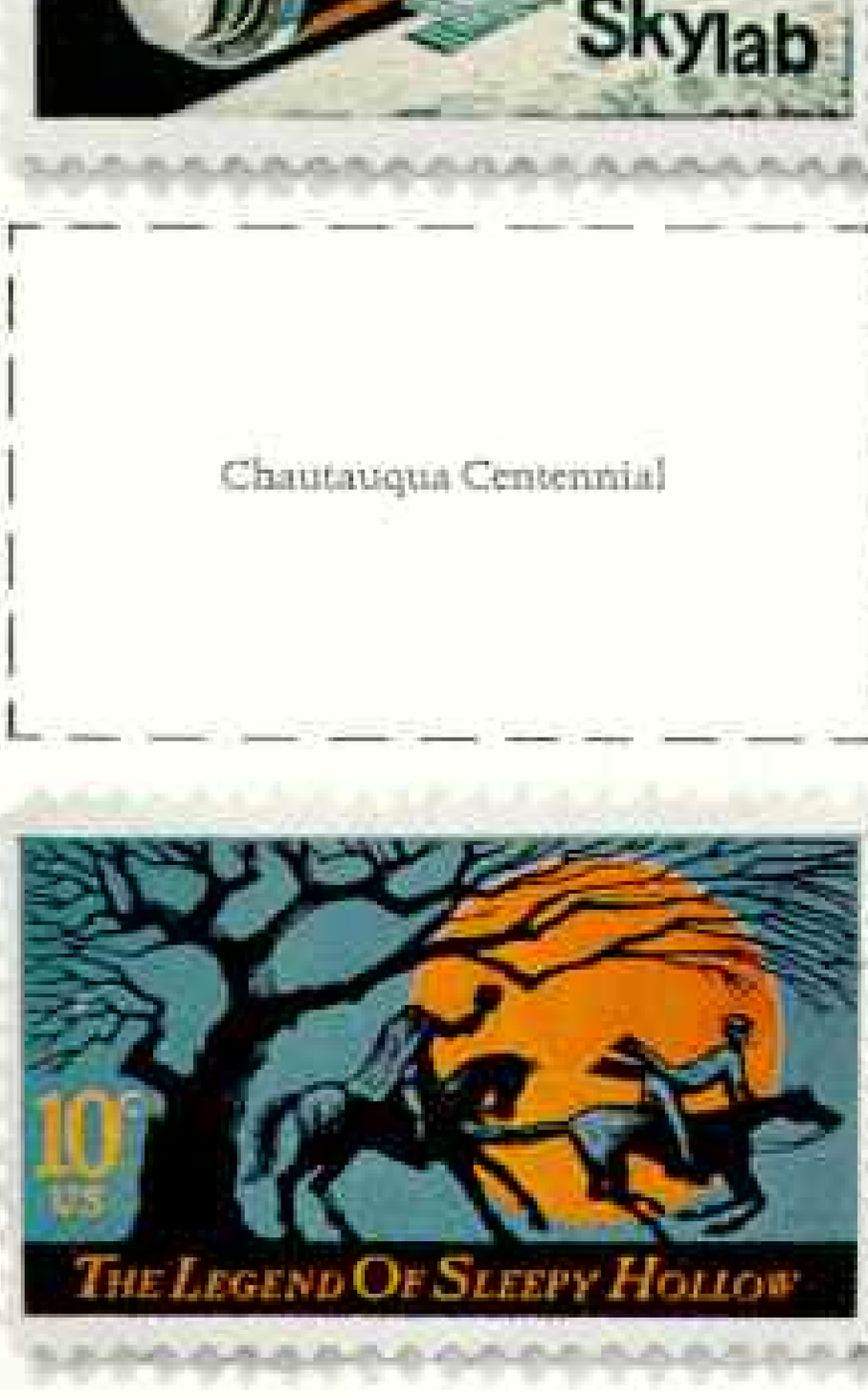

At least sixteen times this year, something special will happen at your Post Office. A special stamp.

A recent one celebrated Kentucky's First Settlement.

In 1774, Kentucky was no-man's-land. King George III forbade anyone to settle there. And the Indians not only fought and forced each other off the land, they forced everyone else off too. Including Daniel Boone. But a group led by James Harrod formed Kentucky's First Settlement in what is now called Harrodsburg.

This stamp gives you a small picture of the exciting story that lies behind every stamp. And there are more terrific stamps: one on The Legend of Sleepy Hollow, and a beautiful Currier & Ives Christmas Masterpiece.

At the Post Office we issue special commemoratives like these every few weeks. And they make a great American collection. But since each stamp is a limited edition, none will be available for very long.

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