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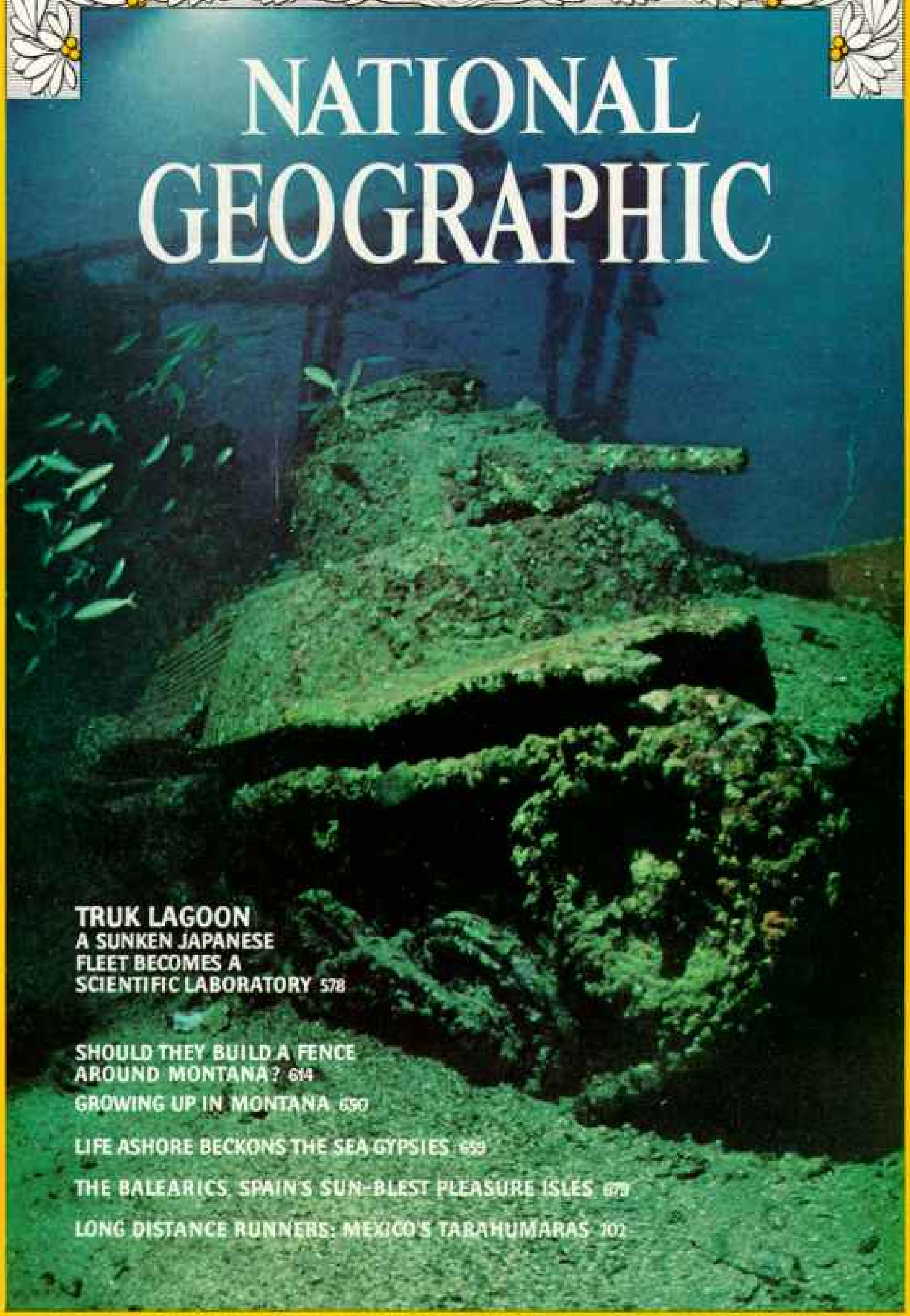

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IT TICKLED Mark Twain's fancy. He had stopped at the home of Thomas Williams, manager of his publishing house, and found young Judith, a toddler, playing on the floor with an open copy of *Adventures of Huckleberry Finn*. The infant seemed fascinated by a drawing, and soon what was remembered as a "general excitement" broke out when she spoke her first words: "Huck Finn! Huck Finn!"

So delighted was Twain that on his next visit he presented Judith with a memento—the original pen-and-ink drawing by Edward Windsor Kemble, signed "Truly Yours, Mark Twain."

In the years since, scholars have looked in vain for that original, upon which so many Huck Finns were subsequently based. Unbeknownst to them all, it remained in the Williams family for these past 85 years. Now Lessing Whitford Williams, Judith's brother, has presented the drawing to the Mark Twain Memorial in Hartford, Connecticut. He did so after reading "Mark Twain: Mirror of America," in last September's issue.

"Thanks to NATIONAL GEOGRAPHIC," the Memorial's Curator, Wilson Faude, recently wrote to us, "this drawing of America's most important literary character is now available for all to enjoy."

And that, we must admit, tickles *our* fancy.

Gilbert M. Grosvenor

NATIONAL GEOGRAPHIC

THE NATIONAL GEOGRAPHIC MAGAZINE VOL. 149, NO. 5

May 1976

COVER: *The ocean's prodigal growth shrouds a tank, still sitting upright on the deck of a sunken Japanese vessel in Truk Lagoon (pages 578-613). Photograph by Al Giddings.*

Life Springs From Death in Truk Lagoon

By SYLVIA A. EARLE, Ph.D.
Photographs by
AL GIDDINGS

Once a testament to destruction, a Japanese ship's mast has become a tower of life for marine growth and hordes of hungry fish. In 1944, United States air raids on Truk, Japan's bastion in Micronesia, sank some sixty vessels. During a pioneer study of the wrecks—earth's largest concentration of man-made reefs—the author glides above *Fujikawa Maru.*

FOR ONE AWESOME MOMENT we seemed to have chanced upon a vast submarine cathedral. Framed against the surface, the ship's mast and yard extended crosslike as if in benediction, the coral-encrusted arms wreathed in halos of schooling fish.

Turning to my diving partner, Al Giddings, I wrote on my underwater slate, "Give nature time, and a sunken warship resembles a place of worship."

Al gestured toward a heavily encrusted stern gun nearby, then scribbled, "And guns have garlands."

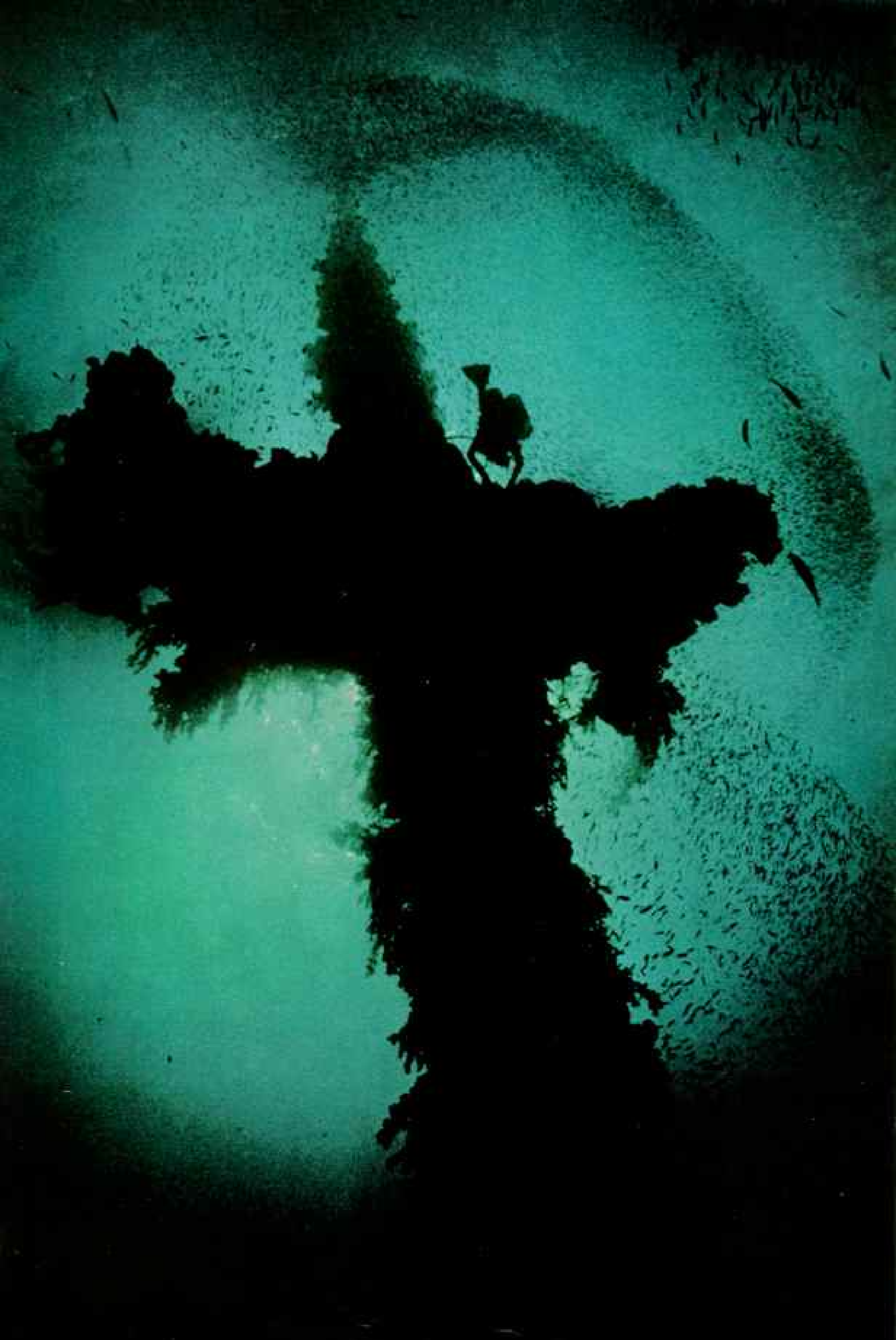
The impression of a hallowed site was more than mere illusion, for our sunken ship was both memorial and tomb for scores of Japanese sailors killed during World War II. On the morning of February 17, 1944, a United States Navy air attack caught a fleet of Japanese merchant vessels and warships by surprise at Truk, in the Caroline Islands of the western Pacific. After continued attacks, some sixty ships and thousands of men lay at the bottom of the Pacific, to remain undisturbed for more than a quarter of a century.

For all its tragedy, that long-ago event presents marine scientists today with a unique opportunity. The sunken fleet of Truk Lagoon represents not only the world's largest collection of artificial reefs but also one whose age is precisely known. It offers invaluable clues to the growth rates and patterns of the abundant marine life that congregates around submerged reefs. It was this fact that had brought Al and me to Truk Lagoon.

Few undersea laboratories are more beautifully situated. The Truk Islands, now part of a United States trust territory, consist of 11 major islands and scores of islets within a 40-mile-wide lagoon surrounded by a protective coral reef (map, pages 584-5). The water of Truk Lagoon is not only crystal clear but normally calm, an advantage both to me as a marine biologist and to Al as an underwater photographer. Sometimes called "a lake in the middle of the Pacific," Truk Lagoon is a quiet haven set in a broad expanse of open sea.

Arriving at the settlement on Moen Island last summer, Al and I chartered a 30-foot diving support boat for our research and signed on Kimiuo Aisek, a likeable 48-year-old Trukese scuba diver who had witnessed the 1944 air attack as a boy of 17. Kimiuo's memory of the event and his detailed knowledge of the lagoon floor saved us many days of searching for particular wrecks.

One of our early choices was the sunken "cathedral," an armed aircraft transport, *Fujikawa Maru.* Measuring 436 feet in length with a 59-foot beam, she had carried Zero *(Continued on page 582)*



Commandeered by coral, algae, and sponges, the ship's telegraph aboard *Shinkoku Maru* (**below**) once relayed orders from the bridge. Dewey Bergman, a colleague of the photographer, finds a many-colored cloak of marine life embroidering *Fujikawa Maru*'s bridge (**right**). The lagoon's bottom, virtually flat before the attacks, now harbors dozens of these artificial reefs. Their ages are known, many to the day and even hour. Resting in calm, clear water, they presented a unique opportunity for biologist Sylvia Earle and a team of divers to measure the growth rates of marine life.

fighter planes, drums of fuel, and assorted munitions that had failed to explode when she was attacked.

Such wrecks are controversial today, for Truk Lagoon has been designated a historical monument—a museum whose ships and artifacts are protected from removal by law. Recently there have been suggestions that those ships with explosives or high-octane fuel aboard be blown up to prevent accidents to the many divers who will be attracted to the site. Along with our other studies, Al and I hoped to assess the dangers these ships pose today to humans and to Truk's underwater environment.

My first dive on *Fujikawa Maru* emphasized the haunting dual image of human and natural history. Although the tips of both masts break the surface, the ship's deck lies in about 70 feet of water and the keel in 130. Descending along the aftermast, arms forward, Al and I landed softly on the stern deck. I looked back at the mast's crossbeam, silhouetted against a sunburst of light from the surface, then turned to view the submarine garden surrounding us. Over the course of 31 years the entire ship had been transformed from a bare metal monument to human tragedy into a richly productive reef of extraordinary beauty.

Fujikawa Maru's holds, once used to store tools of war, had now become homes for large groupers. Crew's quarters and passageways, essential features for long-ago human occupants, now offered aquatic residents an extensive system of tunnel and cave habitats. Hatchways were filled from sill to top with hundreds of small silver fish. Curtains of algae graced exposed portholes. A low jungle of marine growth carpeted every surface exposed to light.

Old Wounds Now More Than Healed

As I explored this lush submarine forest, my thoughts turned to the violent events from which it had grown. During our first surface inspection of Truk Lagoon, Kimiuo had described the scene on those February days in 1944.

"When the attack came," he said, "I hid in a cave on the side of Dublon Island. Several ships were hit and sank as I watched."

During the next 30 hours there was unremitting chaos—noise, smoke, uncertainty,

In the deathly stillness deep within *Shinkoku Maru*, the author finds a skull half-buried in silt. Here, nearly 90 feet down, the sediment was so thick that the slightest movement by the divers raised a blinding cloud that could be dangerously disorienting. This wreck and the others hold thousands of skeletons, but no one knows exactly how many Japanese at Truk went down with their ships.

and fear. "For more than two years afterward," Kimiuo recalled, "oil from ships and planes covered the beaches and reefs. But the sea is healed now."

More than just healed, I thought time and again, as I explored the array of plants and animals covering *Fujikawa Maru*. Any solid object placed in the sea is likely to become home for passing plankton, an effect known as the "substrate phenomenon."

Once, on an oceanographic expedition in the South Pacific, I scooped a drifting feather from the open sea more than 200 miles from any shore, and in so doing captured a host of unexpected travelers: three minute goose barnacles, attached to the base of the feather; a slender nudibranch; several young crabs; and a tiny jacklike fish that apparently had taken refuge under the frail umbrella.

Exploring Three Decades of Growth

Here in Truk Lagoon I was faced with this same phenomenon on a grand scale, in the form of *Fujikawa Maru* and some sixty other enormous artificial reefs.

No one had recorded the kinds of plants and animals that settled and grew on these ships during the first month, or the first year, or even the first quarter of a century after their sinking. It was now my goal to help document what had taken place during more than three decades.

Not all the large corals and giant mollusks on the sunken hulls could be 31 years old, but they positively could not be *more* than 31 years old. Studies by others elsewhere suggest that the rates of coral growth vary greatly, depending on the species and the ecological conditions in which the corals live. Individuals of the same species may develop at different rates, depending on their age and the amount of light, food, and space available.

I explained our task to Kimiuo: "I want to locate and tag the largest corals we can find. This will give us an idea of the maximum size reached since the ships sank. Dividing a coral's diameter by 31—its maximum age in years—gives us the minimum average yearly growth rate. We'll also mark and measure small corals and return later to see how much they've grown. Once we've established a new starting point, measurements can be made at any time to see how fast—or how slowly—these corals grow."

As Al photographed, Kimiuo and I set about measuring and tagging. We encountered some unexpected giants among the corals. The largest, a species of *Stylophora*, grew like a chrysanthemum on the bow gun of *Fujikawa Maru*, supporting a thriving community of small fish, crabs, polychaete worms, and algae. More than five feet across, it had clearly increased its diameter at an average rate of no less than two inches a year.

An exceptionally large black-coral tree of the genus *Antipathes* grew in 60 feet of water on the starboard side of the ship. In my years of diving I have seen many examples of this commercially valuable coral, but most were in deep water and few exceeded a height of three or four feet. This specimen stood 15 feet high. Many of our measurements, in fact, exceeded those for the same kinds of corals elsewhere in the world.

To gain insight into short-term growth rates, I cleared a number of areas on several ships to bare metal, including a section of anchor chain, portions of rails and beams, several patches on decks, and a ring around the barrel of *Fujikawa Maru*'s stern gun. Within a few hours reddish-brown rust filled each of the cleared places. In time the living mantle that I removed will be replaced, and growth rates based on a new starting point can be established.

Live Shells Not the Only Dangers

Each day I became more fascinated as I worked with this beauty-and-the-beast paradox. Deadly weapons, tanks, and trucks were frosted with pink-and-white plants, sponges, sea squirts, and corals. A blue sponge indifferently covered the nose of an artillery shell 18 inches in diameter (page 590), one of several in a disorderly mound of ammunition in a hold of the freighter *Yamagiri Maru*. I admired the sponge but felt a ripple of apprehension as I touched the point upon which it grew, recalling that these shells had been intended for the giant guns of the Japanese battleships *Musashi* and *Yamato*. Each, when fired, had a range of more than 20 miles.

It remained for something with far less range—a mere two inches—to cause my most anxious and painful moments in Truk Lagoon. During several dives on *Fujikawa Maru* I observed a lionfish *(Pterois volitans)* that had taken up residence in the ship's stern gun.

"GIBRALTAR OF THE PACIFIC"—Thus ran the myth of Truk's impregnability as base for the Japanese Combined and Fourth Fleets and a key stepping-stone for moving war matériel from the home islands to the southern Pacific. Reality dawned on February 17, 1944. Waves of carrier-launched U. S. warplanes found a fleet of merchant ships and a few war vessels at the weakly defended base. In two days "Operation Hailstone" rained 400 tons of bombs and aerial torpedoes; about forty ships plunged to the bottom. Ten weeks later a second raid added a score more. For Truk, the war was over. And on the floor of the lagoon a new era was beginning. For the first time there was something substantial for life to grab hold of—a flotilla of artificial reefs.

To survey the results, Dr. Earle and her team made some 200 dives on 11 of the wrecks. After a long day they moor to the protruding forward mast of *Fujikawa Maru* (**above**). Beneath them, the sea claims the battle's final victory, echoing Jules Verne's *Twenty Thousand Leagues Under the Sea*: "Upon its surface men . . . tear one another to pieces . . . with terrestrial horrors. But at thirty feet below its level, their reign ceases . . . and their power disappears."

Truk's ghostly fleet now helps biologists study the sea

CORAL REEF

North Pass

SHIP CHANNEL

CORAL REEF

Northeast Islands

YAMAGIRI MARU: *The 439-foot freighter's cargo of 18-inch projectiles never reached its destination — the guns of superbattleships* Yamato *and* Musashi.

FUJISAN MARU: *Recently located, the 494-foot oil tanker lies on its port side.*

Fatas

Quoi

Northeast Pass

SHIP CHANNEL

AIKOKU MARU: *When a dive bomber dropped a lethal payload on her bow, jammed with munitions, the resulting explosion was so huge that it also destroyed the attacking plane and its pilot. Blown nearly in half, the 409-foot armed cargo ship rests in 230 feet of water.*

SHINKOKU MARU: *This 503-foot armed oil tanker lies just 30 feet below the surface.*

Airfield

Moen

+373

1,224

MOEN ANCHORAGE

Ulalu

169 SUBMARINES

HEIAN MARU

REIYO MARU

ISLANDS

SHIKI ISLANDS

+242

794

Udot

Eot

Dublon

KIYOSUMI MARU

HOYO MARU

+343

1,125

Eten

+303

994

Fefan

Param

Tarik

Fala-beguets

SAN FRANCISCO MARU: *This 385-foot munitions ship lies 250 feet down, still filled with supplies and explosives.*

HOKUYO MARU

HOKI MARU

YUBAE MARU

FUJIKAWA MARU: *Fire gutted the interior of this 436-foot aircraft transport after an aerial torpedo struck her amidships. Holds contain Zero fighters, spare plane parts, and ammunition.*

DAI NI HINO MARU

TAIHO MARU

Tsis

Uman

+273

896

SEIKO MARU: *An old field-artillery gun with wooden wheels gives evidence of a makeshift effort to convert this 376-foot cargo vessel for war. She was torpedoed astern and went down in 170 feet of water.*

"STERN-HIGH WRECK": *Possibly the cargo ship, Gosei Maru, this vessel rests on a steep incline, its stern just six feet below the surface.*

Salat

SHIP CHANNEL

South Pass

SANKISAN MARU: *The rear of the 370-foot munitions ship, now lying at 110 feet, was twisted into a gigantic steel flower when a torpedo ignited a cargo of bombs in her stern.*

RIO DE JANEIRO MARU: *In the holds of this 461-foot armed troop carrier are guns, coal, and beer bottles.*

Fanan

AMAGISAN MARU: *Traces of oil and aviation fuel leak from the 454-foot cargo vessel, which sank in 200 feet of water.*

Ujec

Otta

Mesegon

Lionfish are beautiful, but notorious for the painful, even deadly, stings they can inflict with their venomous spines.

I mentioned the lionfish to Al and he decided to photograph it, so we dived together to the gun, 70 feet down (page 601). The lionfish, however, refused to cooperate and remained half hidden inside a crevice. At length I decided to try and maneuver it out into the open, something I have done in the past, though with great caution.

Inching forward, I eased my hand along the fish's tail. It responded to my gentle motion and began moving into the open. Then it did something I had not anticipated: It made an abrupt tilt in my direction with its dorsal spines, a defensive motion. I waited a moment before moving again, but the fish was evidently alarmed, for it tilted again.

That was enough for me. I started to withdraw my hand, but the lionfish suddenly tilted once more, this time vigorously, and through my diving glove I felt a sharp jab below the nail of one finger. I'm sure I only imagined a look of self-righteousness on my attacker as it darted away. Removing the glove, I examined my finger and saw a trickle of green—blood, as it appears more than 50 feet below the surface.

An Hour Seems an Eternity

I was in trouble and I knew it. This was our second dive of the day, and we required an hour's decompression before surfacing in order to avoid the bends—the painful, and in some cases fatal, formation of nitrogen bubbles in the bloodstream.

Al escorted me to a point ten feet below the surface and watched intently to see if my reaction to the lionfish's venom became serious. As pain began to spread through my hand, I tried to entertain myself by watching a graceful school of small damselfish flow around *Fujikawa Maru*'s stern mast. Never before had I tired of the sight of their electric-blue forms, but within ten minutes I closed my eyes and could think of nothing but the intense, stabbing agony that was building in my finger. Only twice before had I known such pain: briefly, in a dentist's chair, and during childbirth.

Tears came. I wanted to cry out, but with a regulator in my mouth and ten feet of water over my head, I could only remain silent.

Inexorable fingers of marine growth clutch the rpm indicator for *Fujikawa Maru*'s propeller (**above**). Japanese instrument labels were often in English. On *San Francisco Maru*, a munitions ship, the chemistry of the sea gently defuses a cache of mines (**right**).

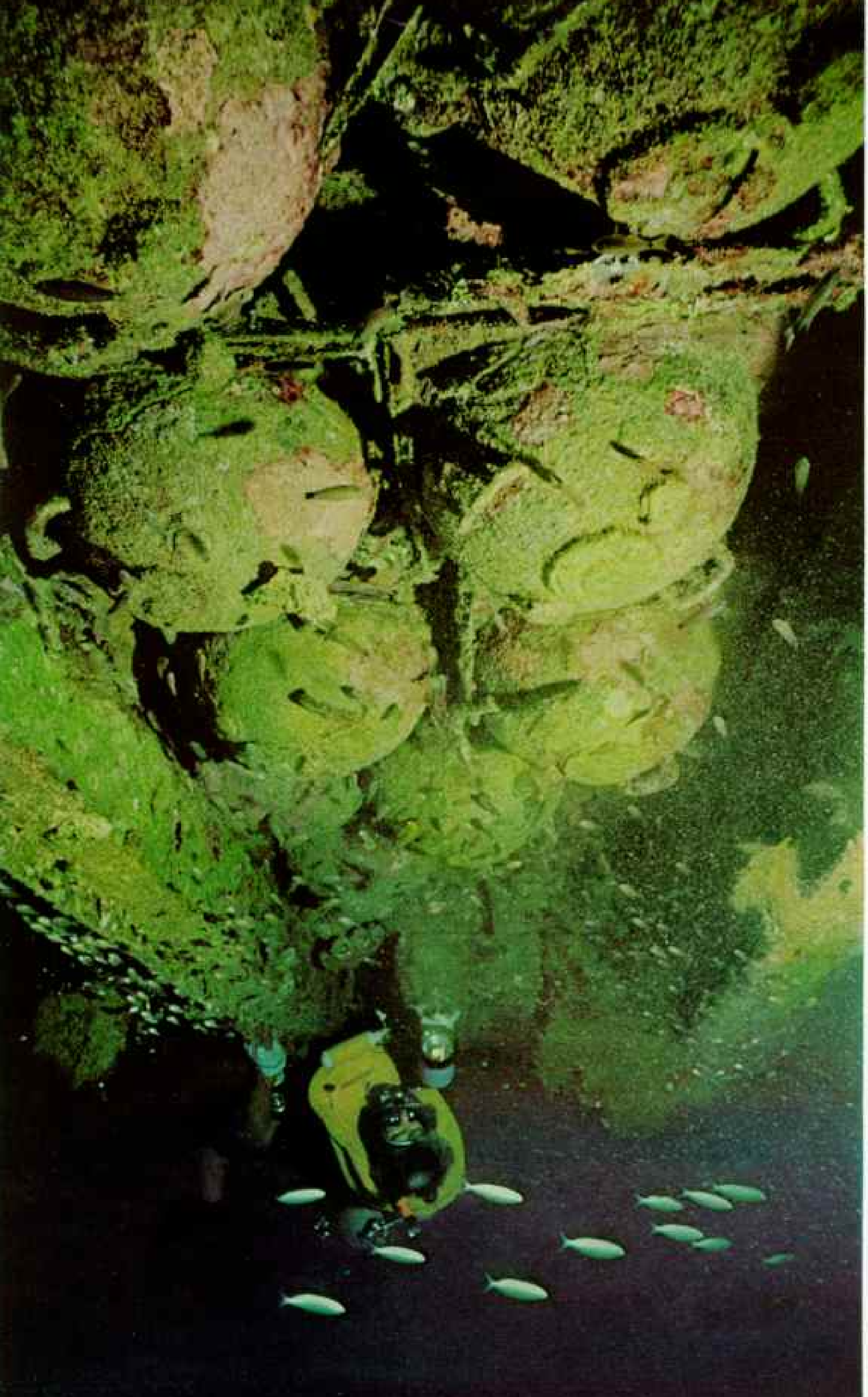
After 45 minutes my finger had swelled to nearly double its normal size, and my arm and shoulder began to ache as well. But finally, as the hour ended, the sensation of fire began to diminish. Al helped me aboard and the worst of my ordeal was over. But the burning in my finger continued for two more hours, and tenderness and swelling were evident for several days.

From *Fujikawa Maru* we turned our attention to *San Francisco Maru*, an armed munitions transport that had been proposed for demolition. One morning Al and I asked Kimiuo to guide us to the wreck.

San Francisco Maru rests in 250 feet of water, substantially deeper than most divers would care to venture. The 30-minute excursion we planned required double tanks, and Al placed additional cylinders on the deck of the dive boat with regulators and long hoses attached for mid-water decompression.

The ship proved invisible from the surface. It was not until we approached the 100-foot level that its eerie outline appeared—perfectly oriented, upright and fully intact (pages 587-93). Three small tanks and a truck were neatly in place on the foredeck, each beautifully embroidered with lacelike plants. Half a dozen more trucks, like metal skeletons in a catacomb, rested on platforms below.

We paused to look at the forward hold filled with *(Continued on page 598)*



VIVID EXPLOSION *of coral and sponge festoons* **San Francisco Maru's** *three-inch bow gun, wreathed by blue damselfish and other tropical species.*

Farewell to arms: The elevating wheel, pistol-like grip, and trigger of the stern gun on *Fujikawa Maru* (**left**) provide an abstract palette for orange sponges, pale-blue soft corals, and reddish coralline algae. "There are easily a hundred different plants and animals in this photograph," Dr. Earle marvels.

Deep inside *Yamagiri Maru* (**lower left**), lumpy sea squirts cake 18-inch projectiles, originally destined for giant battleships with a firing range of more than 20 miles. A blue sponge tips one of them.

Corrosion crumbles 7.7-mm rifle cartridges (**left**), scattered in a hold of *Sankisan Maru*. On the deck of *San Francisco Maru* (**below**) a three-man tank materializes like a silent sentinel in the 200-foot depths, its heavy treads choked by a profusion of life.

Green and pink icing of algae frosts a small cargo truck, one of several stacked on platforms in a hold of *San Francisco Maru* (**left**). A fuel drum rests beneath the bumper. "At this depth, 200 feet, we rarely spent more than 25 minutes," says photographer Al Giddings. "You have to allow plenty of time for decompression or you're risking the bends"—the agonizing and sometimes fatal release and expansion of nitrogen bubbles in the bloodstream.

On nearby *Seiko Maru*, diving assistant Van Worley (**below**) finds a compass on the bridge still in working order.

Deserted wardroom once used by the officers of *Shinkoku Maru* now spreads a feast of discovery for the divers—a decanter, cut-glass jar, sauce servers, and plates dusted with sediment (**left**). On *Amagisan Maru* Dr. Earle examines a delicate porcelain vase (**below**); beneath her hand lie massive cockscomb oysters fringed with orange sponges. A loop of coral, like a flower lei, floats above.

Carrying bags for collecting biological samples, the scientist (**bottom left**) investigates a large rice-cooking kettle. "Exploring these ships was like browsing through an antique store. We never knew what we'd find," she said.

OYSTER, LOPHA CRISTAGALLI; CORAL, DENDROPHYLLIA ANGULOSA

In perfect condition, elegant porcelain serving platters are discovered by Dewey Bergman in a cabinet aboard *Fujisan Maru* (**above**). Amazingly, the dishes survived the crash of shifting cargo when the oil tanker settled on its port side. The lagoon has been designated an undersea monument, thus protecting by law these and all other artifacts from souvenir hunters.

GHOST FOREST OF ALGAE *camouflages* Fujikawa Maru's *bridge, bombed and strafed into twisted chaos. Dangling cables once relayed commands from the flying bridge above, of which only a steel skeleton remains.*

(Continued from page 586) hundreds of anti-landing-craft mines festooned with coralline algae, then glided aft and gazed upon row on row of torpedoes and other ammunition carefully stored there. All were secure, potentially explosive, but slowly eroding through the natural combined forces of sea chemistry and time. Ultimately each deadly object will be rendered harmless.

Few people will ever see *San Francisco Maru* and her ghostly cargo, for she rests in such deep water. Yet she, among the sunken ships, most eloquently symbolizes the tragic waste of war. She should remain undisturbed in her ironic final mission—as a laboratory for the study of new underseas life.

Ocean Jewelry Enlivens Long Waits

Long decompression was needed before we could return to the surface, a procedure that became routine but never dull. Occasionally reef whitetip sharks emerged from the green-blue water beneath us, made wide circles, then moved on. Large jacks often rose from the ships below and cruised nearby, apparently as curious about our presence as we were about theirs. Always, there was plankton to watch.

Women who long to be adorned with the world's fairest gems should come with me to Truk Lagoon. Diadems of translucent comb jellies with bands of iridescent cilia passed through my hair as I waited, and I touched chain after chain of fragile, sparkling salps with violet-blue spheres enclosed in a clear, jewel-like mantle. Sometimes, when I moved not at all, the salps became bracelets and necklaces and then drifted on, and more came in their place. Minute medusae, like crystalline beads, pulsed by or lingered when I touched them with my fingertips.

Most dazzling but most unpredictable in their comings and goings were the jellyfish. None of the several species that we encountered irritate human skin, although all are equipped with microscopic armament useful in procuring food. One day the water was so filled with transparent disks that the sea seemed more jelly than liquid (page 613). Most were a kind of *Aurelia*, a clear hemisphere laced with four lavender loops, but occasionally an unknown giant the color of lilacs and the consistency of firm aspic rhythmically undulated into view.

Several small jellyfish were accompanied by one or more minute fish that repeatedly

thwarted Al's attempt to photograph the team, although he finally managed (page 612). "I think the fish watch," Al fumed. "When they know I'm ready to take a picture, they zip to the other side of the jellyfish!"

Sea Salad Gets a Mixed Response

Although often preoccupied with Truk's fascinating animals, I concentrated on the plants associated with the ships. As basic producers, plants set the pace for the number and kinds of animal settlers. If a habitat is suitable only for limited plant growth, then only limited food will be generated to support animals.

Some reef residents are wholly or partially dependent on various kinds of drifting plankton for food, and many corals flourish in combination with certain types of algae. Moreover, whole families of tropical reef fishes and numerous invertebrates graze directly on the local attached plants.

One day aboard the diving boat we were joined by Fumio Meres, a Trukese friend of Kimiuo's. Watching me retrieve my daily harvest of algae in plastic bags, Fumio looked puzzled. Grinning, Kimiuo explained, "She likes that stuff."

Since I am basically a botanist, I make no effort to hide my enthusiasm for plants. Rarely do I eat algae, but in this case I decided to turn the tables on the unsuspecting Kimiuo. I offered to share some freshly collected *Caulerpa racemosa* with him to see if he, too, might "like that stuff."

Kimiuo accepted my green, grapelike offering with some hesitancy. In Japan the alga is gathered for salads, and after a sample or two Kimiuo announced that a little oil and vinegar would improve the slightly salty flavor. But Steve Bowerman, Al's photographic assistant, was less enthusiastic. After a single mouthful he declared, "I'll take the oil and vinegar, and you can keep your *Caulerpa!*"

In the course of our diving I counted more than a hundred species of green, red, and brown algae, including 15 previously unknown in Micronesia. One minute red plant is a new genus of alga. Its closest relatives, independently discovered only last year in California, Australia, and the Comoro Islands in the Indian Ocean, have yet to be named—a small example of how much remains to be learned about the myriad plants and animals in the sea.

The most abundant and conspicuous plants

Gnarled by coral, the bow of *Fujikawa Maru* looms like a phantom at 50 feet (**left**). In the holds of the 436-foot cargo ship, divers discovered several Zero fighter planes. On the muzzle of the deck gun in the background, Dr. Earle found the wrecks' largest stony coral, a burst more than five feet across.

Clearing two links of *Sankisan Maru*'s anchor chain, Dr. Earle tags the site (**right**); a measuring device hangs from her arm. A year later she will check the size of the coral growths that return. By dividing the size of Truk corals by their oldest possible age—31 years—she already has learned that some species appear to be growing at record rates. Her other discoveries include a new genus of red alga, plus 15 algae previously unknown in Micronesia.

on the sunken ships in Truk Lagoon were species of segmented green algae known as *Halimeda*. These plants hang on the ships' masts, sprout on the ladders, adorn the guns, lace the beams, and grow in extraordinary abundance on the decks. Adjacent to *Fujikawa Maru* the seafloor is literally paved with a thick sediment composed almost solely of dead *Halimeda* fragments, which we called chips.

Numerous small animals, characteristic of the lagoon floor, had taken up residence in the chips on *Fujikawa Maru*'s deck. They flourished like penthouse dwellers, 50 to 75 feet above their seafloor neighbors. Once, while digging among the chips near the stern, I displaced an elongated fish, a goby with spots and large eyes (below). I stopped digging and looked for others, and soon spotted 13 burrows close by. As I watched, I was amused to see a "bulldozer shrimp" scuttle from a burrow, pushing a load of chips.

Later, Al returned with Kimiuo to film the curious fish-crustacean association. Kimiuo was laughing when he came to the surface. "That fish!" he said. "He's the *boss*. The shrimp does all the work. The fish just sits there and supervises!"

The "boss" fish and shrimp were not the only chip dwellers. Occasionally I glimpsed two or three ephemeral blue fish among the chips, each nearly five inches long; they seemed to dissolve as I approached. We found the same fish at a depth of a hundred feet, living in holes on the side of *Rio de Janeiro Maru*, a prewar passenger liner that had been converted to a troop transport.

One hole harbored 26 fish. They hovered several feet above the hole until a diver or large fish came near. Then, as if being poured down a funnel, all disappeared into the narrow opening. We sat quietly and watched, and within a few minutes heads reappeared, then a "morning glory" of fish blossomed from the ship's hull.

Intrigued about the identity of these fish and curious to know more about their habits close at hand, I used a small amount of quinaldine to anesthetize three specimens and eventually returned them alive to ichthyological colleagues at the Steinhart Aquarium in San Francisco's Golden Gate Park. They were identified as *Pteroleotris heteropterus*, a fish that is rarely collected, dead or alive, and one that has never before been displayed in a public aquarium.

ALGA, HALIMEDA ORIENTALIS; FISH, CRYPTOCENTRUS OCTOTAENIUS; SHRIMP, ALPHEUS

Refuge for reef life, *Halimeda* algae (**top**) decay into a thick carpet, providing quarters for a shrimp and a goby (**above**). The half-blind shrimp keeps the burrow shipshape while the fish stands watch.

New Food Chain Starts With Plants

Plants, typically, are pioneers on sunlit surfaces newly introduced into the sea, whether warships, bottles, or old boots. Most of these plants grow rapidly, providing food and shelter for small animals, which in turn give sustenance to larger animals. When I arrived at Truk Lagoon 31 years after the ships settled to the seafloor, complex food chains were in evidence, originating with the plants. Hundreds of parrotfish, blennies, rudderfish, and certain damselfish species were conspicuously browsing on algae. In turn, these fish were food for larger resident predators, such as groupers, jacks, snappers, and barracudas. Above these were the roving, top-of-the-food-chain predators—giant

oceanic tuna that occasionally cruised by, sleek and swift, or the slower but more ominous whitetip and gray reef sharks.

Among the most vigorous and persistent of the small predators were the red-speckled hawkfish that seemed to gather around the masts of *Fujikawa Maru* and a submerged munitions freighter, *Sankisan Maru*. Once I was drawn to vigorous hawkfish activity around a clear gray patch of eggs on one of the masts. At first I thought the hawkfish were doing their utmost to care for the eggs, but when I looked closely, I saw that the eggs belonged to a distraught damselfish and that the hawkfish were devouring them.

One patch of eggs laid on a truck tire and guarded by a pair of clownfish fared considerably better. I first noticed the eggs on June 21, in the form of a glossy black disk beneath a flap of the giant anemone in which the clownfish resided. Six days later I looked again at the egg patch, and was startled to see that it had changed from black to glistening silver (page 605). When I looked *very* closely, I could see two tiny silver-rimmed eyes in each transparent egg sac. The next day the cases were empty.

Cabins and Corridors Pose New Dangers

Moving from the outside of the sunken ships, Al and I began to explore their inner recesses to record cave-dwelling organisms that had taken up residence in the rooms once used by men. Such diving can be dangerous, for clouds of fine silt rise with the slightest movement, quickly reducing visibility to a few inches. Even with the help of a powerful light one's orientation becomes confused, and with a limited air supply at 90 feet there is little time to correct errors.

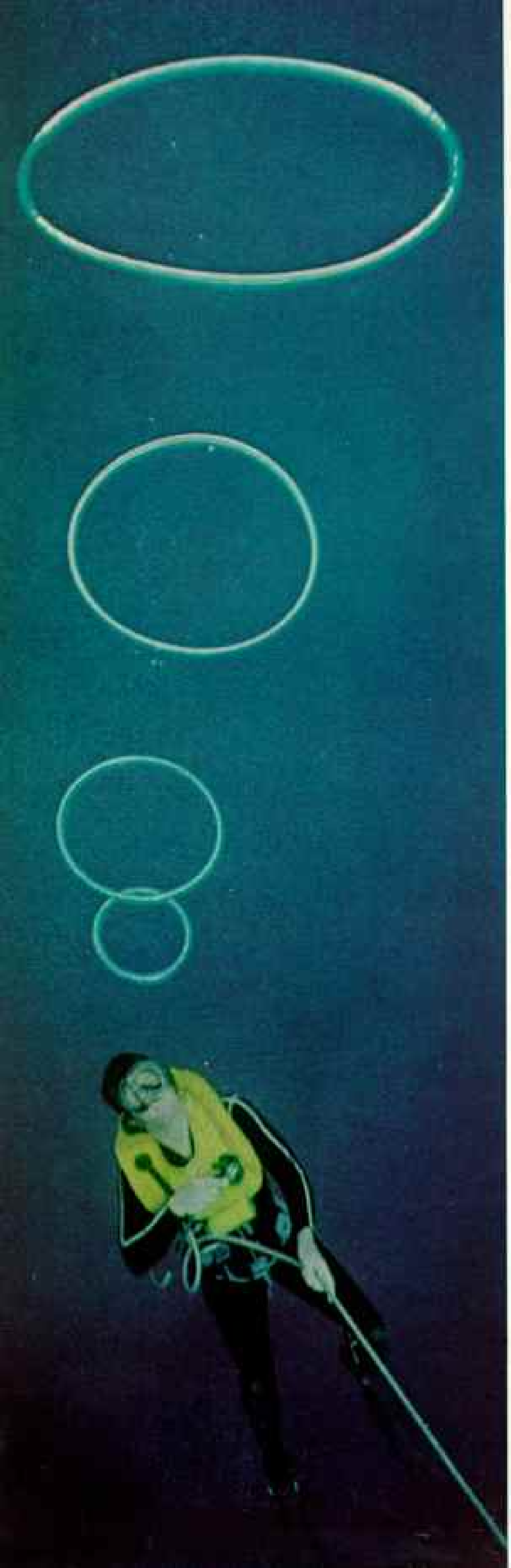
On one of our first such dives we explored the crew's quarters of *Shinkoku Maru*, an oil tanker with phenomenal numbers of corals thriving on her decks. In addition to Al's normal photographic gear we carried a thousand-watt light connected to a surface generator. While Al and I entered the crew compartment, Kimiuo stood by the light cable at the entrance to the passageway.

Inside we found that the ceiling had collapsed, exposing wires, pipes, and other fixtures. A layer of black oil inches above my head glistened and moved eerily as our air bubbles mixed with it. Several fragile, papery

Perilous beauty of a lionfish gleams in Dr. Earle's light (**below**). Moments later the disturbed creature jabbed a venom-tipped spine into her finger. For an hour, "burning fire" inflamed her arm and shoulder.

ACTINOSTOMA, ACTUAL SIZE

Mysterious animal: Tentacles and pale column of a seldom-studied burrowing anemone rest upside down on a laboratory slide. Dr. Earle found several such creatures in shipside sediment.



bivalves filled a high corner, and chalky white *Arca* shells lodged in the decaying walls. Red squirrelfish, normally confined to dark crevices by day, reacted only slightly to our presence. One peered out of a cabinet filled with teacups, plates, and bowls, all decorated with a rising sun and anchor insignia.

At the entrance of an adjoining compartment Al flashed his light inside and I noticed three unusual transparent shrimp with red markings on them. Collecting net in hand, I started through the hatch, when Al gently touched my arm and pointed to some human bones in the compartment, pathetic reminders of the 1944 holocaust.

Sobered, we slowly retraced our way back to the entrance, where Kimiuo, faint sunlight, and a garden of soft corals greeted us. At the surface once more, I recalled the blossomlike clusters of soft corals growing on the ship below and remarked to Al, "The sea tends her graves well."

Danger From Cargo and Leaking Fuel?

Our six weeks of work in Truk Lagoon gave us new insights into many aspects of reef ecology. A new genus and several new species of plants, records on coral growth, food chains, habits of fishes and invertebrates, and data reinforcing the significance of substrate—all were evidence of a rewarding and productive expedition. The most significant contribution may not be single discoveries, however, but rather the overall basic documentation that can be developed in years to come.

Numerous questions remain unanswered concerning the ecology of Truk Lagoon. One of immediate and urgent concern may affect the fate of the lagoon's underwater archipelago of ships: How significant is the impact of oil seepage and contamination by other cargo with respect to the lagoon environment?

One of our final dives resolved my doubts. It involved a 40-minute inspection of *Amagi-san Maru*, a large freighter lying in 200 feet of water and still leaking small quantities of fuel.

Forever blowing bubbles, photographer Al Giddings indulges in a favorite pastime as he waits for decompression after a deep dive. Exhaling "air rings," he breathes from a hose connected to a tank on the diving tender, twenty feet above.

Even as we anchored above the ship, we noted two kinds of fuel rising to the surface. One type, apparently oil from the ship's own bunkers, began as a rainbow-hued circle that spread until dissipated by action of the surface waves. Another kind—most likely volatile aviation fuel—spread with a shimmer of blue, red, and gold, then contracted and disappeared in a few seconds.

Donning twin air tanks, Al and I went overboard and glided down on *Amagisan Maru*'s bridge area. There we found the ship's compass intact and a magnificent brass telescope, both remarkably free of corrosion or encrustation.

I became engrossed in a kind of minute red alga, growing in a barely illuminated crevice, and failed to notice that Al had disappeared into a passageway. When I looked up, he was emerging with an object that might have come from Poseidon's personal art collection —a stark-white porcelain vase with an outline of pine boughs and mountains raised in delicate relief. For a moment I held it in my hand, turning it and enjoying the combined beauty of what it was and where it was (page 595). Then I returned it to Al, who put it back where he had found it.

Outside, on the flat surface of the ship's hull, we located the vent from which golden globules of fuel were escaping (right). I moved to the edge of the ten-inch pipe and peered in, just as a dozen spheres of oil bubbled forth, floating upward till they disappeared from sight. Immediately surrounding the vent and lining its sunlit upper end, we noted a profuse tangle of algae, corals, and sponges, apparently unaffected by the emerging oil.

Ships' Future Still Uncertain

Later, as I clung to the decompression lines beneath our diving boat, I contemplated the future of the giant ship below me. Surely, the best course of action concerning her cargo is *no* action. The gradual dispersion of fuel over the years should have little or no damaging consequences, but releasing massive amounts all at once would without question be detrimental to the marine life.

That evening Al and I discussed the fate of the munitions ship *San Francisco Maru* with Kimiuo, and we all concurred: Her cargo is not dangerous if left untouched. The picric acid now locked in the unexploded mines will seep into the sea harmlessly through gradual corrosion, but detonation of those mines would have severe impact on the lagoon. Salvage techniques are dangerous, expensive—and in this case, unnecessary.

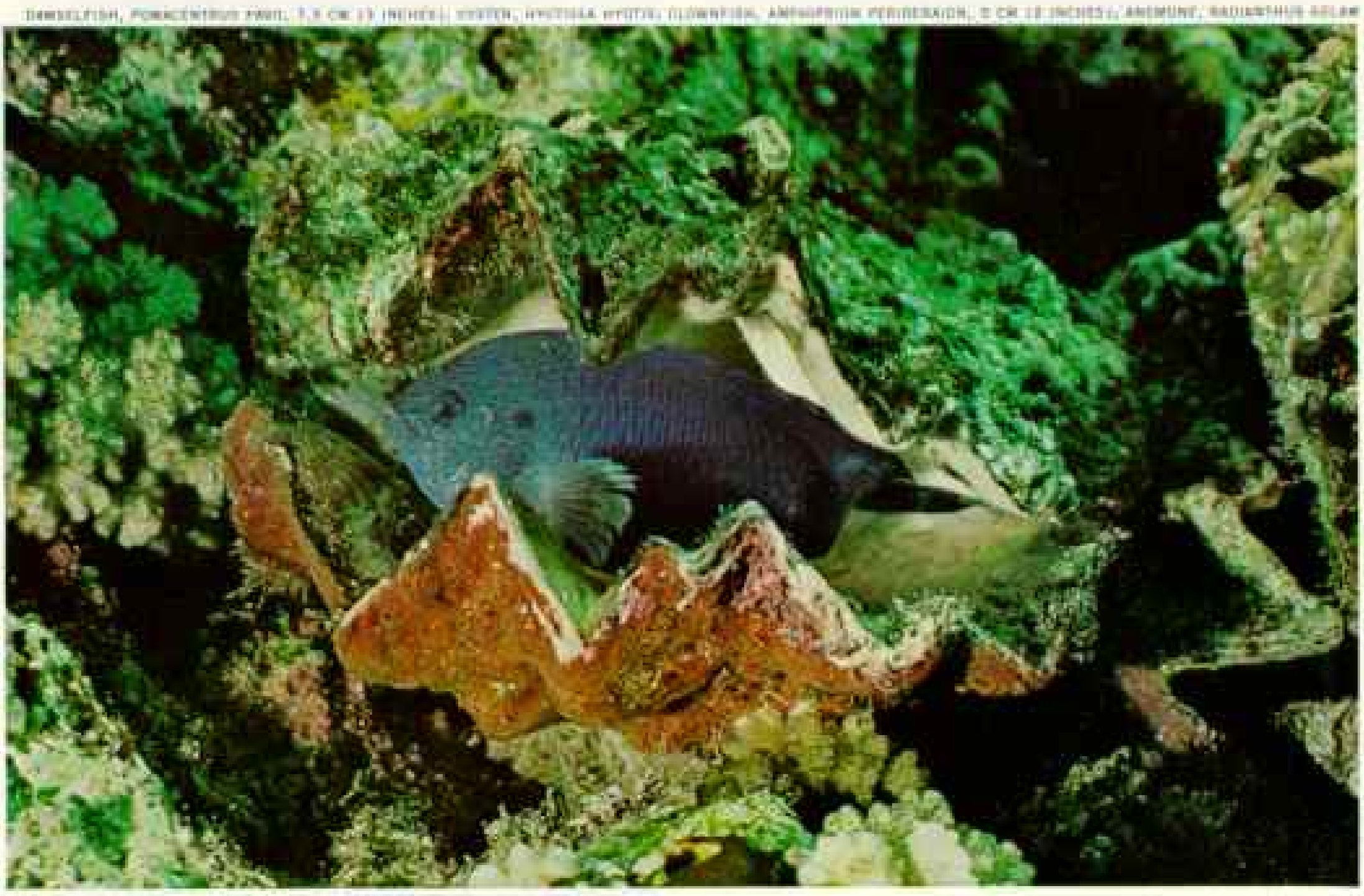
The destruction or modification of even one of the ships in Truk's underwater archipelago would mean lost opportunities for scientists, historians, and the many who in future years may benefit from that monument to the destruction of war.

What will become of the porcelain vase, the telescope, the peaceful undersea tombs, the living corals and plants? What of the ships themselves and the promising research now just begun? How can all this best be protected?

To us, the answer is clear: Nature is achieving the goals men seek. May we have the patience not to interfere. □

Burp of oil escapes from *Amagisan Maru*. Dr. Earle and her colleagues believe the lagoon safely dissipates such slow leakage of oil and other pollutants from some of the ships and argue against proposals to salvage or destroy them.

DAMSELFISH, POMACENTRUS PAVO, 5.5 CM (2 INCHES); OYSTER, HYOTISSA HYOTIS; CLOWNFISH, AMPHIPRION PERIDERAION, 7.5 CM (3 INCHES); ANEMONE, RADIANTHUS KYLAE



TRUK LAGOON

From Graveyard to Garden

Born of a holocaust, life now burgeons on the skeletons of war-torn ships.

CRADLES IN THE RUINS: Relentlessly, marine life conquers the sunken Japanese fleet, turning the floor of the Pacific lagoon into an undersea nursery.

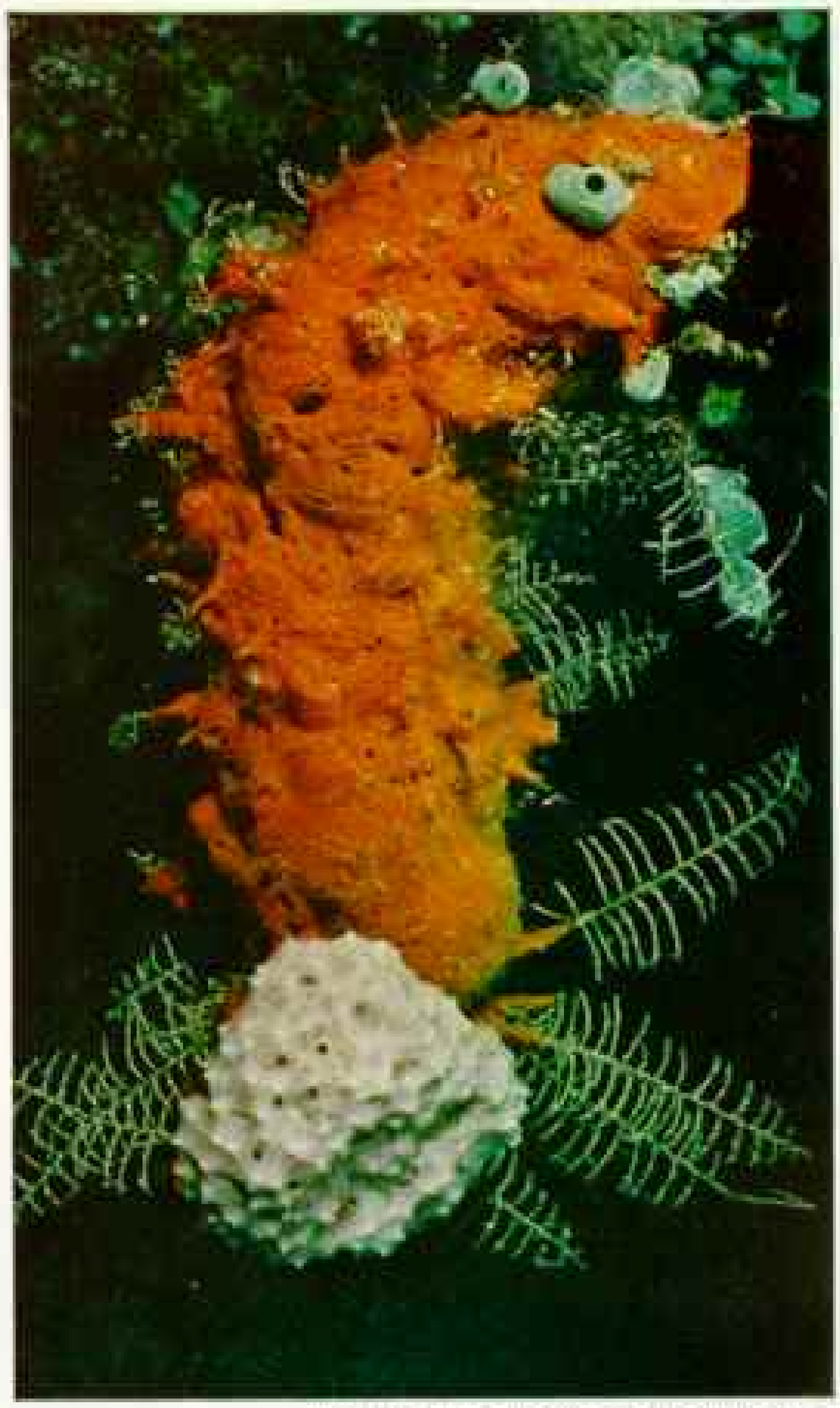
On the aircraft transport *Fujikawa Maru*, a damselfish builds a cozy nest (**above**) in the jaws of an oyster shell. Like an incubator of crimson velvet (**right**), a huge sea anemone protects a clutch of clownfish eggs laid atop a truck tire on *Sankisan Maru*. Prodded by the author, the anemone revealed the nest beneath it. The anxious parents, impervious to the anemone's sting, nipped frantically at its side to cause it to cover the eggs again. The next day they hatched.

OYSTER, LOPHA, 10 CM (4 INCHES); CORAL, DENDROPHYLLIA GRACILIS, 2.5 CM (1 INCH); SPAIN

TRIO OF OYSTERS mantled by a layer of sponge clings to a cable (**above**). Like fireworks on a summer night, polyps of "tube" coral unsheathe their tentacles (**right**) on *Fujikawa Maru*. Each has stinging cells to paralyze plankton, which the polyps draw into their buttonhole mouths. When not feeding, the animal curls into a sausage shape (lower left).

CORAL, ALCYONARIAN, 2.5 BY 5 CM (1 BY 2 INCHES)

CORAL, PLEXAURA SUBOSA, 5 BY 10 CM (2 BY 4 INCHES)



ORANGE SPONGE, AGELOCHINA, 30 CM (12 INCHES) LONG
WHITE SPONGE, DYSIDEA

NEPTUNE'S GALLERY crowds every cranny of the battered hulks. From one ship's funnel an alcyonarian coral spreads its feathery polyps (**left**). Like a cluster of ivory grapes, "bubble" coral (**below, far left**) grows on a vessel's bow. A ventilation pipe hosts a "sea serpent" (**below, left**) made of orange and white sponges, with sea squirts for eyes and plumed hydroids for a tail. Sinuous ruffles of a calcified brown alga envelop another pipe (**below**), while a "tube" coral with budding polyps rises like a Christmas tree with chartreuse ornaments (**right**).

ALGA, PADINA JAPONICA, 4 BY 9 CM (1 1/3 BY 3 1/2 INCHES); CORAL, RIGHT, TUBASTRAEA MICRANTHUS, 38 CM (15 INCHES)

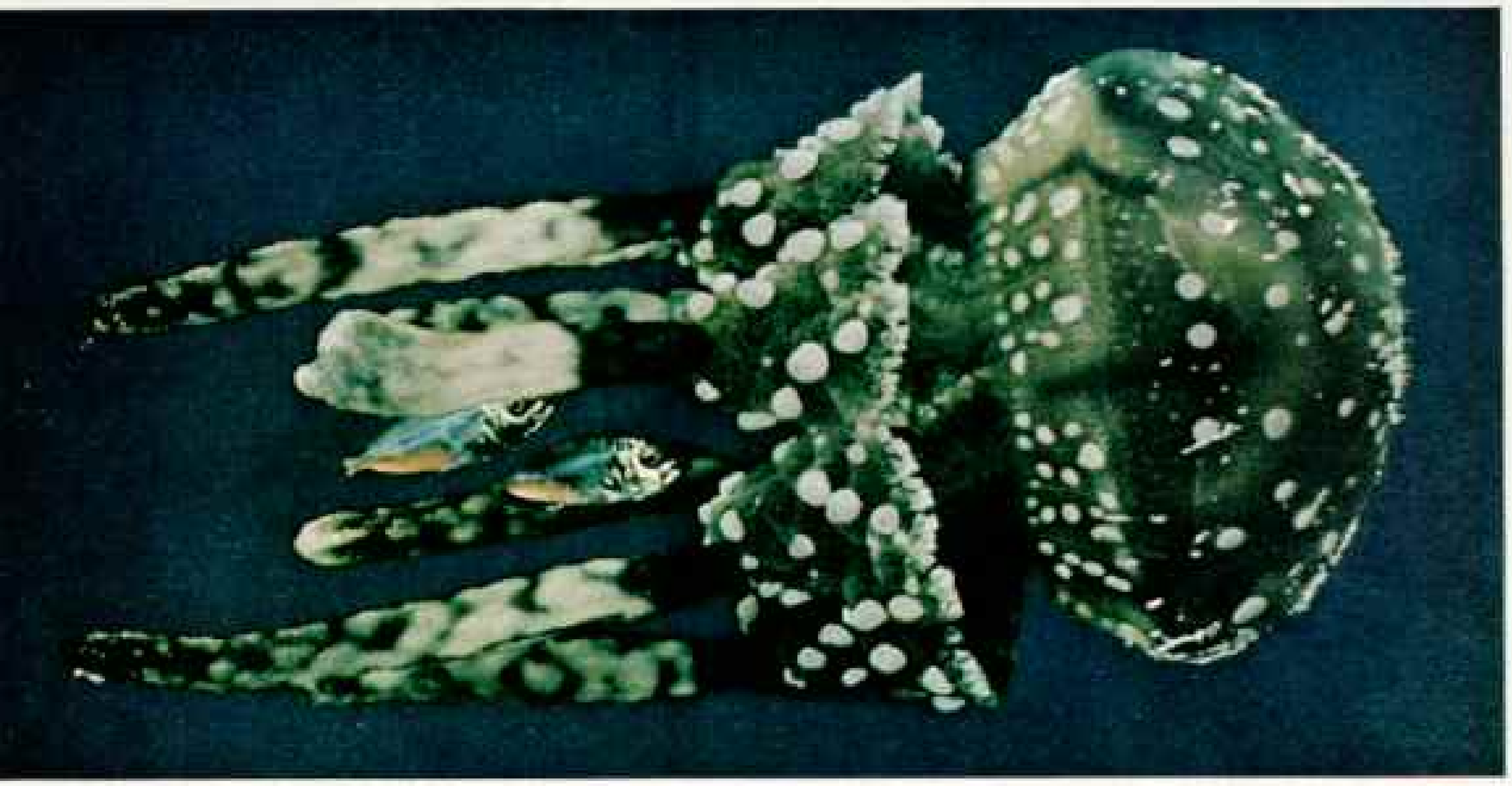
INCREDIBLE VOYAGE *into a sponge reveals the lacy network of spicules that give form to the animal. It feeds by pumping seawater in and out through circular pores; inside the body special cells extract plankton.*

ORDER POECILOSCLERIDA, 10 TIMES LIFE-SIZE

PROTECTED BY DANGER: Young jacks seek tidbits of plankton within the shelter of a two-inch-long jellyfish's stinging tentacles (**below**), to which the fish are immune. Likewise, a cleaner shrimp leads a charmed life on the equally perilous tentacles of an anemone (**bottom**). Here 21 shrimp maintained valet parlors where they groomed food particles from passing fish.

Of all the phenomena of the lagoon and the battleground it shrouds, none surpassed the eerie beauty of what Dr. Earle (**right**) and her colleagues will always remember as the day of the jellyfish.

"Suddenly, while we were exploring the *Yamagiri Maru*, they swept over us in a billowing cloud, millions of them," she recalls. "Then, just as suddenly, they were gone." □



JELLYFISH, MASTIGIAS, 8 CM (3 INCHES); SHRIMP, PERICLIMENES, 2.5 CM (1 INCH); JELLYFISH, AURELIA, 15 CM (6 INCHES) IN DIAMETER

Should they build a fence around MONTANA?

By MIKE W. EDWARDS

NATIONAL GEOGRAPHIC STAFF

Photographs by NICHOLAS DEVORE III

THEY HAD a favorite song, a rollicking Irish drinking song called "Garryowen," and I like to think they sang it on that June Sunday in 1876 as they rode toward the Little Bighorn.

Let Bacchus' sons be not dismayed,
But join with me each jovial blade,
Come booze and sing, and lend your aid. . . .

I know, though, that Lt. Col. George A. Custer and the Seventh Cavalry had little time for singing when they attacked the largest gathering of Indians—Sioux and Cheyenne—ever seen on the Great Plains. "In about the time it takes a white man to eat his dinner," as an Indian story has it, Custer and 225 troopers were wiped out.

To my mind few vistas are as magnificent as eastern Montana's empty sprawl. But I find no beauty on the grassy ridge, grooved by coulees, frosted by sage, where Custer became a legend. Under a lead sky the battleground is austere, melancholy (pages 616-17).

"You wonder why it had to happen," said Hector Knowshisgun, Jr., whose Cheyenne forebears were in this fight. "When I think about the battle, what comes to mind is that all those people, on both sides, had loved ones." His side won the battle but, Hector added, "we lost the war."

It did not seem so at first. The Indians danced while news of Custer's disaster inched back to the telegraph station at Bismarck, in Dakota Territory, to burst upon a nation just celebrating its Centennial. But in five or six years most Plains Indians were on reservations and white men were building cabins in the vicinity of the Little Bighorn.

Not far from Custer Battlefield National Monument, I sat with John and Ethel Whitham, a silver-haired couple, both sweat-stained from a long day of putting up hay. "We've been here fifty years," Ethel said of their small ranch. "Selling out would be like cutting my heart out. This is the only real home I ever had, the only real home John ever had. I don't want to live in town. I couldn't take my dogs, I couldn't take my cat, I couldn't take my horse or cattle. I don't know of anything I want that we don't have here."

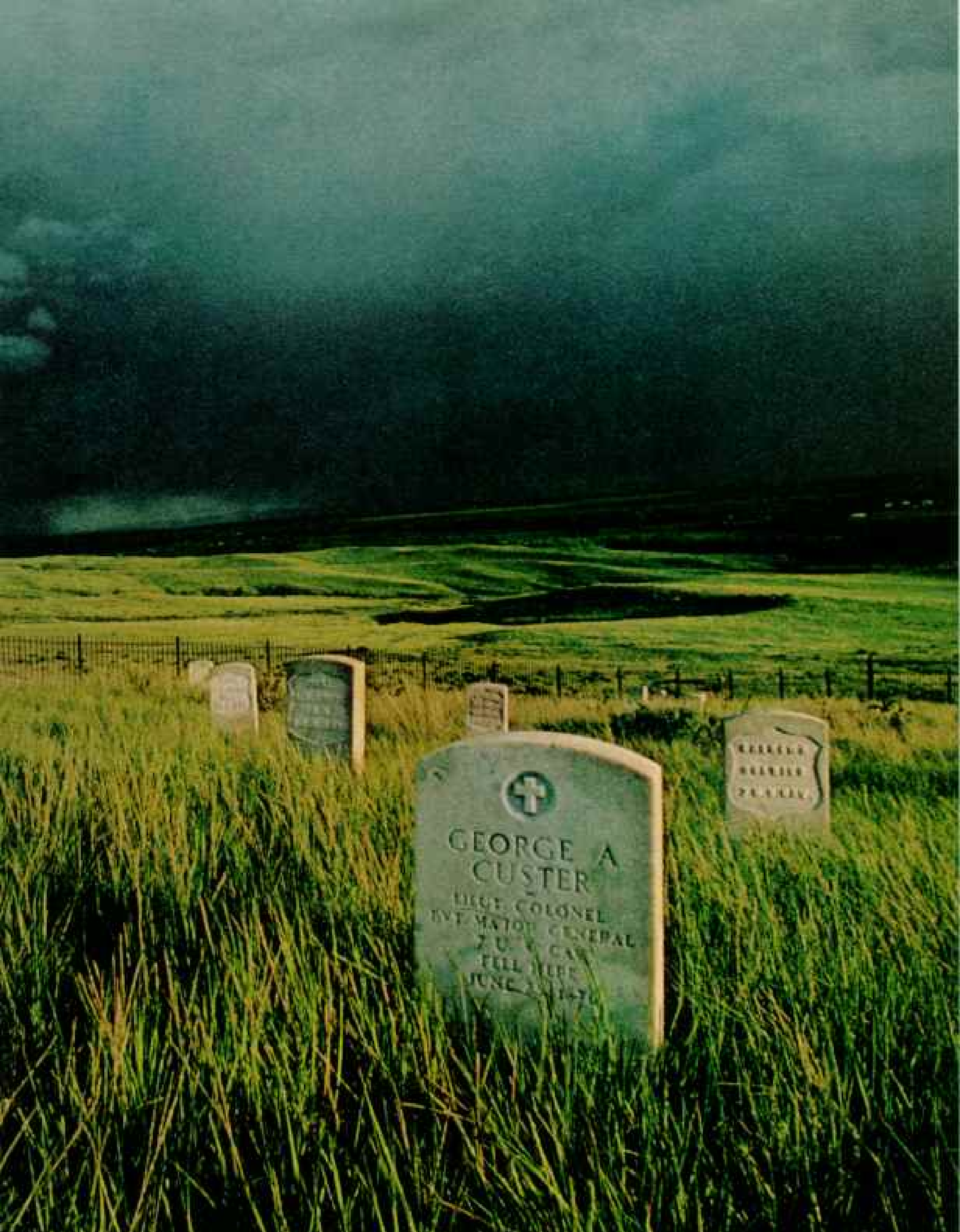
Coal Men Bid for Ranchland

Until about ten years ago few people thought much about eastern Montana's coal—the largest deposits of recoverable coal in the entire country. In 1972 a coal company made the Whithams a modest leasing offer for their 720-acre summer pasture, which is over a thick seam. The Whithams declined. Two years later, with a coal boom in full cry, attracting the largest companies in the energy industry, another company man handed the Whithams a draft for $144,000. John showed it to me. He had written on it: VOID. "I didn't want to tempt myself," he said.

But the Whithams are compelled to consider the alternatives. Their lonely slice of Montana, a fragment of the West where the

All smiles, a Japanese tourist carries a newly purchased saddle down Central Avenue in Great Falls. Lured by big sky, big land, and big minerals, people come from just about everywhere to see Montana—and just about everybody wants a piece of it.

"Plenty grass, plenty game" existed a century ago on lands of the Sioux and Cheyenne. And plenty anger, too. When the Indians resisted fortune hunters and railroad surveyors, Federal troops moved in. An overwhelming force of Indians responded. "Swirling like water round a stone," they met and surrounded their attackers on a ridge. "We



shoot, we ride fast, we shoot again," said one of their chiefs. None of the troopers trapped with Lt. Col. George A. Custer survived. Memorials at Custer Battlefield National Monument in southeastern Montana stand where the commanding officer and his 225 men fell in the Battle of the Little Bighorn.

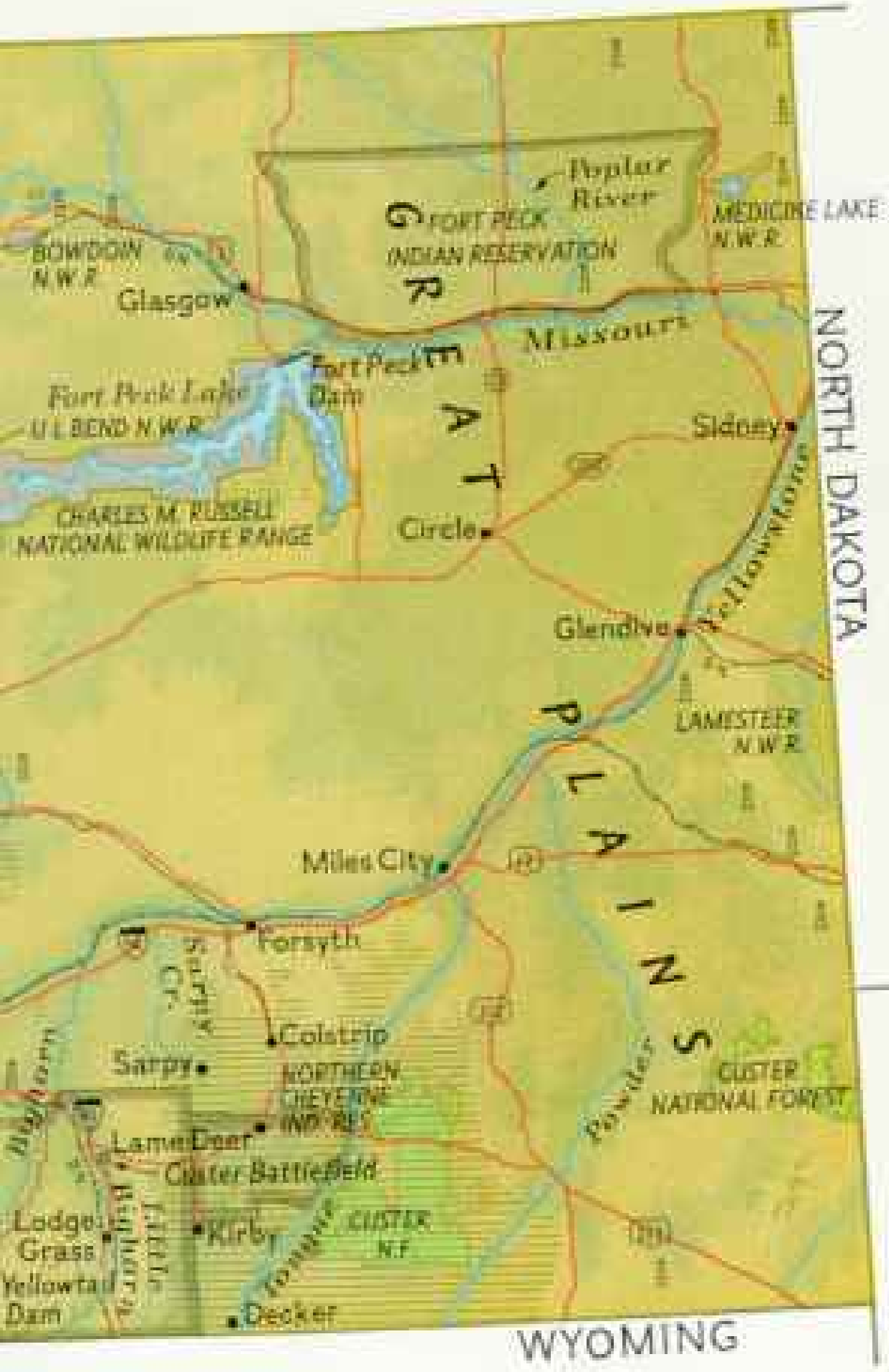
pickup truck barely surpasses the horse as man's best friend, faces the prospect of enormous change: mines, traffic, generating plants, coal-gas plants. Some of their neighbors already have leased. Block-busted, the Whithams may already have lost *their* war.

Montana always has been a shipper-out of things from the land. Coal mines now open at Decker and Sarpy and Colstrip are miniatures of the awesome Anaconda Company pit at Butte, where the copper kings warred for a bonanza that thus far has amounted to perhaps 20 billion dollars. "The richest hill on earth," Butte had its parallel in Last Chance Gulch, which allowed Helena in the 1890's to boast of more millionaires in proportion to its population than any city in America. Virginia City, Nevada City, Bannack—the bonanza place-names reach back to the time of the Civil War. Even earlier, trappers were taking Montana's furs to make hats and coats.

Anything was free in Montana in those days, if you could only get it. In one cynic's view, the chief differences now are that dollars are bullets and the faces displaced from the land are white.

Montanans Fight for Their State

But there *are* other differences. "Montana does not intend to become a boiler room for the nation," Lieutenant Governor Bill Christiansen has said. Environmental concern has resulted in laws protecting the air and water, restricting second-home subdivisions, requiring restoration of stripped land. Developers, forest clear-cutters, and extractors have found themselves in a thicket of protests and lawsuits—this in a state long dominated by a



Coal fields of commercial value

Bituminous and subbituminous

Lignite

single employer, Anaconda, and a state that, with a low per capita income, cannot easily turn its back on jobs.

Some Montanans are worried not only by big land disturbers, but by the rest of us as well: Easterners, Californians, people looking for a place to light. As Governor Thomas L. Judge has noted, some citizens would like to build a fence around their state. Driving along Interstate 94, I passed under a bridge where someone had painted: "Do something about the population explosion—commit suicide." With paint enough, I suppose, he would have added: "But not here."

What is Montana trying to hide? Enormous beauty, yes. But the real treasure of the Treasure State is space. Consider the figures. Our fourth largest state—twice as big as Missouri, for *(Continued on page 623)*

MONTANA

LIKE A CRESTING WAVE, the wide-open spaces of eastern and central Montana rise to the battlements of the Rocky Mountains. "Seens of visionary inchantment" impressed Meriwether Lewis as he explored the region in 1805 with William Clark. But most of the rough-and-ready pioneers who followed within the century found more earthly rewards: land enough to support vast herds of cattle, vast stands of wheat. And under the ground lay gold, silver, and copper, riches that earned a nickname: Treasure State.

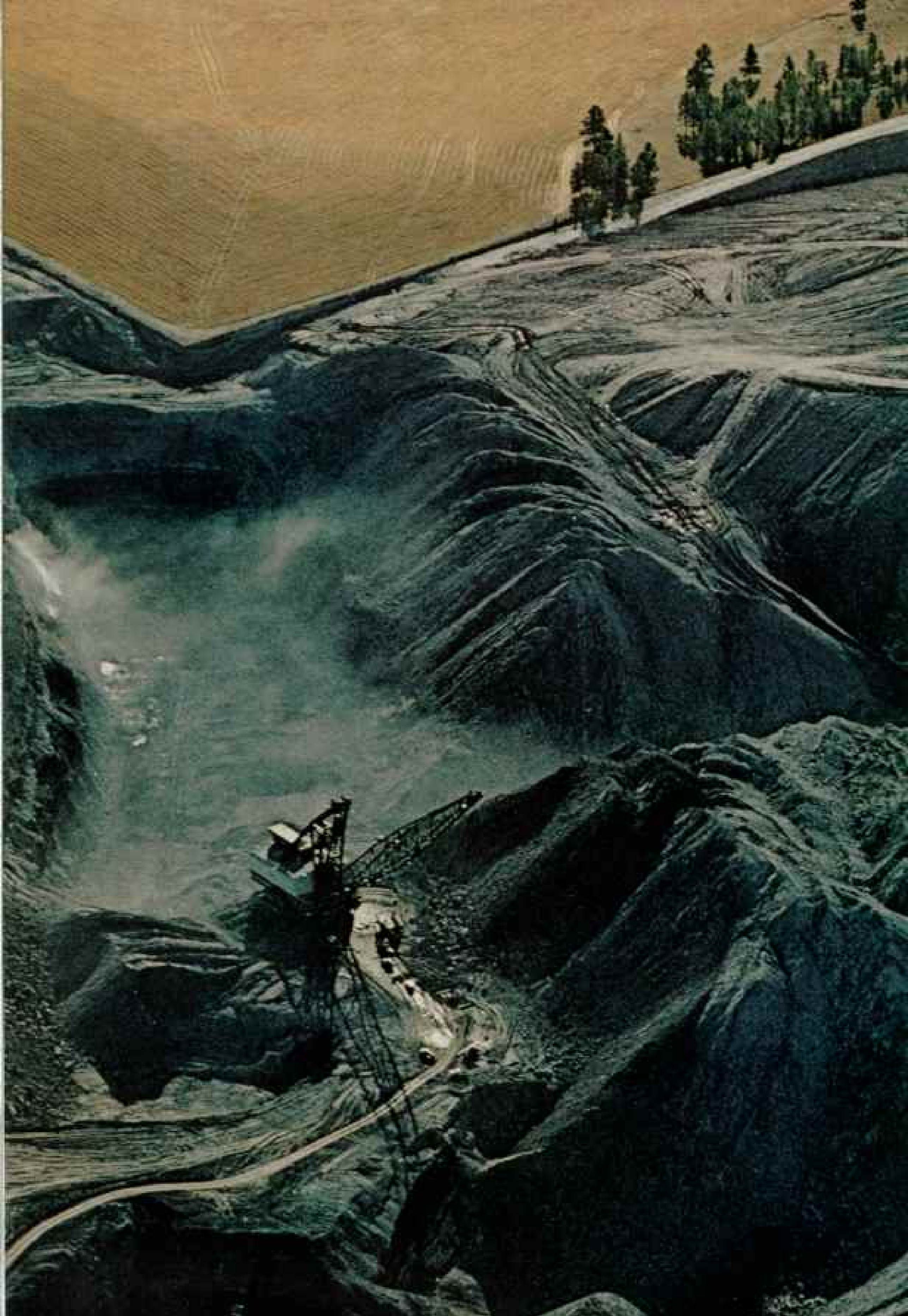
In a world looking for alternatives to oil, Montana's boom mineral is now coal—a mixed blessing. Producers and property owners differ on whether to mine it, how to mine it, and the toll to the land in mining's wake.

AREA: 147,138 sq. miles, ranks fourth. **POPULATION:** 748,000—only slightly more than live in Washington, D.C. **ECONOMY:** Mostly agricultural, with 62,500,000 acres of farmland, second to Texas. Wheat major crop, ranks fourth. Also livestock, oil and gas, timber, copper, tourism, lead, zinc, silver, smelting. More minable coal than any other state. **MAJOR CITIES:** Billings, 67,000; Great Falls, 62,000; Missoula, 30,900; Helena, capital, 25,300; Butte, 23,000. **CLIMATE:** Varied northern plains to alpine.

Rip-off on the range or fuel for an energy-starved nation? Either way, the great coal rush is under way in Montana. A dragline removes overburden at the Westmoreland Resources mine near Sarpy Creek (**right**), which harvests some of the 20 million tons produced in the state last year. More than a hundred billion tons are still accessible.

But how do you get the coal without ruining the land? Tough laws require strippers to revegetate the surface. Whether that will restore productivity remains controversial.

The payoff can be huge—hundreds of thousands of dollars, before taxes, of course—for landowners who choose to lease or sell their spreads. "Sell and retire," an energy-company agent advised rancher Harold Sprague (**above**), who has a small place near Colstrip. But Sprague, smoking a hand-rolled cigarette in the house his father built, said, "No, I like it here."



example—counts but 748,000 people. Half live in cities. The rest roam a landscape so vast that if it were divided, every family of five would possess two square miles.

I rose early one morning in Winnett, in central Montana, after a night in the old wooden hotel there (room rent: $3). Driving out of town (it takes half a minute), I stopped to watch the sun climb over a rim of buttes. Each blade of winter-worn grass seemed to blink on, as if lit by a tiny filament. I looked around—as a city man would, I suppose—for someone with whom to share this show of small pyrotechnics. I saw no person, no ranch, nothing that suggested habitation except a fence and the asphalt ribbon that rolled across the grass, away, away.

Mountains Reach for Heaven

"A raw, vast, lonesome land, too big, too empty," A. B. Guthrie, Jr., called these plains in *The Big Sky*, his fine novel about the fur trade. "It made the mind small and the heart tight and the belly drawn, lying wild and lost under such a reach of sky as put a man in fear of heaven." To which I could only add that morning: Yes indeed.

Montana would not be named Montana were it not for the various ranges of the Rockies that divide the plains from Idaho: the Absarokas, the Bitterroots and Beaverheads, the Gallatins and Madisons.

These, too, can put a man in awe of heaven. In mid-July—spring in the high country—I backpacked into the Mission Mountains Wilderness in the Flathead National Forest, accompanied by my daughter, Meridith, and her friend Hilary Canty. Our way was illumined by bear-grass flowers, which in shape are like electric-light bulbs—nature for once imitating the artificial. We trudged over snowfields that in retreat revealed glacier lilies popping up like yellow gushers.

Meridith and Hilary, wandering near our campsite at evening, suddenly came running back, squealing, "Quick, quick, quick!" They had spotted a young black bear only thirty yards away. He was looking intently toward the camp. Hastily we tied our packs in trees.

He visited us the next dawn, padding softly about while we were in the tent. Finding no food, he vanished with Hilary's jacket. We found it later, wrinkled but not torn. It was as if he had played a little joke.

"We're not out to stop development," Governor Thomas L. Judge told the author. "We are out to make sure it's done right." The governor, whose grandmother came to Helena in 1864 in a covered wagon, addresses the legislature in the House of Representatives (**facing page**). On the Charles M. Russell mural behind him, Flathead Indians gather to parley with Lewis and Clark. Below the lectern sit pages, excused from high school for the session.

Sculpting the West that is, Bob Scriver fashions a clay figure of champion rodeo cowboy Jim Shoulders. Scriver finds inspiration almost as pervasive as the air in his hometown of Browning. "There's rodeo cowboys, old-time bowlegged cowboys, long-haired Indians," he says. "And all around, those beautiful mountains."

Wearing hallmarks of Western individuality, neighbors help out at spring branding (**top, right**) on Walter Taylor's W Lazy T Ranch at Kirby. Kelly Peabody's belt buckle (**top left**) marks a first place won in rodeo steer riding at age 10. The spurs of Dwight Sanford Ferguson (**right**), a Christmas gift from his wife, bear his initials in silver.

A tin of snuff shines through the shirt pocket of a ranch hand (**above**). In Montana, snuff is called "snoose."

The previous afternoon a man had come to our camp, scouting, he said, for a place to bring a church group. He wore a pistol. I hope our bear didn't meet him.

The weather often makes life hard in Montana. Take Bud Knerr. What I remember most about him are his eyes: two red holes in his face. On the March day I spent on his ranch, vaguely near a town named Roy, the blowing snow stung like glass. Bud (whose real name is Harold) had been out all night, four-wheeling his pickup across his range, looking for new calves. If he could not find their mothers, he brought the calves home to Bev, his dark-haired wife, who warmed them in the bathtub and fed them milk.

"In this weather, if they don't eat in the first two or three hours, they're done for," Bud said. In the barnyard he chased cows into a steel chute, there to be held while other calves were coaxed to nurse. "The trouble is, after you start helpin' 'em, they *expect* you to help 'em," Bud said. He took aim at a calf and squirted milk, grumbling, "You gotta learn to do this yourself, you little dummy."

Bud and Bev had not sold their cattle the previous fall because the beef market was so bad. "I've already told the kids we may lose this place," Bud said. "It's a hell of a thing to have to think about." He shrugged. "But with prices like they are. . . ."

He went back to work with the calves. Finally, half frozen, I asked the obvious: "Bud, if it's such a bad deal, why do you keep on?"

His red eyes traveled to the distant butte. "It's hard work and stuff, but I just wouldn't want to do anything else. Anyway, you don't have to put up with a lot of people out here." He looked back at the calf. "And I have to take care of this fella; he's part of the outfit."

Artist Caught Spirit of the West

It was in the Judith Basin, only fifty miles away—a hop-skip by Montana standards—that Charles M. Russell met the West. Just 16, he had persuaded his wealthy

Hay's out for the Herefords. In zero weather Scott and Hale Jeffers feed the cattle on their father's ranch at Lodge Grass. "Long as they've got the food, they can stand.

parents in St. Louis to let him wander. He was a poor rider and perhaps too enthusiastic about life in the raw—and it was very raw in 1880. A lady remembered that he almost never washed. He wore a shirt until it was filthy, then put another over it. But the cowboys liked his funny stories and his pictures of bucking broncs, the range, wildlife.

Of Russell's 3,000 or more paintings, drawings, and sculptures, two important collections remain in Montana. One is at the headquarters of the Montana Historical Society in Helena, the other in the Charles M. Russell Museum in Great Falls, which adjoins the log building that was his studio.

Until a collector bought the lot, the Mint bar in Great Falls was full of Russell's works, some of which he had traded for drinks. After his wife, Nancy, took control of his affairs, Russell's commissions soared, ultimately into five digits. But he would still slip off to the Mint, have a couple with the boys, and perhaps pay with a small figure molded at the bar.

Russell's popularity is evident everywhere in Montana; prints decorate hotels, bars,

JONATHAN T. WRIGHT

the cold," Scott's wife says. She remembers a morning in the 1940's when the temperature dropped to minus 48° F. "So cold it brought tears," she says. "And they froze to my face."

homes. It is not, I think, the beauty of his landscapes that makes him endure; go outdoors and you will see purple sage and yellow morning skies. But his people—Indians chasing buffalo, cowboys at work with lariats or at play with .45's—these have vanished, leaving a deep, nostalgic void, a wish for the West that was. Russell keeps alive the old dream of living close to raw land, and the freedom of wearing a dirty shirt.

Much of the raw country he knew is now tamed in endless fields of wheat. It was raining as I drove northeast from Great Falls to Havre and then turned west on Highway 2. I stopped at Kremlin, a town whose notable landmarks are five grain elevators. These look over a landscape as flat as the sky seemed that morning, a landscape of strips of yellow grain and chocolate earth.

Export Surge Spurred Wheat to $6

Times for farmers are good in the "Triangle," a wedge cornered by Great Falls, Havre, and Cut Bank (map, pages 618-19)—as good as they have been bad for ranchers like Bud Knerr. This Connecticut-size area

usually yields about 40 percent of Montana's wheat—with plenty of rain, it produced 62 million bushels last year—and foreign sales have boosted prices to levels undreamed of by the homesteaders of the early 1900's.

"Six dollars a bushel in January 1974." Larry Johnson, who was spending the rainy day welding a seed-drill rig, spoke the figure as if he didn't believe it. The market soon retreated, but prices are still so good that at age 24 Larry is a kind of superfarmer, a sun-bronzed capitalist in overalls talking of $40,000 combines and buying more land. "We don't need $6 wheat," he confessed. "If you have $3.50 wheat, you can make a profit.

"For years, many wheat farmers hardly made enough money to pay income taxes," Larry said. "Now people around here *love* to pay taxes. If you didn't pay $10,000 last year, you don't talk about it because you're ashamed of yourself."

Homesteaders Opened the Wheatlands

That afternoon the wind rolled back the cloud layer like a curtain. I camped below a small dam on the Milk River and spent the evening watching five terns dropping like dive bombers to grab fish in the spillway. With my bag on the ground I went to sleep looking at stars as numerous as I have ever seen: Guthrie's Montana Big Sky. At 4 a.m. I was awakened by the northern lights stabbing the spangled velvet like searchlight beams.

When I drove back to the Johnson farm, combines were moving across a field. I squeezed into the cab of one with Larry's brother, Rodney, a chunky man with a fine full beard, and we rumbled along in air-conditioned comfort while the blades whirred. "This is our poorest field," Rodney said, "but I figure we'll get 45 bushels an acre here."

That recalled a handbill I had seen in a museum. Issued soon after the turn of the century by the Montana Land and Immigration Company, it offered assistance: "Let us locate you on a free homestead." On one margin was printed in red: "Wheat goes 40 bushels to the acre every year here."

A realist commented: "They should have added, 'If it rains.'"

A few experts warned that a 160-acre homestead, or even the 320 acres offered by the Enlarged Homestead Act of 1909, would not support a family on the northern plains, which are sprinkled with only 12 to 15 inches of moisture a year—and often less. The voices of caution went unheeded.

Prominent among the boomers was railroader James J. Hill. His Great Northern needed customers along its lonely tracks. Hill had allies: Montana businesses, even state officials. Europe as well as America was papered with promises of Eden.

Land! "It was something you could have," said 79-year-old Laurel Wright, a neighbor of the Johnsons, who still raises wheat on the tract his mother homesteaded in 1911. Separated from her husband, she came to Montana to start a new life.

In 1909 the land office at Miles City was recording 1,200 claims a month. A day in 1910 saw 250 people reach Havre. Cowboys had no kind words for this swarm that plowed the grass and put up fences. "Honyockers," the homesteaders were called, and "scissorbills"—the first a corruption of "Hunky" and "Polack," the second meaning a stupid person.

"We had plenty of rain in 1915 and 1916," Laurel Wright recalled, "and good crops. You could even borrow money on your land." But the 1917 rainfall was scanty. There was even less rain in 1918. In bone-dry 1919, the land yielded only dust. "Most of the people around here just folded up and left," Laurel said. Still another cycle of drought occurred in the 1930's, and Laurel knew another year when the land yielded no crop.

I asked him why he had stayed on.

He shrugged. "Tough ol' devil, I guess."

Exodus Leaves Relics of Failure

Montana historian K. Ross Toole has estimated that 70,000 to 80,000 people homesteaded in Montana between 1909 and 1918. By 1922, 60,000 of these had been starved out or had given up, a human tide that ebbed almost as it crested, leaving upon the land, in broken buildings and rusted fences, a poignant record of hope and failure.

In central Montana I met Stan Wiggins, whose father came from Nebraska seeking land. Six feet four, with shoulders as broad as the country itself, Stan raises sheep on a 10,000-acre ranch that contains ten or more abandoned homesteads.

I flew one morning over the rolling land around the Wiggins ranch—over the dead town of Flatwillow, *(Continued on page 633)*

Spikes of wheat adorn dress and bridal bouquet of Katrina Wilson Stephens on her wedding day. She and her husband, Mike, will farm 900 acres of his father's land near Dutton. Quilted wheatfields (**following pages**) seem to roll on forever near Conrad. The state's wheat growers reaped a record harvest of 156 million bushels last year.

For survival, not sport. That's the reason sheep ranchers Stan and Shirley Wiggins give for hunting coyotes. "There was one month when we thought we had coyotes under control; then in one day we found five coyote-killed lambs. That kind of loss would drive a small sheep owner out of business." Usually the Wigginses take home only the

pelt, which they can sell to a furrier for about $25, but here they carry a coyote on wing struts, a practice when darkness or bad weather threatens.

(Continued from page 628) over tracks in the grass striking off to the remains of houses. Stan was scouting for coyotes. "I admire the coyote as a clever animal," he said. "But what he's done to me. . . ."

Stan tells of springs when he found as many as 40 lambs killed by coyotes, a heavy loss for a family ranch. He fights back.

Soon after daybreak a Piper Super Cub had landed behind the Wiggins house. I was introduced to its pilot, Mike Goffena, another rancher. "Mike and his brother Robert and I have accounted for about 300 coyotes the last two years," Stan said. He opened the door of a shed that hangared his own Piper, then oiled a 12-gauge automatic.

Soon we were a dawn patrol, skimming the ground. Stan's wife, Shirley, rode shotgun. I went with Mike as a noncombatant. Antelopes galloped up coulees and deer peered up from thickets. Suddenly Mike banked sharply. "Two down there." Though the planes circled and circled, the coyotes were not to be seen again. We went home to breakfast.

Many ranchers cite coyote losses as the reason they no longer raise sheep. Stan told me that coyotes had been fairly well controlled around his ranch by the poison known as "1080." But since a federal ban on its use in 1972, he said, "the population has run wild." Wildlife authorities also report an increase in coyotes in Montana. Aerial hunting helps to protect the 15,000 or so sheep raised in Stan's area.

Conservation Comes in Many Forms

Such a hunt would have appalled the coyote's many conservationist friends, who contend that the animal is overrated as a sheep killer. But I think of Stan as a conservationist too, in his own way. He talked of grass—bluejoint, blue grama, needle and thread, crested wheat, the grasses that ranchers call "strong," good for cattle and sheep. He showed me reseeded pastures, new dikes to husband the runoff. Perhaps "economic conservationist" is the right word for him; his view of coyotes is a sheepman's view, heard any day on the plains.

Unseemly August snow mantled the Tobacco Root Mountains in southwestern Montana when I drove into Virginia City. Much of this gold-rush town, Montana's territorial capital for ten years, has been preserved by

Palace fit for a king—a Montana copper king named William A. Clark—adds a touch of elegance to downtown Butte. Also a merchant and banker, Clark built the 37-room mansion in the 1880's, the decade when electricity began to flow on copper wires and copper mining wrote rags-to-riches stories. Owner Ann Smith now opens the house to visitors year round.

Charles Bovey and his wife, Sue, from their own pockets.

"Mr. Bovey," said a man who works for him, "never threw anything away—unless it was new." Mr. Bovey smiled when I asked him about that. "Well, I do have a few old things," he conceded. He was puttering about in his favorite project of the moment, a turn-of-the-century grocery store. Its shelves were stocked with Sapolio soap, Uneeda biscuit tins, and bags of Bull Durham tobacco—a few of Mr. Bovey's trophies from a lifetime of rummaging in attics and dusty storerooms.

On springy plank sidewalks I strolled past buildings built in the 1860's. Weather-corduroyed clapboard and wavy false fronts testified not only to their age but also to rough-and-ready frontier craftsmanship. I gazed at bonnets in a store for ladies, at buggies in a livery stable. Down the hill a mile, at Nevada City, there is even more. The Boveys restored that town and crammed it with such fascinating paraphernalia as a carriage-repair works and a Chinese grocery. The 40-odd buildings are open to the public from Memorial Day to Labor Day.

Enough for Tobacco—and Then Some

Six prospectors were hereabouts in 1863. Henry Edgar recorded in his diary that when they stopped by a creek Bill Fairweather sank a pick. Filling a pan with dirt, Bill said to Henry: "Now go wash that pan and see if you can get enough to buy some tobacco." They found plenty of gold for tobacco.

Soon there were 10,000 people in the vicinity, and many struck it rich. Estimates of the gold taken from this district range from 30 million dollars to 100 million. "Road agents" robbed and murdered travelers until vigilantes went to work. In a store I peered at the beam from which five outlaws swung one day in 1864. The vigilantes hanged 22 men in two months—including a sheriff.

Charles Bovey, the son of a major stockholder in General Mills, began plowing his wealth into withered Virginia City in the late 1940's. How much money? I wanted to ask, but Charles Bovey is shy. "Are you the man responsible for saving this place?" a tourist inquired as Mr. Bovey ate in a café. I thought he would take flight.

Later he confessed: "I'm not really as modest as people think I am. In the twenties

I drove to work in Great Falls in an old Anderson motor buggy made about 1910. If nobody had stared at that old car, I wouldn't have driven it out the second day. The pleasure I get out of old things is having other people enjoy seeing them."

Some of Charles Bovey's music-making machines were collected from saloons in Butte. "Oh, Lord, this was a good town!" exclaimed a retired Butte miner, a massive, bull-necked man, in the Helsinki Bar, Grill, and Sauna. "Girls, slot machines. . . . There were about six bars here along East Broadway. If you fell out of one, you fell right into another."

The wide-openness of the gold-rush era survived in Butte long after it died elsewhere. But copper, not gold or silver, paid for it. Extraction of copper ores coincided with the spread of the electric light and the telephone; mile-high Butte Hill, catering to a wire-hungry world, soon became one of the richest mining districts on earth.

Job-hungry men poured in from Europe. During World War I, Butte was by far Montana's largest city, with 90,000 people. East Broadway was the main stem of Finntown, one of half a dozen ethnic neighborhoods. "Lots of days I never heard a word of English," remembers Michael Patrick McNelis, a retired smelter employee. "Most Finns were miners. The mill at the smelter, where the ore comes in, that was pretty near solid Norwegian. Down at the converter, it would be Yugoslavs, Italians, or Irishmen."

Butte's population has shrunk to 23,000 today. The Anaconda Company's Berkeley Pit, more than a mile wide and 1,500 feet deep, began to swallow the old neighborhoods in the 1950's. Where did the people go? I asked the old miner in the Helsinki Bar.

"Lots moved to the flats, off the hill. Some's in the graveyard too."

"There's very few left who savvy Finn," the bartender added. Still, the Helsinki maintains a brave front with a sign that says: "We Understand Broken English Here."

Third Time Around for Mining

Mine gallows frames climb the sky atop Butte Hill, but most Butte "miners" are teamsters who drive 150-ton ore trucks in and out of the pit. "This area has been mined three times," Superintendent LeRoy Wilkes told me. "The first miners 'high-graded,' just took the best ore. Then it was re-mined for the best of what was left. Now we come along with the open-pit method and take what's left of *that*. But the grade is low, about half of one percent copper, and we take off 2½ tons of overburden to get to a ton of ore."

Marcus Daly, who came to America from Ireland alone at 15, correctly gauged the future in 1880 when he bought the Anaconda mine. It was a silver mine, but at places its veins held ore assaying 55 percent copper. Backed by California financiers, the Anaconda Mining Company bought other claims. About 25 miles from Butte, Daly built the city of Anaconda and a smelter. He added coal mines, timberlands.

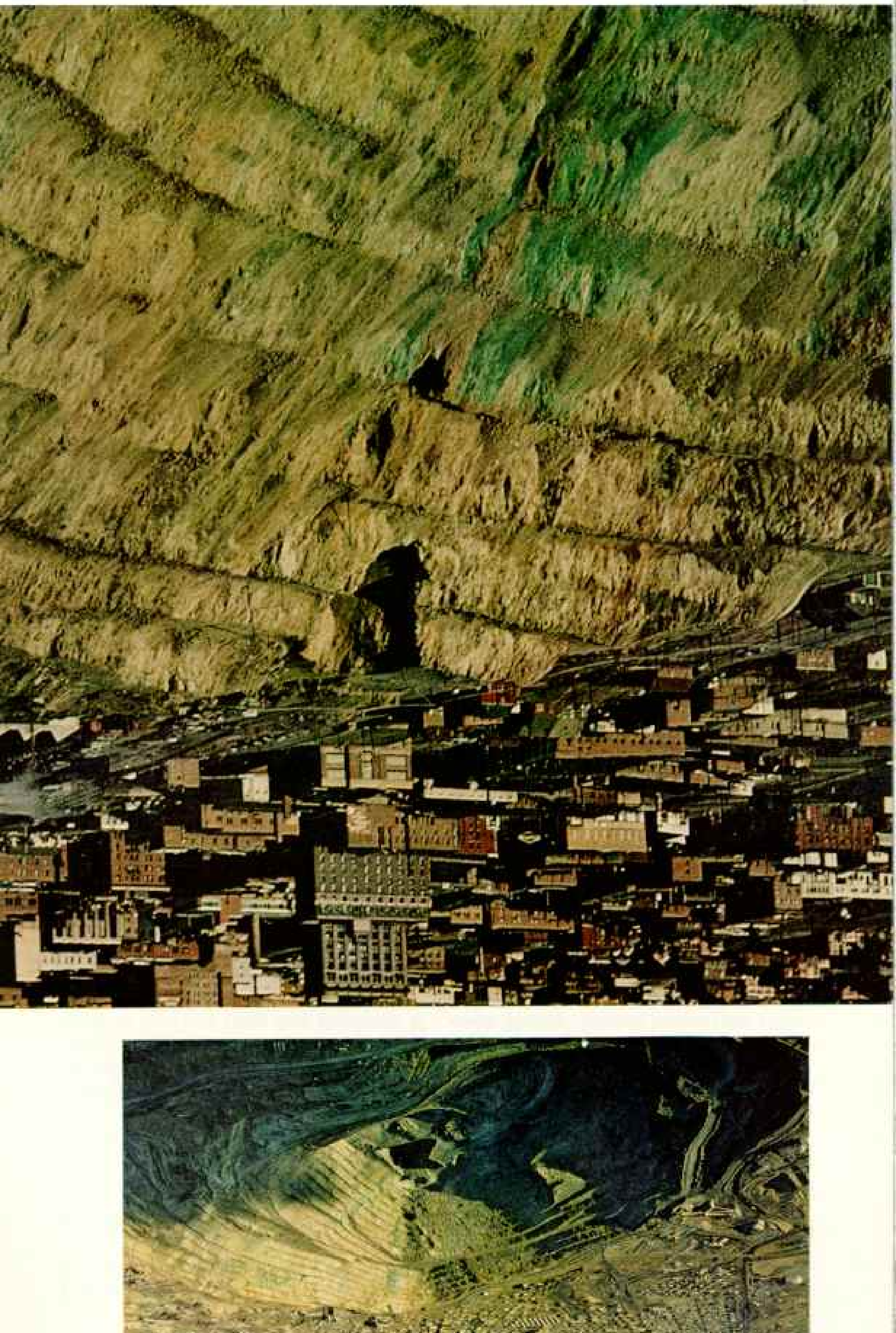
Others also cashed in. William Andrews Clark amassed a fortune of 47 million dollars. Montana was not big enough for Daly and Clark, who warred with dollars and printing presses for control of the state. Clark hoped to become U.S. Senator; Daly blocked his ambitions. Clark spent $450,000 to keep the state capitol from being built in Daly's Anaconda. Only after Daly's death did Clark become a Senator, serving from 1901 to 1907.

Statute Favors Mischief Underground

Butte was a perfect money factory in the 1890's. Smelters and ore-roasting ovens belched fumes of sulfur and arsenic, while begrimed immigrants extended hundreds of miles of tunnels into ore veins. To build an empire, a man needed ore, and F. Augustus Heinze, still in his twenties, knew where to get it: in the veins of his competitors, to which he assiduously tunneled.

Taken to court, he relied upon two remarkably friendly judges and a statute, still in force, known as the "apex law." If a vein surfaces, or apexes, on a given claim, this law holds, the claim owner is entitled to pursue the vein to any depth, provided he doesn't go beyond the length of his surface rights. But the law puts no limits on following the vein to either side. Since Butte veins often splintered or were interrupted, only to continue elsewhere, the possibilities for mischief were enormous. Heinze used the apex law not only to defend himself but also to press claims against rivals—"courthouse mining."

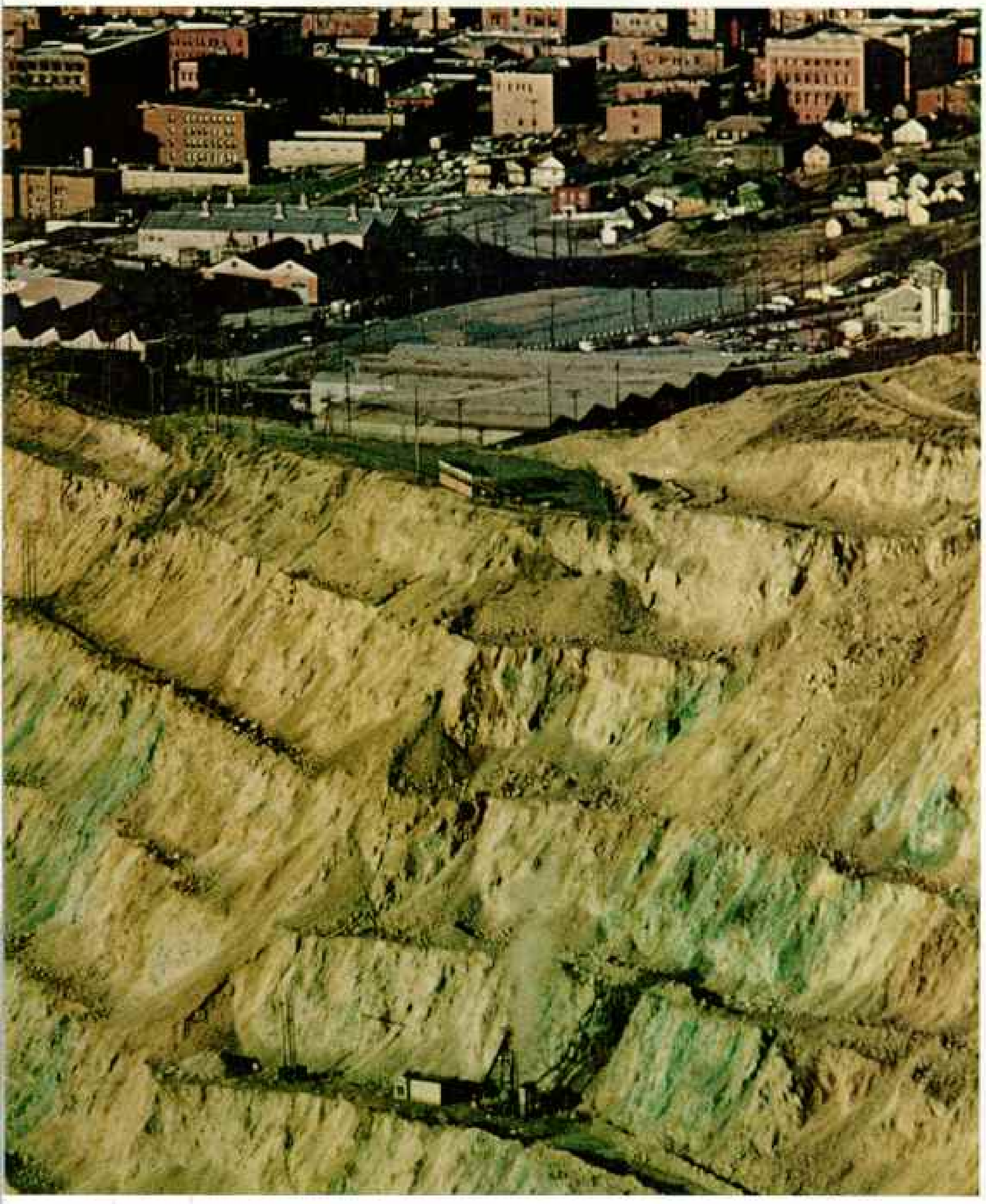
In 1899 Anaconda came under the control of the Standard Oil Company as that powerful trust attempted *(Continued on page 640)*

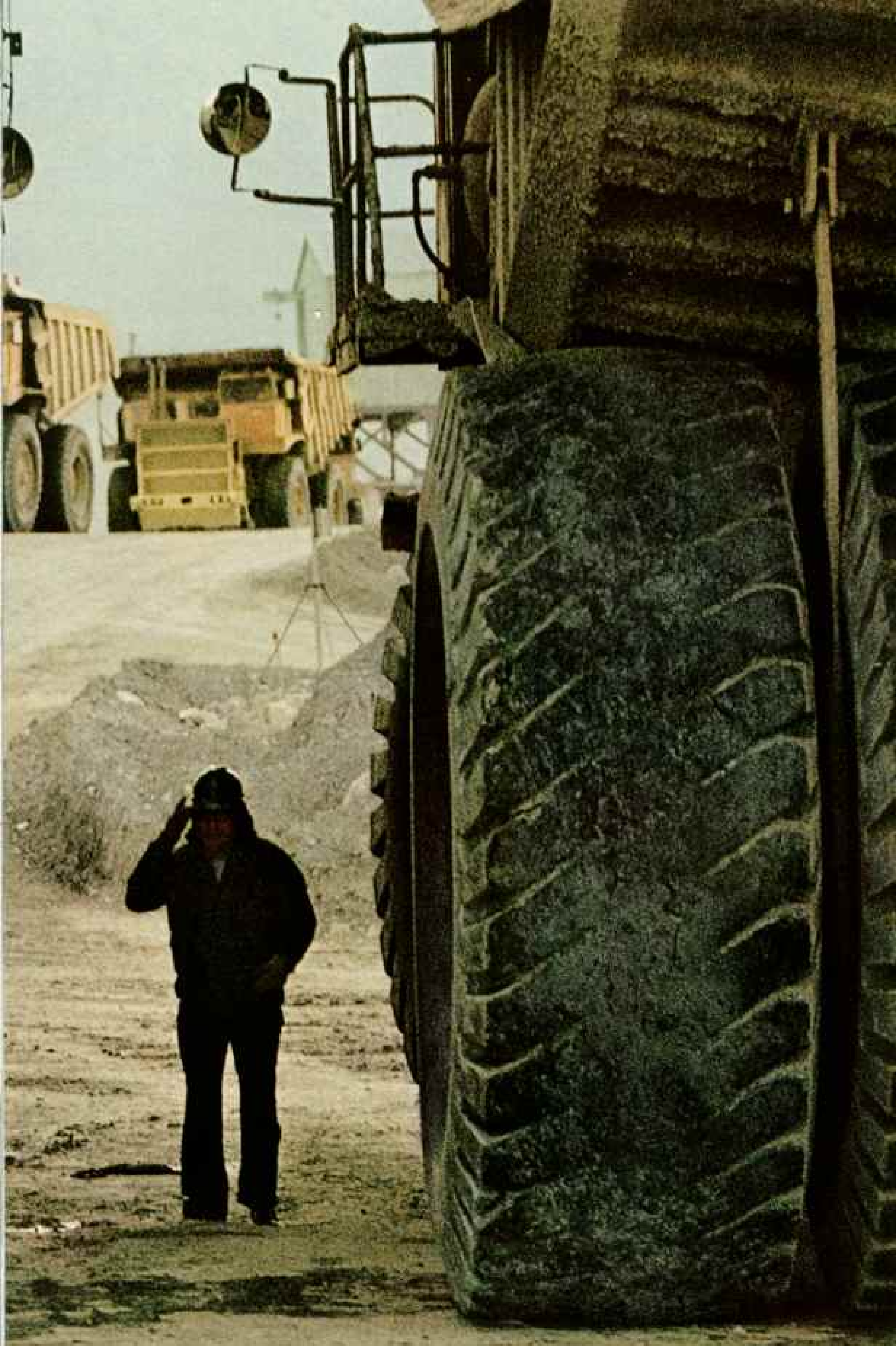


Cup of riches, crater of destruction: This copper-streaked mine devoured a fifth of Butte (**left**) before the Anaconda Company halted expansion toward the town. Now round-the-clock mining operations proceed straight down in the mile-wide pit, with shovels that scoop 15 cubic yards at a bite. They load earth into trucks whose wheels tower 12 feet (**following pages**).

Long known as a company town and a union town, Butte sits atop "the richest hill on earth." Its people never fretted much about underground shafts, which by 1900 produced nearly half the United States copper supply. But with high-grade veins playing out, the pit was begun in 1955 to excavate low-grade ore. That meant more machines, fewer men; the work force shrank from 5,000 to 2,500.

Now Butte courts other industries, citing its location on railroads and highways. Already major companies maintain warehouses here; in one of the largest of the nation's "inland ports," customs officials clear containerized cargo from the Far East for distribution throughout the Midwest.





(Continued from page 635) to consolidate Butte's riches. Heinze led a war against the "octopus" above ground and beneath. Mines were dynamited to conceal thefts. Tunnels were flooded. Jets of steam or slaked lime dropped into air pipes repelled attempts to see what the opposition was up to. Frustrated, Standard Oil in 1903 shut down all its Montana operations—copper and coal mines, smelters, lumber camps, railroad, offices. The firm announced that it would stay shut until the state legislature passed a law permitting a change of venue when either party in litigation considered a judge prejudiced. Twenty thousand men—four-fifths of Montana's wage earners—were idled.

The law was passed, the miners returned to work. Heinze, his power broken, sold out to Standard Oil for ten million dollars, and 100 suits were dismissed. Heinze soon lost his fortune on Wall Street—vengeance, some said, wreaked by Standard Oil.

Under pressure from federal trustbusters, Standard Oil sold its Montana holdings in 1915, but the reorganized Anaconda Company remained the dominant power in the state. With four out of five of Montana's largest newspapers under its control until 1959, Anaconda greatly influenced opinion. Company lobbyists plied the halls of the legislature in Helena. "We had a right to state our position," an Anaconda executive remarked. "But now we're playing defense more than offense."

An Advantage to Being Behind

His comment reflected the changes in Montana. A new breed has entered the legislative halls. At the capitol I talked with Representative Paul T. Richards of Helena—not yet 21 when first elected, but wise beyond his years. He spoke of his concerns: air pollution, destruction of wilderness, strip-mining. "We're in a unique position because we have been left behind by the so-called progress that you see in other states," Paul said. "We're in a much better position to address the issues of protecting the environment."

Environmentalists won a significant fight

Politicking on pride in their state, Montana Jaycees elected officers at Big Sky resort last May. Vested in campaign badges, the vice-president of the men's civic club, Alfred (Poncho) Page (**right**), approves incoming president Joel Ebben (**left**). The Miles City businessman accepts the gavel with thanks for the "loving support of my wife, Lanny." She is active in the wives' club, the Jayceens. Earlier Mr. Ebben led a Jaycee-sponsored project to control flooding of the Tongue River in Miles City.

against Anaconda in 1970, blocking plans for a new mine. "People who wanted to save the land got a big boost from that," said newspaperman Dale Burk of Missoula. I met Dale as he was about to leave for Harvard University on a Nieman Fellowship. He had won recognition for articles on conservation, particularly questioning clear-cutting in the national forests, published in a former Anaconda newspaper, the *Missoulian*.

In Bozeman I met Eldon Smith, a wildlife biologist, and his wife, Elizabeth, a writer, who were fighting in the 1960's for such causes as protection of streambeds from bulldozing. "We had always been stepchildren," Liz said, her large green eyes flashing, "but now there are people in the state agencies and the legislature who feel as we do. We're members of the family now—though I don't think we're the oldest son by any means."

A few miles southwest of Bozeman mountains close in on the Gallatin River, seemingly determined to dam this stream, which rises in Yellowstone National Park and eventually joins the Madison and the Jefferson to found the mighty Missouri. You do an exaggerated dance with the Gallatin, twisting, turning, following its lead, as you drive toward Yellowstone on U. S. 191. Finally the peaks relax their corset strings, and the Gallatin meanders in meadows, a ribbon of mirror crazing a Charles Russell sky. A fly fisherman arcs a pencil line of nylon and the heart yearns to share his splendid solitude.

Forty-three miles from Bozeman I turned off the highway on a cold winter day. An hour or so later I was zipping (and sometimes tumbling) down the ski slopes of Big Sky, the 60-million-dollar resort that grew from Chet Huntley's dream (following pages).

The late NBC newscaster was born to parents who homesteaded on the plains. When he was a nightly guest in millions of living rooms, he looked upon Montana as a place to forget the world's turmoil. "He felt that people were constantly bugged by bad news," said his widow, Tippy. An effervescent woman who seems to be everywhere at Big

Sky—on the slopes, on the dance floor—she talked of Chet's dream in Huntley Lodge, near the base of the ski runs that pattern 11,166-foot Lone Mountain. "He felt the pressures were relieved out here. He felt very strongly about Montana's curative powers."

Why not, he thought, build a place where others could restore themselves? What came about, after six corporations invested, was a virtually self-contained leisure community. You can pay $5 for a dormitory bed during ski season or plunk down $11,500 to $40,000 for a home site. There are tennis courts, pools, a golf course, condominiums, convention facilities, a dude ranch. Buildings are clustered so that large parts of the 10,800-acre tract remain in a natural state.

Environmentalists fear Big Sky's impact on Gallatin Canyon. One critic concedes: "They've done about as careful a job as they could. They have to, because they know we're watching them."

But many believe that the greatest threat to the canyon is the absence of zoning controls. A mobile-home park sprang up near Big Sky. Environmentalists have challenged plans for two other new communities along the river. Residents speak of the need for controls, but a rancher described the local attitude as "Zone everybody but me."

Opposition to zoning is as characteristic of rural Montana as a rifle on a rack in a pickup. I visited a charming little gray-haired lady, the owner of 252 acres. How did she feel about zoning? She smiled sweetly as she said, "Nobody should have the right to tell me what I can do with my property."

Real estate broker Fred Pack believes attitudes change: "People see what can happen, trailer courts unscreened from traffic, and so on. I hope they won't allow much of that."

Digging Up Coal and Trouble

Coal country. Sixty-four, sixty-five, sixty-six . . . the rail cars rolled through the crossing, each hauling a bit of Montana to Illinois or Minnesota to light homes and power factories. When the caboose passed, men and women in hard hats hurried on to work; the morning rush was under way in Colstrip.

Once a railroad coal-mine site, Colstrip withered after diesels came in. At the time of my visit, 1,800 people worked there, most of them building two coal-fired generating plants that will supply electricity to the Seattle area as well as to Montana. The 507-foot stacks of these will be joined by two more if Montana Power and other companies win final approval from state authorities—and if anticipated lawsuits by environmentalists do not thwart the plans. The new plants would boost Colstrip's power output to 2,100,000 kilowatts, equal to about 60 percent of the peak use in Los Angeles last year.

Comradeship and $9.32 an Hour

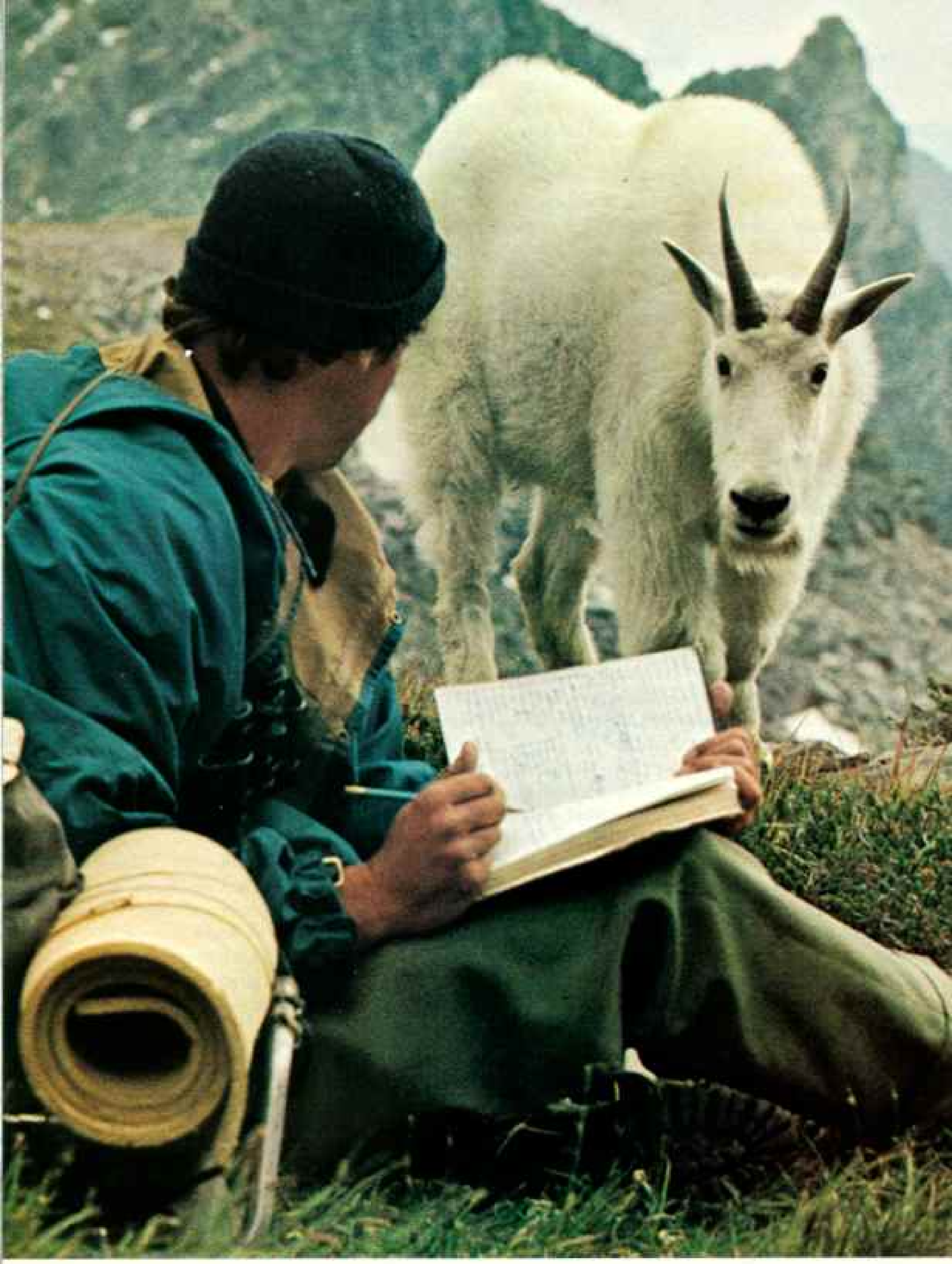
There's a yeasty quality about the Colstrip boom, confected of dust and mud and make-do, and of the camaraderie of men who've come from all over to build on the plains. "The pay's all right—$9.32 an hour," said an electrician from North Carolina. He lived with 180 other single men in a barracks of sheet metal that adjoins a trailer court known as "Hobo Village." "I like to travel," he said, "though it broke up my marriage."

I spent an evening in the B & R Bar, one of two throbbing night spots. A welder who was playing poker explained that he had come to Colstrip from Wisconsin out of necessity: "Jobs were slow at home."

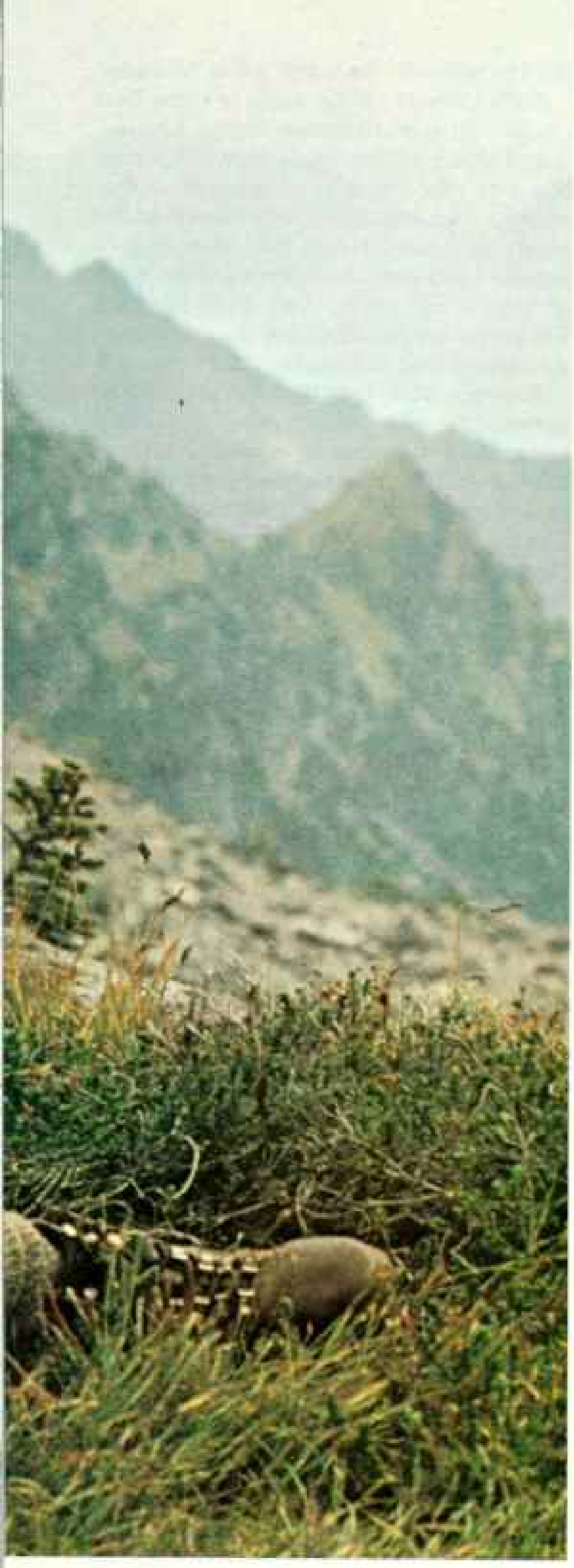
The next day Project Manager Martin White unrolled a plan of the Colstrip of the future, a town with bike paths and elaborate landscaping. "We've got to make it good to attract quality people and keep them happy," Martin said. "We've got a dragline out at the mine that takes 60 cubic yards a bite. It swings every 60 seconds. If the man who operates it is unhappy about his home and slows down a little . . . say, he swings the shovel every 66 seconds, we've lost 10 percent of our earth-moving potential."

Energy companies were snapping up coal

New trails across a timeless land, ski runs of Big Sky resort carve Lone Mountain near Bozeman. Conceived by the late newscaster and native son Chet Huntley, the 10,800-acre development offers hotel and hostel accommodations, a convention center and shopping mall, condominiums and homesites. Some Montanans view any development with sadness. In the words of Bozeman poet Jason Bolles: "Where the bear lurches, where the brown deer stamps, Mankind has hung the wilderness with lamps."



Watching the watcher, a mountain goat checks up on wildlife biologist Douglas Chadwick. The scientist notes the animal's lame leg—the result of a spill on cliffs of Glacier



National Park. In winter, winds expose patches of lichens and mosses, the goats' survival fare.

leases in Montana and other Western States well before the oil crisis of 1973. "A lot of oil companies were looking for ways to diversify in the sixties," said a man who has followed developments. "At the same time utilities were becoming disenchanted with nuclear energy." Coal producers were attracted by the vast blocks that could be leased. And the coal was easy to get at: Strip away 50 feet or so of overburden and you were looking at a black seam 10 to 50 feet thick. The U. S. Clean Air Act of 1970 spurred intense interest; Western coal is generally low in sulfur—though also low in heat output.

Scores of companies and speculators have now tied up more than a million acres of coal or surface over coal. Thirteen companies meanwhile obtained from the U. S. Bureau of Reclamation options on half the water behind Yellowtail Dam, not far from coal deposits. The water almost certainly would be used for steam power plants or for plants using coal to make natural gas or liquid fuel.

Boom Exceeds Official Estimates

Many ranchers did not realize the dimensions of the boom until late in the game, in the opinion of Dr. Raymond Gold, a University of Montana sociologist who has spent much time in the coal area. "Information was withheld that was necessary for them to understand what was likely to happen. I guess industries always play their cards close to their vests. Government agencies didn't let the people know a lot, either—maybe because they didn't know themselves."

By one estimate, 64 million tons of Montana coal will be mined in 1980, about three times as much as last year. Looking further ahead, no one really knows how much coal the nation will need, whether it can be obtained elsewhere, or whether other energy sources can be developed. One Washington official suggested to me that if gasification plants are built, all Montana's easily recoverable coal might be mined in 30 to 40 years. Like many claims and calculations in this troubled region, the suggestion is disputed.

Also at issue, in spite of stiff laws and much research, is the question of whether strip-mined land can be restored to its previous productivity. Early results seem encouraging, a researcher noted, but it will be years before there is a definitive answer.

Many ranchers are fighting at a disadvantage; they do not own the coal beneath their land. Montana's major coal-lord—with 222 billion tons—is the Federal Government through the Bureau of Land Management (BLM). Under the homestead act of 1916, the government retained rights to coal deposits. Another major owner, the Burlington Northern Railroad, heir to vast tracts granted by Congress to a predecessor, the Northern Pacific, also usually retained mineral rights when it sold land.

Whether a coal firm may mine through someone else's surface is an issue that has concerned lawmakers—and may concern the courts. To avoid problems, companies try to buy or lease the surface. To some ranchers, the lease option payments—$3 an acre and up—looked like easy money, Dr. Gold said, and many thought that mining would never take place.

Refrigerators or Wide-open Vistas?

A few miles from Colstrip I went to see Wallace McRae, an outspoken opponent of coal development through the Northern Plains Resource Council, a group of ranchers and farmers. "Friends and neighbors, that's what made this country great," Wally said. "You can't imagine the tremendous pressure the companies bring when they try to break the community, try to get somebody to lease. You think, what the hell, I can run my outfit. I don't care what the neighbors do. But it isn't that way." He no longer feels welcome in Colstrip, where he went to high school.

BLM officials came to see him and discussed the possible mining of coal beneath his ranch, Wally told me. "They said it was accessible—there's a railroad near. I told them, 'You know, I don't think you've properly assessed accessibility. This is probably the most inaccessible coal area on earth.' "

Leasing of federal coal, suspended while BLM prepared planning documents and environmental analyses, is expected to resume in 1977 or 1978. "That federal coal belongs to all U. S. citizens," a BLM official in Washington reminded me. "And the fact is, the country needs it. Are people in Chicago going to shut down their refrigerators so people in Montana can have uninterrupted vistas? What is *that* going to cost the nation? We'll do the best we can to minimize the impacts, but the trade-offs have still got to be made."

From Colstrip I drove south to Lame Deer on the Northern Cheyenne Indian Reservation. The wind filled the air with orange dust, and I had the sensation of being in another country. Wrinkled faces with shawls pulled about them appeared in the swirls, only to vanish. I glimpsed small houses, a few made of logs, a few stores. The 2,900 Northern Cheyennes are poor. But they are sitting upon a fortune in coal, perhaps five billion tons of it.

Between 1966 and 1971 the tribe signed agreements with six companies, possibly committing a quarter of a million acres to mining—half the reservation. Allen Rowland, chairman of the Tribal Council, and Jim Canan, supervisor of the Billings office of the Bureau of Indian Affairs (BIA), the Indians' trustee, differ in their accounts of why such a large slice of the reservation was let out. At any rate, many Cheyennes subsequently had second thoughts when two companies began to talk of gasification plants, and some wondered if the royalty they were promised—17½ cents a ton—was fair. The tribe petitioned the Secretary of the Interior to void the agreements, alleging violations by the BIA. The leases are now in abeyance, and the tribe is deciding what it wants to do.

Mining Will Be on Cheyennes' Terms

Hector Knowshisgun, Jr., feels that the Tribal Council needs more information. "People don't want to lose the reservation. It's their home," he said. "Their ancestors are buried all over the reservation. We've got to know how much of our heritage is going to go down the drain, what would happen with a large influx of non-Indians." The tribe has hired experts to help provide the answers.

"I think the coal will be mined," council chairman Rowland told me. He added emphatically: "But on our terms, nobody else's."

South of the Cheyenne reservation is an area where BLM has proposed the mining of 285,000 acres. I asked ranchers there how they felt. One wife told me her husband had given an option to a company, but she hoped mining would never begin. One rancher was holding out for a better price. A widow had refused even to allow prospectors to drill on her land. Still another rancher felt that the mining of a small area might not be bad, but that railroads, power lines, gasification

plants, and many new people would devastate the country.

Near the Tongue River, Mark Nance pointed to what he hopes will be the site of the next strip mine in Montana. Not only is some of the surface his, but some of the coal also. His family might realize 10 to 20 million dollars from a mine, he said. How could he refuse?

Can Ranchers Live Beside Mines?

Burton Brewster, who is 73 years old, has leased. "I believe we can mine and run cattle at the same time," he said. "And the money is something that is hard to ignore. I'm not sure government should ignore it either. The county and the state could do a lot with the taxes."

He intends to stay in his large white house while mining goes on. "And I think my grandchildren will stay. Coal money can make this a better place for them than I've known."

I dropped in on Ellen Emerson Cotton, who has straight gray hair and a face grooved by time. "This land is valuable for agriculture," she said. "There's a food shortage. Maybe we shouldn't feed so much grain to cattle. We could feed them longer on grass. Then there's just the plain beauty of the country. By gosh, there has to be someplace, somewhere, that's left alone for peace and quiet."

Ellen Emerson Cotton understands the need for coal. "But I don't think it's right for them to grab so much. There are millions of acres of coal leased in the West. They haven't got the right to ask for more until they've used up what they've got. Then, if they need more, I can't believe that everybody wouldn't be perfectly willing."

She served me homemade bread and coffee and we talked awhile of her great-grandfather. It seemed appropriate in the besieged Montana plains to have a conversation about

"A wheel and a bar and a glare and a blare"—thus poet Jason Bolles described a saloon during Prohibition, an era that passed virtually unnoticed in Montana. Saloons and dance halls sprang up wherever cowboys on cattle drives came to rest; whiskey was a "brave-maker," and Sunday the main business day. Now poker players place their bets seven days a week here at a restaurant in the town of Red Lodge.

Ralph Waldo Emerson, friend of Thoreau.

It is too late to build a fence around Montana. The forces of change are inside. They came with the Seventh Cavalry, with the gold seekers, with the fur trappers.

"We're not talking about building a fence," remarked Lieutenant Governor Bill Christiansen, who is also chairman of the state government's Energy Advisory Council. "We're talking about sane resource development.

"Montana has never ignored its responsibility to the nation and it isn't going to now," he said. But if the development is massive and unplanned, he sees dangers: a boom-and-bust cycle, damage to a way of life, to the environment, to agriculture—this last at a time when grain and livestock, like coal, are increasingly important.

Time Enough for Right Decisions

The pressures on Montana are national pressures, as the pressures on the Indians were. But Mr. Christiansen insists that Montanans themselves must make the decisions.

There is still time, I think, for those decisions to be made rationally; time, surely, for husbanding the grandest treasure of the Treasure State; time, *this time*, to consider the people on the land.

In southwestern Montana, miles from pavement, I camped beneath a scowling brow of a bluff at the Red Rock Lakes National Wildlife Refuge. Across the lakes, several miles away, a storm broke in the evening. Lightning crashed down on the Gravelly Range. Strings of rain hung over the rounded summits. Then the sun appeared in a slit in the clouds. It shot light into the rainstorm and the strings began to glow, orange and pink and purple, while the lightning continued to stab the land.

It was a sight at once magnificent and terrifying. But when dark came, the sky was full of stars. There is still time in Montana; even amid the storms, there is time. □

A man is an island when he is 70 years old and speaks no English. Robert Red Woman, grandson of Cheyenne warriors, grew up on a reservation when no education was offered. Now he urges his own grandchildren to complete high school and seek the opportunities that he missed.

Growing Up in Montana

A PICTURE ESSAY BY NICHOLAS DEVORE III

MONTANA may be going the way of high-technology mining and agribusiness, but at a ranch up against the Highwood Mountains, Frank Urick and his family are going the other way. "We're switching from propane to wood;

the wood will always be here," says Frank. The woodpile teaches a plain lesson. "It's a matter of survival; that's no lie. And the kids got on to that real quick."

*For the seven Urick children, fun and chores and livelihood are all saddled up to the care of animals. At 15, Francie, frisking with a colt (**left**), to the amusement of "Gramma" Urick, has already caught rodeo fever. Pat, at 18 (**right**), has the experience, the slouch—and the snuff—of an old hand.*

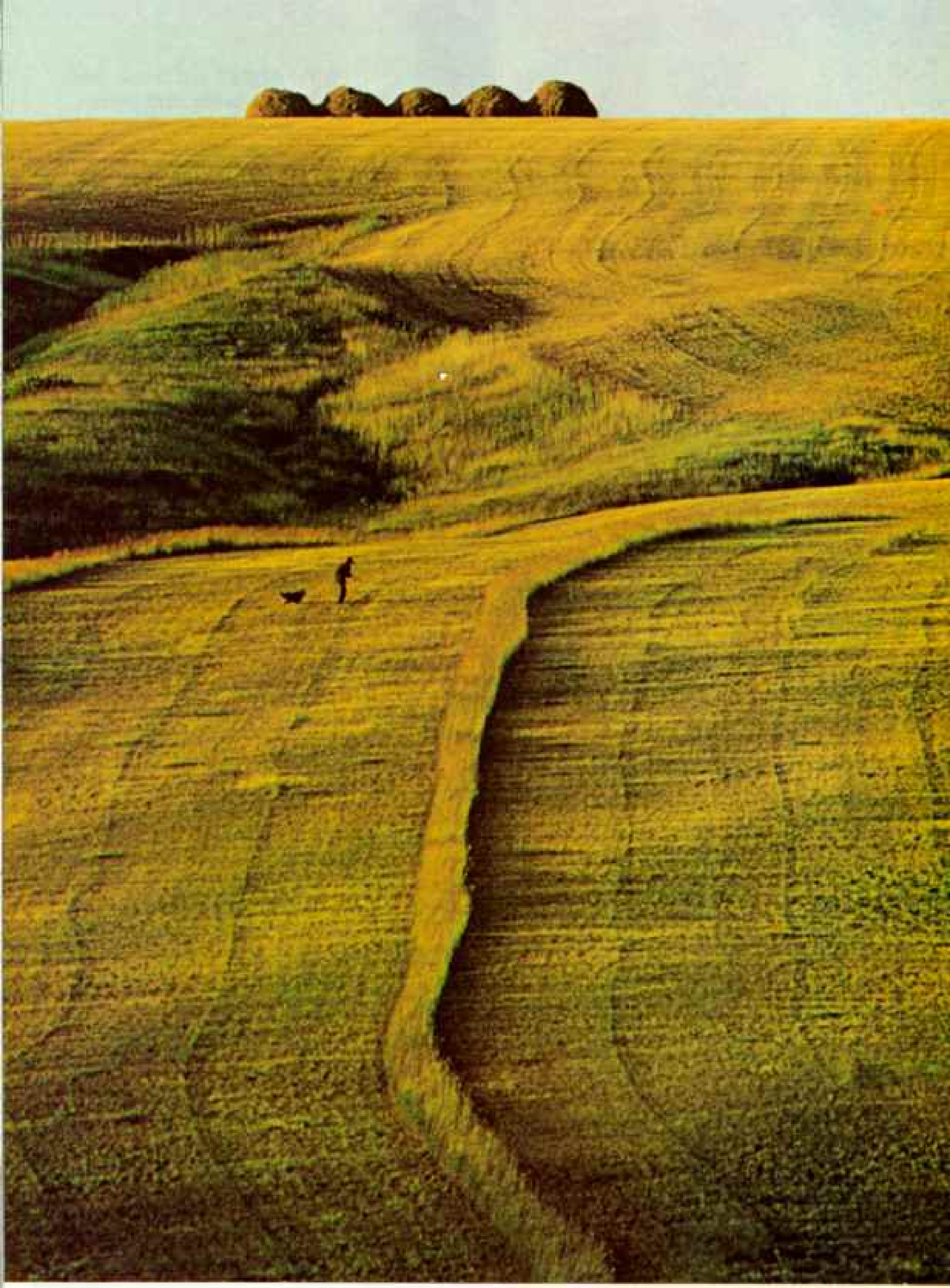
*DRIVING some strays back to the herd, Frank Urick keeps an eye on the fencing while son Pat carries a wire stretcher for repairs (**above**). They constantly scout for broken wire, pulled staples, and downed posts, "the details that keep your cattle at home and your neighbors' out." The Uricks raise 50 head of Herefords and Hereford-Angus crosses on 500 acres, hardly a ranch by Montana standards. Wife Vivian and son Dave have been working part time off the ranch to help with income, since raising calves has cost more lately than selling them brings in.*

*Chores like cultivating potatoes (**facing page**) never seem to end, but Frank and daughter Francie take time to glance at the day's paper (**right**) after tending the cattle, hogs, horses, and garden.*

It's a life apart but not alone. When their barn burned, Frank set out lumber and home-brewed beer, and neighbors pitched in. Two weeks later the Uricks

had a new barn. Since then they have hosted barn dances; with hoops for basketball put in, the loft became a community gym. Frank says, "I haven't been able to use it for hay yet, but I think it's a good investment." Not much cash flows in or out of the ranch, just good friends and good times.

WAVES OF HAY STUBBLE, with bands left unmown to serve as snow fences,



roll to a haystack horizon past Dave Urick, hunting with Major, the family dog.

*NO BUSES call to take Matt Urick to the sixth grade. He mounts one of his ponies, rides to a newly reopened rural school, shuts the gate behind him (**left**), and joins teacher Vickie Johnson and the entire student body of five (**below**). While Matt does his lessons, his faithful mount just grazes and waits, placid even in early-autumn sleet (**right**).*

Frank Urick does not believe in "people educating their kids off the farm as fast as they can." As he sees it: "We've become such a push-button civilization, the kids don't learn anything unless it's in school. But I have a situation where I can give them quite a schooling right here on this ranch."

He hopes his children can stay on the land, mastering trades like horsebreaking. The basic rule there is to be "firm but kind"—not a bad way to raise a family either. □

LIFE ASHORE BECKONS THE BAJAUS

Sea Gypsies of the Philippines

By ANNE DE HENNING SINGH

Photographs by RAGHUBIR SINGH

THESE ARE TROUBLED WATERS, the emerald-green seas off the Sulu Archipelago, the southernmost islands of the Philippines. Long the haunt of fierce pirates, they are also plied by smugglers who run guns from Borneo to Moslem rebels fighting the Philippine Government.

It is not a comfortable feeling to be on these waters at night, but my husband, Raghubir, and I have come to visit the fabled Sea Gypsies, the Bajaus of the Philippines, and these are the waters they fish.

We lie dozing on a 25-foot *lipa* (right), three hours out of Sitankai. The Bajau fishermen have set their line, its foot-long hooks baited with stingray, in a deep channel nearby.

Now, at our mooring in the shallows, we hear the distant sputter of an engine. Itom, our Bajau boatman, jumps to his feet and calls softly to his friends in another lipa:

"Enang . . . Dikma . . . Tahmo—*pamboat!*" With this, everyone awakens, including Mahmud, a young policeman, our bodyguard. He crawls from his mat with a rifle and braces himself, his finger on the trigger.

There is reason for fear. The pamboat, a speedy motorized outrigger, is the pirates' favored craft. Everyone recognizes its ominous pitter-patter sound. We watch as its flickering light draws closer and closer—then passes only thirty yards away.

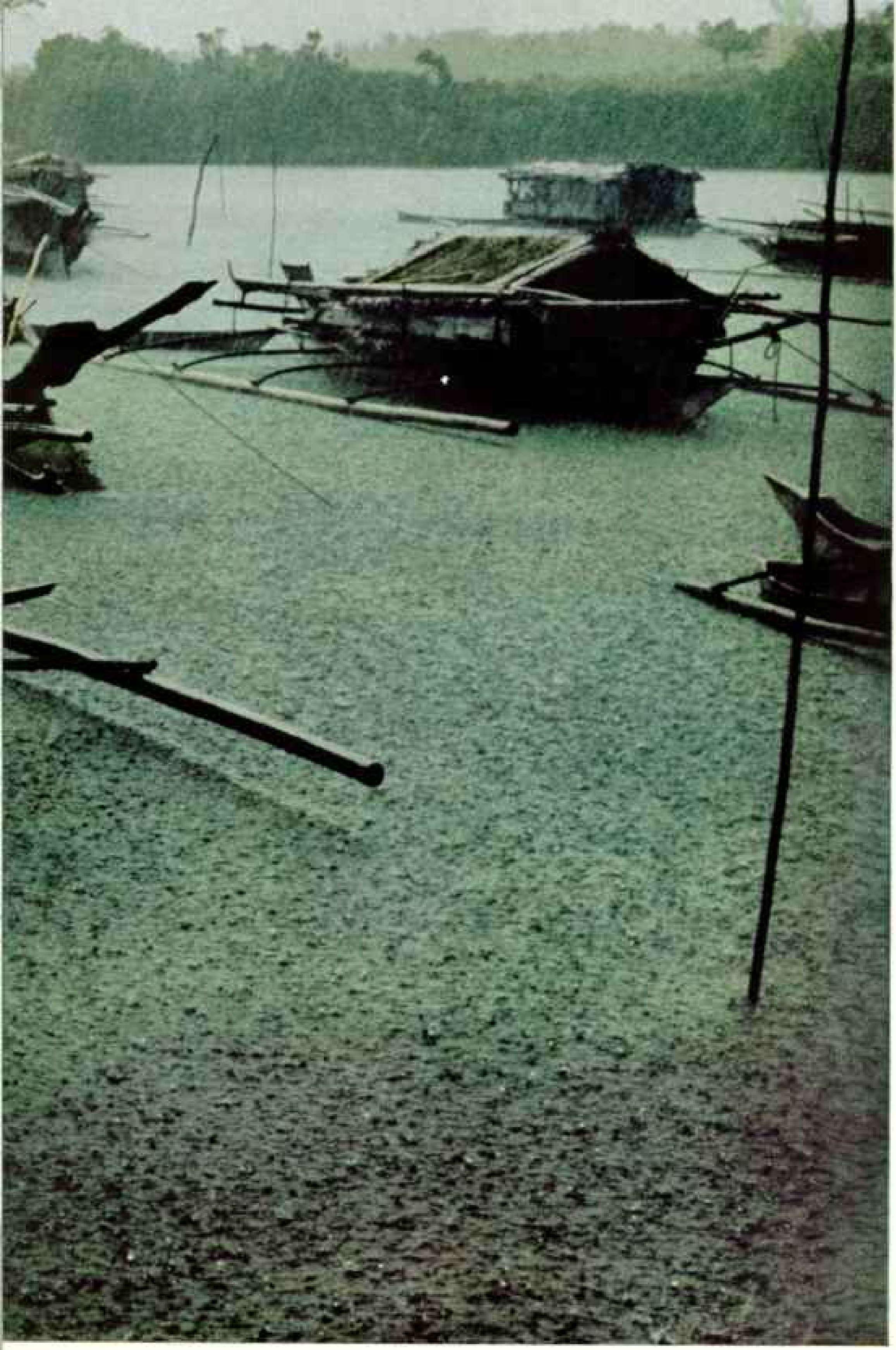
Itom trembles with fear. Enang cups a hand to his ear and listens to another, more distant sound: *"Kumpit!"* A kumpit is a passenger and cargo launch, and is also used by smugglers among the islands.

"Pirates after smugglers," says Mahmud, breaking into a grin. "There will be action tonight, but not for us."

At dawn we haul in the fishing lines and sail back to Sitankai. We have caught only a few small sharks, yet we are content. If many great sharks have escaped our hooks, at least we have escaped the hooks of the pirates.

Home is where the helm is for a Bajau woman (**left**), her face stylishly whitened with rice powder. As these boat dwellers have for centuries, a family sets out on a fishing voyage in the southern Philippines (**right**). Scattered over thousands of square miles, from the Sulu Sea to eastern Indonesia, some of today's 35,000 Bajaus follow the nomadic life of their ancestors, while others settle at the water's edge.

Wading through monsoon-splattered waters, a young woman heads for her outrigger houseboat at Tungkalang, a traditional Bajau moorage in the Philippines'



Sulu Archipelago. From such waterborne communities, Sea Gypsies roam the ocean to fish and sell their catch, raising families on their small, all-purpose vessels.

Primed for pirates, a policeman named Mahmud guards the author and photographer and their gentle Bajau friends during a fishing expedition.

Aboard their *lipa*, a typical Bajau fishing vessel (**right**), a family dries its haul of sharks and stingrays. Often they are meagerly rewarded; two hundred pounds of dry fish, requiring many days of labor, bring in the equivalent of only about 30 U. S. dollars.

But the Bajaus are not always so lucky, for they are gentle people who go unarmed, and thus are easy prey for pirates. At sea they yield their catch and whatever valuables they have; and, for fear of reprisal, will rarely testify against those who have taken them.

The Sea Gypsies of the Philippines number only 20,000, a minority among their land-dwelling Moslem neighbors, the Tausugs and Samals. For centuries, while the tides of history have swirled around them, they have kept to their boats and their nomadic way, living on the edges of stronger societies, trying to avoid involvement in conflicts.

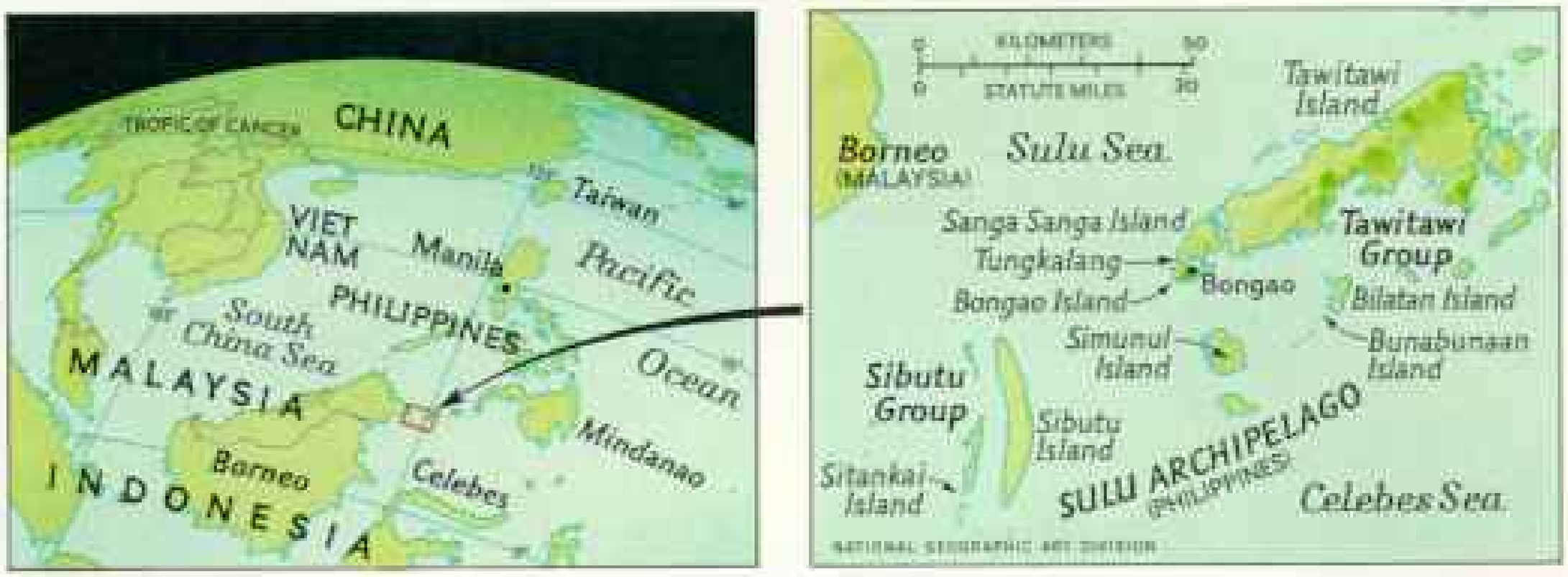
Outsiders have come—Spaniards, Americans, Japanese—and while their neighbors

have resisted, the Bajaus have kept to themselves. And now that fighting between the Moslem insurgents, Tausugs and Samals among them, and troops of the Philippine Government has spread from Mindanao to the Sulu Archipelago, the Bajaus can only watch the approach of war and hope that once again they can avoid disaster.

Pigafetta, the chronicler of Magellan's voyage around the world, was the first Westerner to record seeing the Bajaus. In 1521 he noted a people who "always live in their vessels and have no houses on shore."

Today in the Philippines people still speak admiringly of the Bajaus' sailing skills: of how, by observing the wind and the water, they can forecast a storm; of how, by simply dipping a finger in the sea, they can tell how long it will take to reach a destination; and of how they give names to specific locations in the sea, just as landsmen name a mountain or pass. Thus, in their small lipas, they range as far as Borneo and Celebes.

Fishing with the Bajaus of Sitankai, we could see that they had lost nothing of their way with the sea, but other things had changed. Here the Bajaus have moved ashore —or almost. Their houses are built on stilts above the water. And whereas they have traditionally been animists, perceiving spirits everywhere—in the sea, the sky, on land—many are now converts to Islam.


CHINA
Taiwan
VIET NAM
Manila
Pacific
PHILIPPINES
South China Sea
MALAYSIA
Ocean
Mindanao
Borneo
Celebes
INDONESIA
KILOMETERS
STATUTE MILES
Tawitawi Island
Borneo (MALAYSIA)
Sulu Sea
Sanga Sanga Island
Tungkalang
Bongao Island
Bongao
Tawitawi Group
Bilatan Island
Simunul Island
Bunabunaan Island
Sibutu Group
Sibutu Island
Sitankai Island
SULU ARCHIPELAGO (PHILIPPINES)
Celebes Sea

Venice gone to sea, the island village of Sitankai (**below**) nestles like a tiny raft between Mindanao and Borneo (**maps, left**). Of the settlement's 4,000 residents, perhaps a third are Bajaus. Like their neighbors, the Samals and the Tausugs, they live in houses built on stilts in the shallows. Long discriminated against as pagans, many of the Sulu Archipelago's 20,000 Bajaus have now adopted Islam and settled in Sitankai and other villages. Here, fish buyers have established markets for Bajau catches, usually taken from nearby reefs. Farther north, in the Tawitawi islands, several hundred Bajaus and their families still roam the tides and hold to traditional beliefs in a life little changed since Magellan's fleet encountered their ancestors in 1521.

When we are invited to a wedding in Sitankai, it is not a Bajau ceremony. The groom wears an Arab headpiece from Mecca, and the bride wears a Western-style white gown.

The majority of the Bajaus, we learn, have given up many of their customs, hoping to better their lives through integrating with their neighbors. But it is not an easy journey. Often I hear Bajaus contemptuously referred to as *luwa'an*, or "spit-outs."

Old Ways Reflect Both Beauty and Poverty

We want to press deeper into the archipelago to find a moorage where the old ways continue. "Go to Tungkalang, in the Tawitawi islands," we are told. And so we board a kumpit for the eight-hour voyage north.

We debark at Bongao, a sleepy little town, and next morning set out by launch for the 20-minute ride to Tungkalang. With us is Mrs. Ramona Elejorde, a Filipina who goes to the moorage each school day to teach the children.

The moorage, situated between a reef and an island, holds both beauty and signs of poverty. The scene is dominated by a lush green mountain the Bajaus regard as enchanted. But the 50 lipas and outriggers and 30 stilt houses are fortified with plastic sheets, cardboard, and pieces of metal. Men and women go about their chores, poling small dugouts or wading knee-deep through the shallows.

We step onto the narrow reef, which supports only two wooden schoolhouses. Naked children surround us—few Bajaus wear clothes before age 10 or so. Their hair is bleached by the sun and salt water. "*Milikan, Milikan,*" they shout, meaning "American." To them, all Westerners are Milikan.

"There are two rooms and a kitchen in this schoolhouse," Mrs. Elejorde says. "You are welcome to use them." She pumps rainwater out of a reservoir, heats it on a spirit stove for coffee, and tells us about Tungkalang.

"Until 1961 there were only three huts at the moorage. Almost everyone lived on their boats, so they could get away fast when trouble came. The school, founded by an Oblate priest, gave the Bajaus an added sense of security. They began to build more houses. But most use them for storage and live there only when the family lipa is overcrowded."

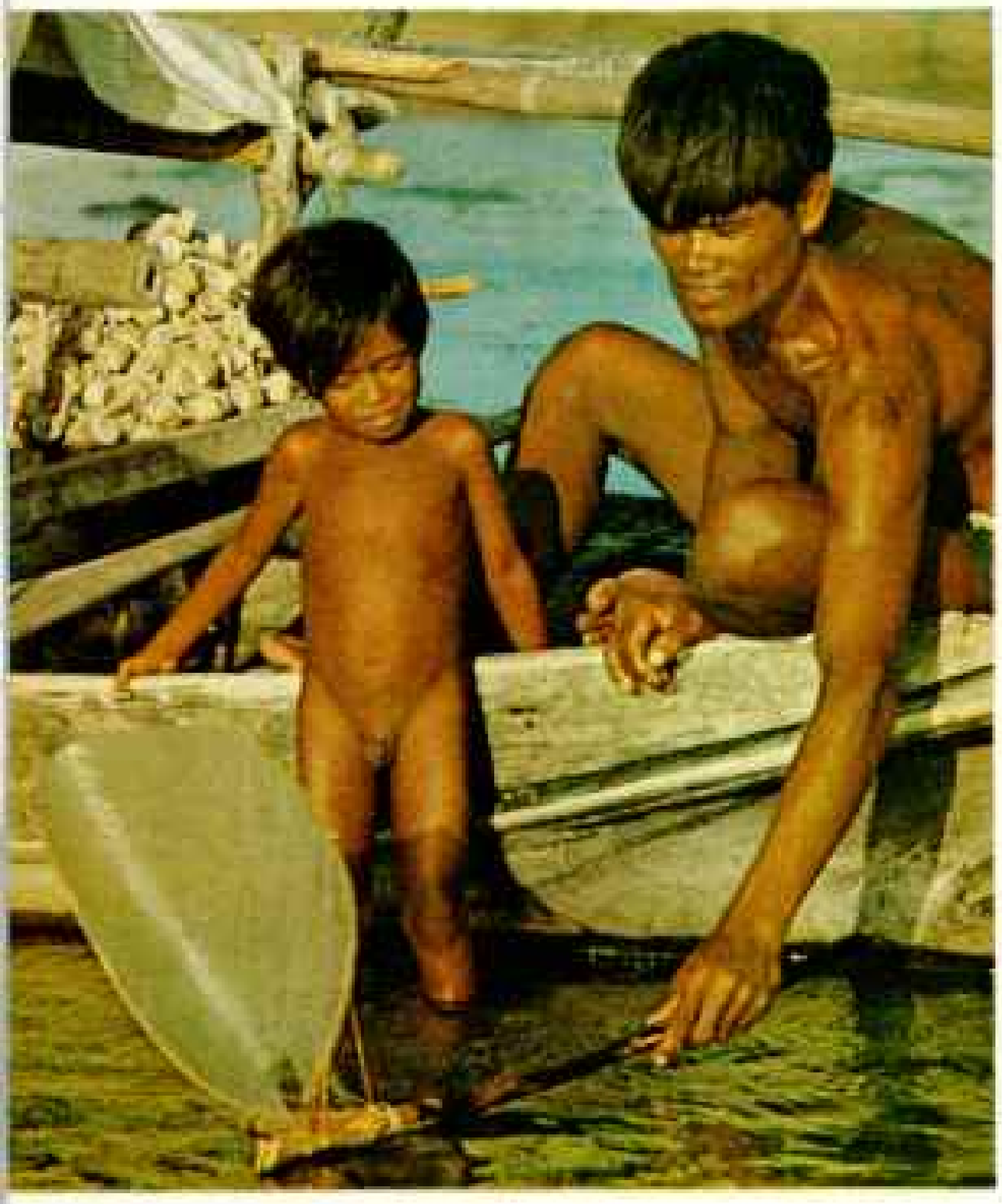
The school has 30 students, ranging in age from 7 to 16. "No Bajau knows his age," Mrs. Elejorde says. "I can only guess."

Many of the children, she said, bear names like Landing, Customs, and Ignorante. "The parents call them after familiar objects and sights. One little girl is called Tapurcita, after a launch that passes here."

A loud din—from a frying pan beaten with a stick—ends our conversation. It is time for school. The children line up and sing the Philippine anthem and their school song in Pilipino, the national language.

Raghubir and I meet Helen, a young Bajau who will be our guide. She has learned English and studied in Manila. Homesick, she returned after two years.

She tells us we are lucky, for there will be a wedding soon. "Maybe tomorrow, maybe



As their lives change course, father and son sail a toy lipa off their houseboat moored in Sitankai (**left**). On another (**right**), supper simmers astern as a woman prepares fish and cassava. Both these Bajau families are in transition, still living in their vessels on the fringe of the main community. Later, as many Bajaus already have done, they may move into houses.

the day after." It depends on the presence of a full moon, which is auspicious for weddings and also provides light for the dance held the night before.

That afternoon, as Raghubir and I settle into our temporary home, we hear the rhythmic beating of gongs. We wade through the rising tide until we find the source, a crowded lipa. The gongs are beaten energetically by young women.

Helen tells us the music is for a sick man, so that he may dance. I look but see no sick man, only a woman with swollen eyes, a little boy, and behind them a large shapeless object enveloped in a green cloth.

"Where is the man?" I ask.

"There, under the cloth."

The cloth is animated by a tremor. The man's head emerges as he struggles to a sitting position. His eyes shine with fever. Suddenly, with a loud shriek, he jumps up and leaps from one boat to another. Dressed in green and white, the colors of the spirits, he flings his arms in the air and tramples the deck furiously (following pages). The gongs go wild.

Now a second man, dressed like the first, leaps from another lipa, joins in the same convulsions, and utters an incomprehensible stream of words—the language of the spirits.

The onlookers laugh and throw talcum powder on them. In two minutes the men collapse. They writhe and moan while a friend whispers into their ears an *anting-anting*, a charm, that is meant to revive them. They open their eyes, look at each other, kiss, shake hands, and are helped to their feet. They then return to their lipas.

The gongs fall silent, the crowd disperses.

Medicine for Good Measure

I am confused by it all, and question the wife of the sick man. "My husband has wronged his friend N'nap," she explains. "The spirits were angered, they sent him illness. Now that N'nap has shaken hands with my husband and the spirits have forgiven him, maybe he will recover."

But she is not fully convinced herself and asks for medicine.

Later I ask Mrs. Elejorde if the Bajaus often seek medical help from her. "If I have the right medicine, I give it to them. They can also receive medical care from the sisters at the mission hospital in Bongao, but few go. They are afraid to mix with town people. Sometimes the priests give me vitamins

Trance dance to cure an illness sets a lively stage aboard a houseboat in an enclave of the traditional Bajaus. Labarani (**above, left**), shivering with malaria, has offended a friend, N'nap, and believes the spirits are punishing him. To call them, both men must dance so Labarani can be forgiven and cured.

Waving symbolic cloths, N'nap prances furiously (**above**), as onlookers grin during the tension-relieving performance. Both dancers finally collapse, writhing and moaning after the exorcism (**left**). Perhaps unsure of the magic's potency, Labarani's wife later asked for medicine from the author.

and I distribute them. But now I have none."

With darkness a mournful chant drifts over the moorage. On one of the lipas a young woman holds her child and sings a lullaby. It is a beautiful song, and I find myself standing by her lipa long after she has finished. I hadn't heard such singing in Sitankai.

Singing Expresses Many Emotions

"Here," says Mrs. Elejorde, "the Bajaus sing all the time. There are songs for everyone and for every occasion. Children sing songs called *lia-lia* to release their anger. Their words can be very harsh, but a child is never punished for what he sings. There are courtship songs and ballads, *tenes-tenes*. And there are lullabies, such as you heard, which express a mother's hope for her young child." She translates one for us:

"Sleep my child, sleep, for your mother is tired;
When you leave me, the rain will be strong,
I will look at the sea with so many sails floating,
But I already know that you will return,
That you are strong and your boat will not sink."

Life in the moorage goes late into the night. Men ground their lipas and use burning coconut fronds to sear off salt and seaweed. Faces slip in and out of the glow. When the boats are afloat again, cooking fires aboard them flicker on in the darkness.

Activity resumes before dawn. Men move in dugouts to visit their friends, share an early meal, and prepare the fishing boats. Later they paddle out to the white surf, unfurl their patchwork sails, and, borne by a brisk wind, disappear on the horizon, melting into the sky like a covey of tropical birds.

One morning Helen alights from her dugout to tell us a baby was born three hours ago. We wade to the family hut, climb the notched log that leads to a bamboo platform, and bend our heads to enter the small, dark room. The young mother lies exhausted, her infant boy beside her (above right). Malajirin, the father, squats at his wife's side with their little girl in the crook of his arm.

He tells us he is happy to have a boy, but contrary to Bajau tradition he is not hoping for a large family. "He will go to school and

I'll make him a fisherman, like me. But I wish he was our last child. We are so poor!"

Helen says the birth ritual has already taken place. "The placenta is collected in a coconut shell, and a man takes it to the shore to bury it. He is called several times, but he must not look back. If he does, it is believed that the baby will turn his head over his shoulder all his life."

I ask when the child will receive a name. "When his umbilical cord falls," answers Helen. "Later, he will be circumcised." If the child had been a girl, her ears would have been pierced.

Death, too, has its rituals. The body is washed, dressed, *(Continued on page 674)*

Another mouth to feed draws a worried stare from Malajirin as his wife, Suklasawa, cradles their newborn son. The fisherman holds their daughter, and Suklasawa is comforted by her mother. Most Bajaus can only hope for prosperity in another life. On the grave of a fisherman (**left**) a yard-long model of an inter-island launch symbolizes his spirit's departure for better fishing grounds.

Hands and hearts attend to rigorous detail in an old-fashioned wedding in the Tawitawi islands. Ritual baths of seawater (**below**) cleanse the groom, Ummalani, and the bride, Ismaraissa. In the ceremony's climax (**right**) the girl's father, Sarani, unites the couple by touching Ummalani's finger to the top of his daughter's head. Her carefully shaped eyebrows and charcoal facial patterns drawn over chalk are traditional—and essential. Said Sarani, "No makeup, no wedding!"

and kept at the moorage overnight. In the morning it is taken to one of two burial islands, Bunabunaan or nearby Bilatan Poon.

A man is buried with his betel box, and a carving is placed over his grave. Sometimes the carving represents a stylized human figure, but more often a brightly painted motor launch, coveted by all in their lifetimes, for use in the afterlife (page 671).

We learned about an even more mysterious island from American anthropologist Dr. H. Arlo Nimmo, perhaps the only Westerner to have been there. Guarded from outsiders, the island is hung with green-and-white flags. Here stand scores of anthropomorphic wooden figures called *tahu-tahu*. In each dwells an evil spirit exorcised from a sick person by a shaman. The Bajaus believe these spirits to be like land dwellers: "They do not like us, and are pleased to make us ill." Many adult Bajaus have accompanied shamans to the island, but when I ask to go there, no one will take me.

That afternoon the breeze is light, the air wholesome. The fishermen glide gently back into the moorage. We wade out to check their catch. Some fish are green, red, and yellow, like rainbows. There are also leaden but appetizing tuna.

Soon, the boisterous cries of children attract our attention. At the bottom of one boat lies a six-foot shark. Its white belly stretches to a huge curved mouth, dropped open in a last gasp. Jawarani, a fisherman, plunges his knife into the flesh to cut off its head. He and his companion, Anai-Anai, will feast on it with friends and relatives. The body and fins will be sold to the Chinese traders in Bongao. The two men might get five U.S. dollars for their efforts.

Harpoon Thrust Ends a Battle

As children crowd around, Anai-Anai tells of the shark's capture: "We left two nights ago. The wind was strong. The boat flooded, and we thought we would capsize. We didn't sleep. We bounced on the black sea all next day and night. But this morning the sea was flat. We started looking for him. We dropped a hook baited with stingray in the sea. Then we rattled in the water coconut shells tied to a pole and we sang: 'Come you *kaliton*, show us your fin that slices the water like a sharp blade. Come, we have been waiting. You are beautiful, you must be ours.' He came. When he caught the hook, Jawarani hurled the harpoon into his side. He battled furiously. Finally he surrendered."

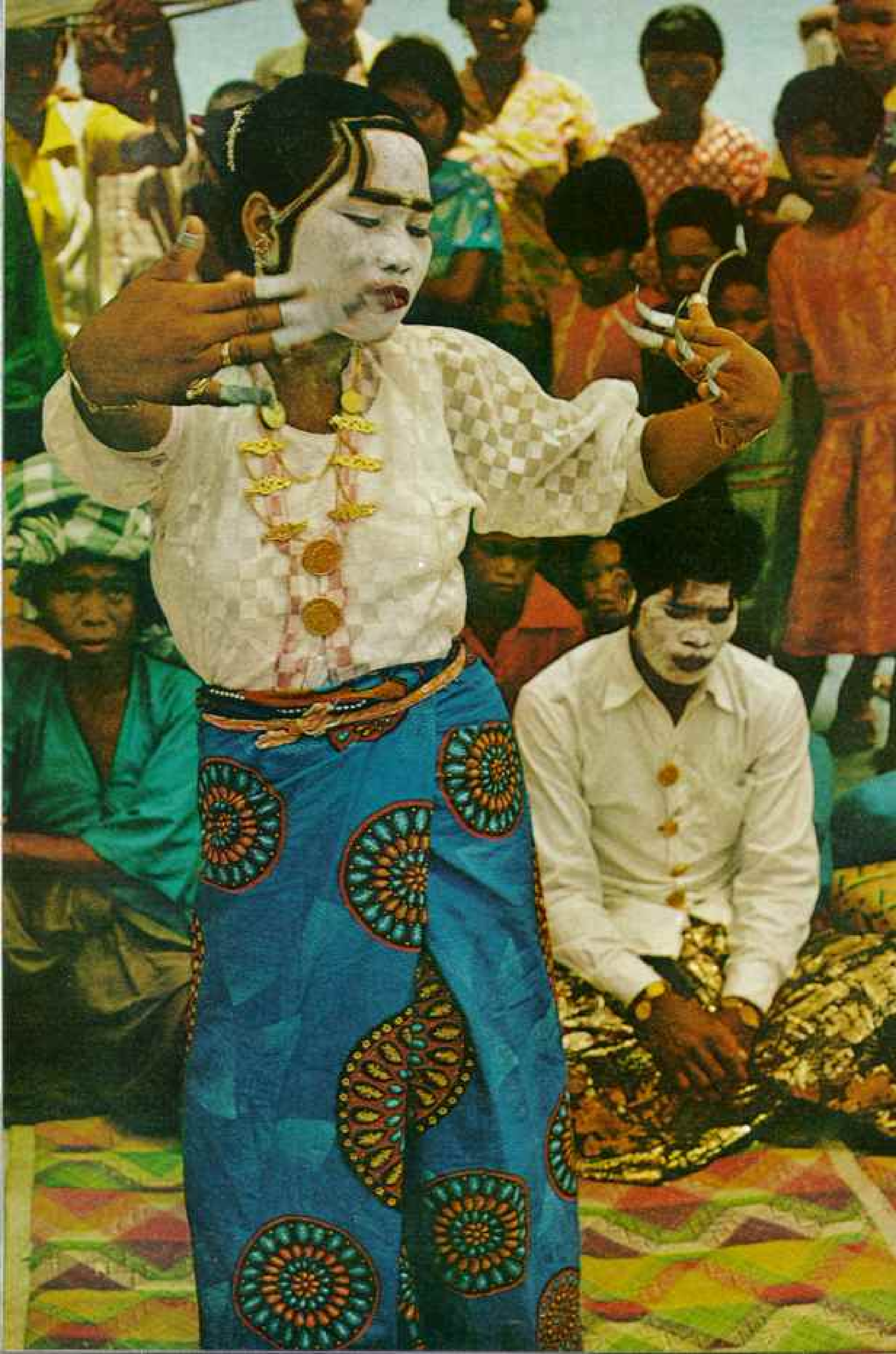
It is clear from the men's faces that they regard this as a man-to-man fight, and that they admire and respect the fallen foe.

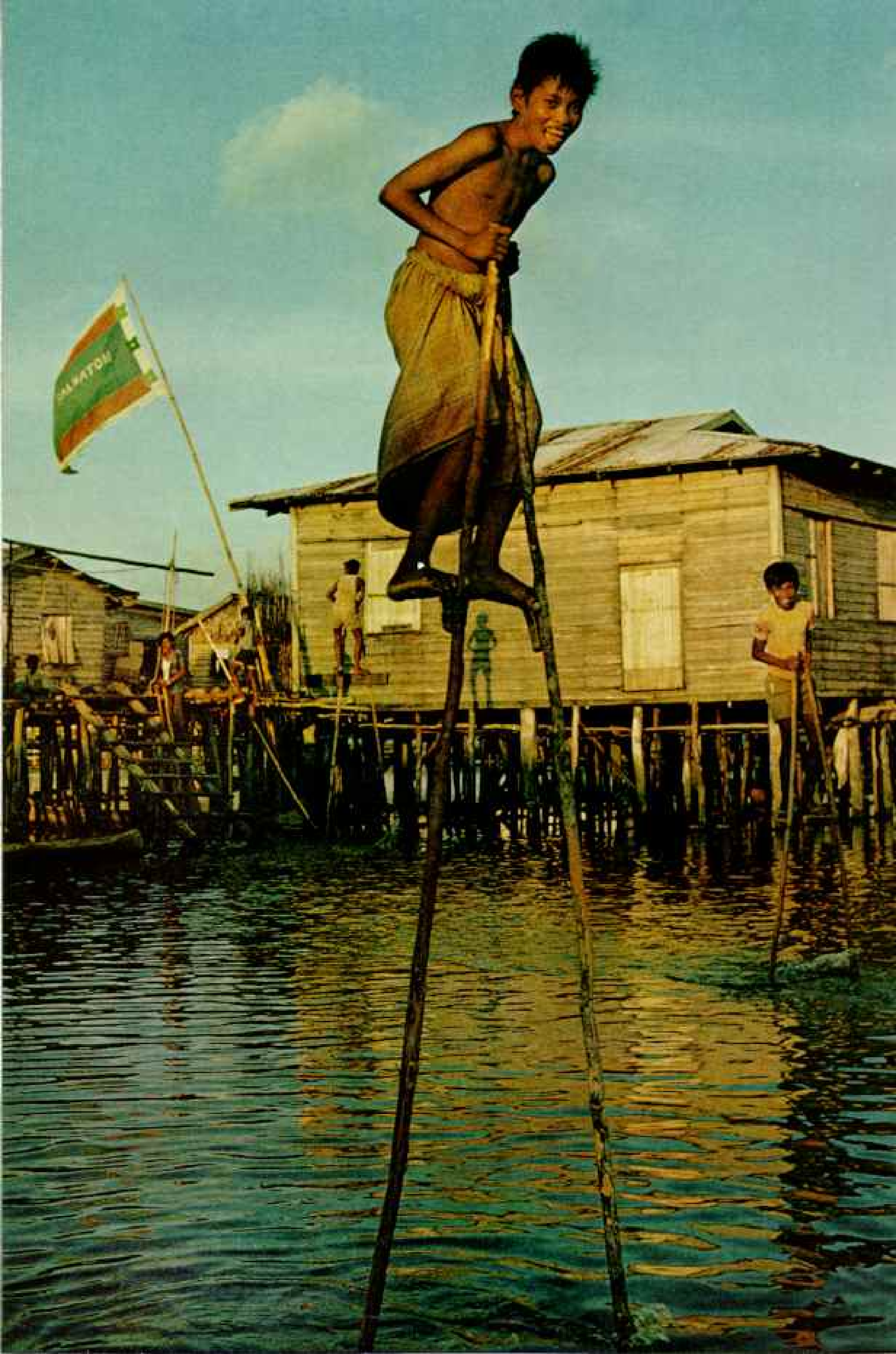
Storms are often a hazard faced by the fishermen of Tungkalang. Helen told me that once her brother and father were caught in a storm and drifted a hundred miles to Borneo. "They were gone two months and we thought they were dead," she said.

In a traditional Bajau community there is always one man to whom they turn for help in making decisions, settling disputes, and performing those rites not reserved for shamans. In Tungkalang this man is Sarani, whose daughter, Isnaraissa, is to be wed.

To his kin, Sarani is exceptional. He was in the Philippine Air Force and is the only

Masking their joy, bride and groom remain properly serious as Isnaraissa performs a solo dance after the wedding ceremony (**right**), fingernails of tin emphasizing her gestures. Strict Bajau custom forbids the couple from expressing happiness until after the day-long festivities. Memories overwhelm Murkissa, the bride's mother (**left**).





man in the moorage who speaks Pilipino. He is also the only owner of a motor launch. Dilapidated though it may be, he lives on it.

When he returns from a short trip, bringing friends and relatives from distant moorages, everyone knows the wedding is at hand. And as Sarani is a man of tradition, everyone knows the wedding will be a splendid one.

That night, in the glow of the moon, families gather on the reef for the festive pre-wedding dance. Gongs are beaten with vigor. A circle closes around women who dance gracefully in the Indonesian fashion, wearing long, curved fingernails made of tin.

Banana Battle Part of Ritual

The gongs sound until morning. At 6:30 we step onto Sarani's launch to wait for the groom, Ummalani, and his family to arrive from their moorage a few miles away.

Soon lipas with fluttering banners appear in the distance. We meet in mid-channel. Girls dance on the boats to the clang of gongs. Men bombard each other with bananas.

The bride-price is passed to Sarani: three large sacks of rice worth 13 U. S. dollars each, one sack of sugar, and $160 in cash. This is considered a large sum—Isnaraissa has had no fewer than five suitors. As part of the bride-price the groom's uncle passes over the *maligai*, a miniature bamboo hut filled with pastries, symbol of the parents' consent. It is topped with flags made of bank notes. We escort the groom's flotilla to the moorage amid a joyful cacophony.

The bride is taken to an open lipa for a ritual bath (pages 672-3), her face masked in mock sorrow; only after the festivities will she be allowed to express her happiness.

A shaman singles out a lock of her hair and blows on it three times, a charm to ensure well-being, and then pours seawater over her head. Isnaraissa winces as it trickles into her eyes. The wedding cosmetician uses a razor blade to trim her hair into bangs and shape her eyebrows into triangles. She traces a black rectangle on Isnaraissa's forehead and covers the remainder of the girl's face with chalk. Younger girls watch with envy.

About noon the bride is helped into a bright blue sarong with bold circular patterns. Her white silk shirt is adorned with gold chains and pins, some borrowed from relatives. A curtain is drawn to conceal her.

Now the groom, similarly prepared, approaches in a procession. He is carried on a friend's shoulders. They stop before the lipa.

The leader of the procession calls out on the groom's behalf: "May Ummalani be granted the honor to enter Sarani's family?" Sarani, who has a hard time remaining serious, makes him repeat the request twice more. Then he replies: "Yes, provided you promise to make my daughter happy, look after her children, and give them all a joyful life." He then bursts into laughter.

The curtain parts. Sarani takes the groom's forefinger and guides it to his daughter's head, then to her breast. And so they are married. Sarani jokes: "I've sold my first daughter—three more to go!"

Fleeting Peace, Vanishing Life

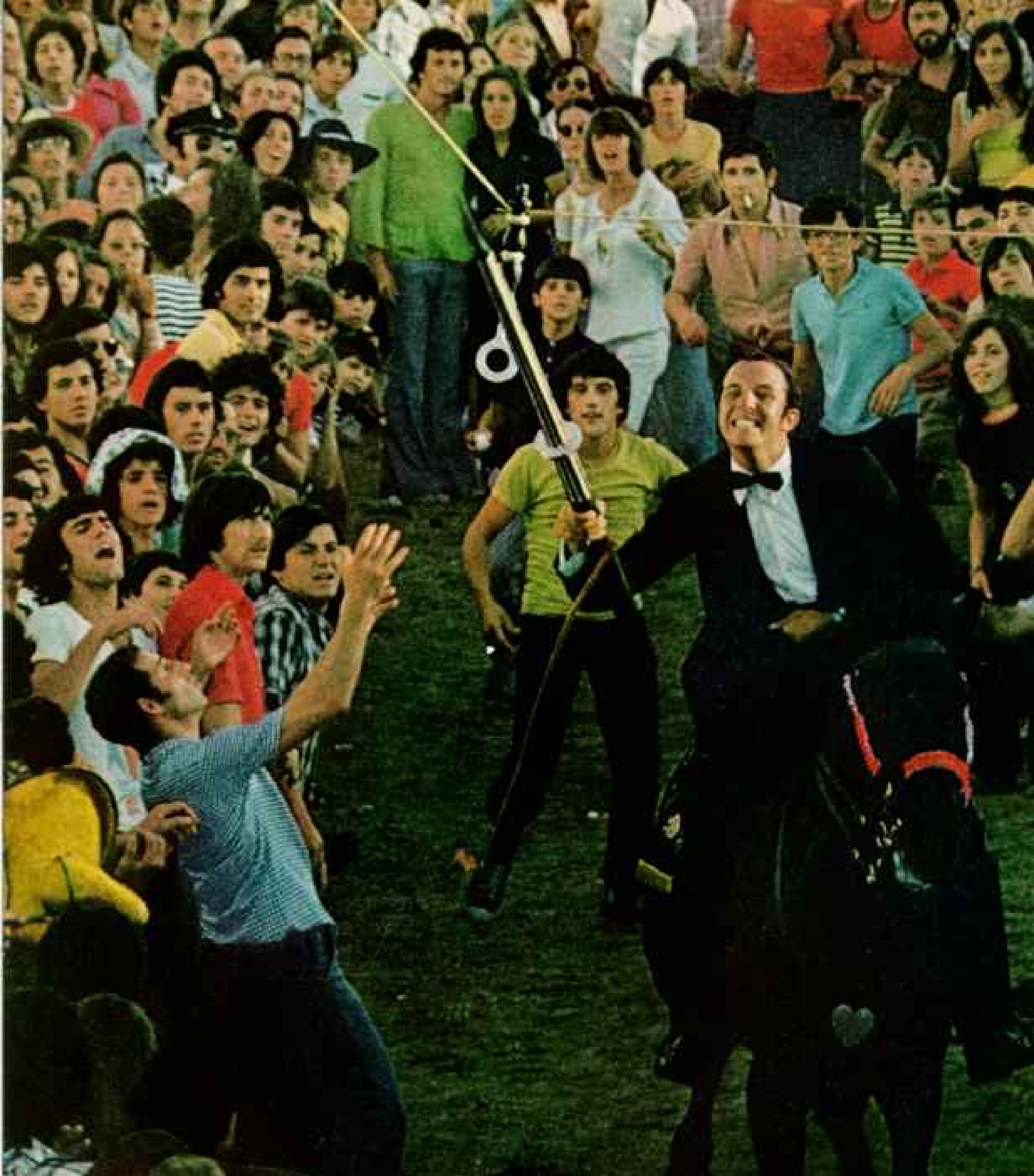
Isnaraissa and her husband leave for his parents' moorage to meet more friends and relatives. Bajaus take leave with little ceremony. Within minutes of the newlyweds' departure, Tungkalang has lapsed into its usual languid pace.

Tonight the moon is a perfect sphere. Its radiance illuminates the water. Small boys perform acrobatics on stilts. Save for the occasional distant drone of a smuggler's kumpit, a primeval peace reigns over the enchanted moorage.

But it was to be a fleeting peace. After we left Tungkalang, the fighting swept through the Tawitawi islands. The Bajaus, still gypsies, abandoned their moorage.

Not quite yet, but in time, these Bajaus will surely go the way of their kinsmen at Sitankai, trading their life on the sea for a better future. I can only hope they find the safe harbor they seek. □

Rising above the differences that have divided their peoples in the past, Bajau and Samal boys of Sitankai find that stilts can build a friendship as well as support their homes. As the Bajaus increasingly anchor their lives closer to shore, the older generation builds a more stable future for the young. For that promise they are trading their nomadic freedom on the seas, hoping to shed the stigma of the outcast.



Spain's Sun-blest Pleasure Isles

By ETHEL A. STARBIRD
NATIONAL GEOGRAPHIC STAFF

Photographs by
JAMES A. SUGAR

THE WINDING ROAD along Mallorca's northwest coast weaves its dark thread through a tapestry of terraced orchards and tiny hamlets that cling like weary seabirds to the cliffs. Olives that once oiled the local economy lie neglected by the wayside; now the pen and paintbrush are busier than the plow.

On a narrow shelf sandwiched between mountains and Mediterranean, an aging Englishman and I strolled among his flowers and fruit trees on this largest of Spain's balmy Balearic Islands.

"I suspect I've always had the metabolism of a Mallorquin. Invigorating places make me nervous. Happily, very little happens around here."

Car horns shattered the stillness, bleating in protest as two tour buses parked outside

Modern-day knight misses the ring at the Fiesta of San Juan on Menorca, second largest of the Balearic Islands. Thirteenth-century knights under Jaime I of Aragon defeated the Moors on these Mediterranean isles, bringing Spanish rule in their wake. Today the Balearics are still under siege—by holiday fun-and-sun seekers.

his gate. The guides' loudspeakers opened fire: *"C'est la maison du célèbre écrivain Robert Graves."* *"Und hier, das Haus des Dichters Robert Graves."* Necks craned, gears ground, the caravan moved on.

"They make me feel like a national monument," said the 80-year-old Mr. Graves, pausing to inspect a mimosa. Well over six feet tall and still straight as a sapling, the widely acclaimed author *is* rather monumental (page 682). "But, with so many outsiders to entertain, I suppose those poor fellows have to have something to talk about."

An Idyllic Spot, But Where Is It?

Last year the four major Balearic Islands —Mallorca, Menorca, Ibiza, and Formentera —entertained more than three million outsiders, most of them on low-cost package tours. The phenomenal influx of charter-plane patrons and their frenetic pace reminded my host of a London lass who asked a friend where she had gone on vacation.

"Italy. I never saw so much rain or ate such funny food. What did you do?"

"I went to Mallorca and had a great time."

"Mallorca? Where's that?"

"I don't know. I flew."

Anchored between Barcelona and Algiers, the archipelago (map, page 684) is, for the most part, a geographic continuation of Iberia's Andalusian mountains and a cultural extension of Catalonia, on the mainland. Yet each of the four major islands has a distinct and appealing character all its own. Even their dialects differ—basically Catalan well salted with local words that in many cases are of Arabic origin.

Expatriate Graves knows the Balearics well, having lived in the village of Deyá for almost forty years. By 1929, when he first arrived on Mallorca, his life had already spanned a rather loose-knit academic career, long years of trench warfare, experiments with socialism, the birth-control movement, and a fully liberated wife. In his role of rebel emeritus, he considers today's issues about as original as warmed-over hash.

Graves ranks with painter Joan Miró of nearby Palma as "top of the tree" among gifted transplants in the Balearics, where some 12,000 outsiders of every type and stripe live occasionally or full time. They cause little stir among *(Continued on page 684)*

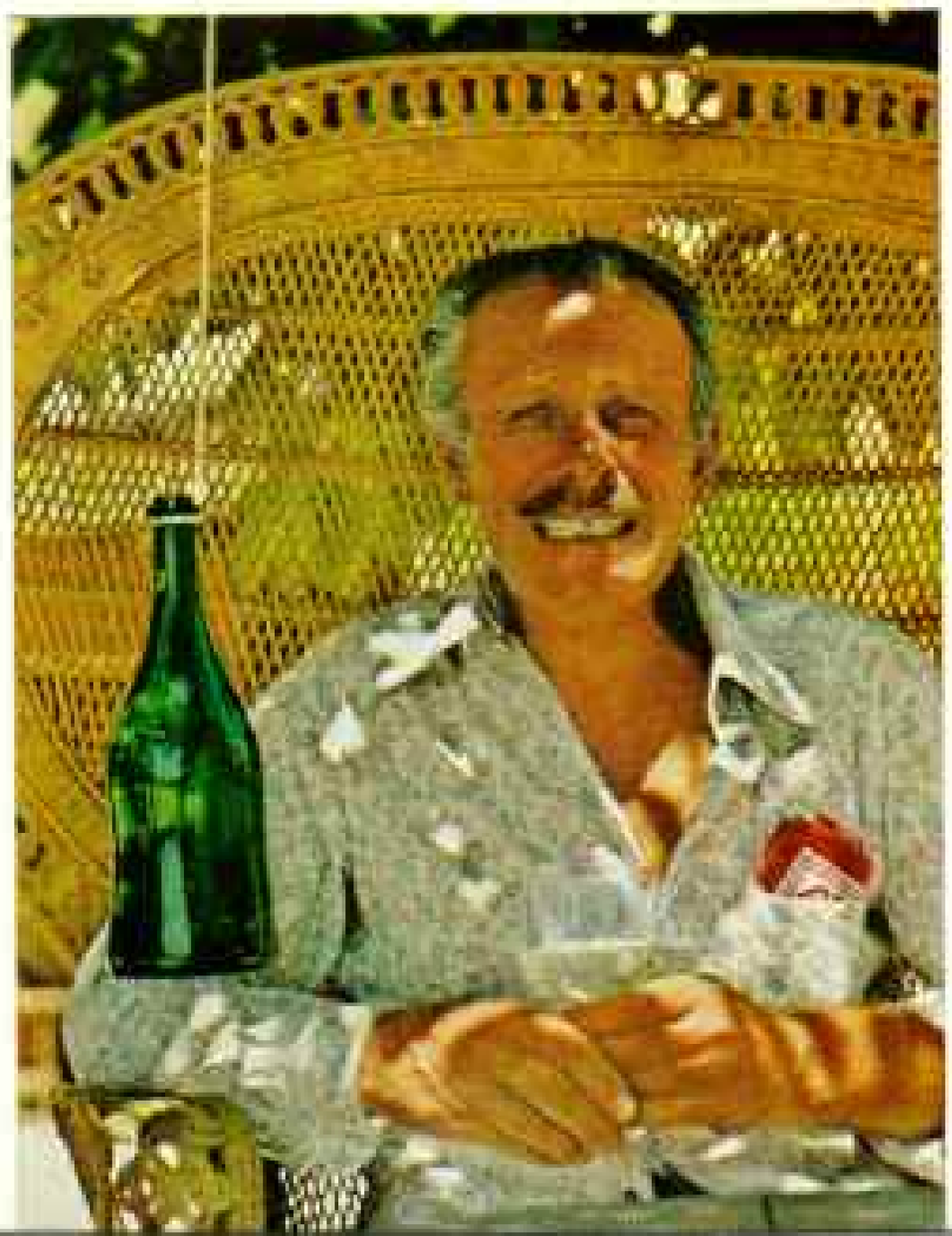
Old dog with new trick kicks sand at every leap (**above**), to the amusement of these Dutch visitors to Mallorca.

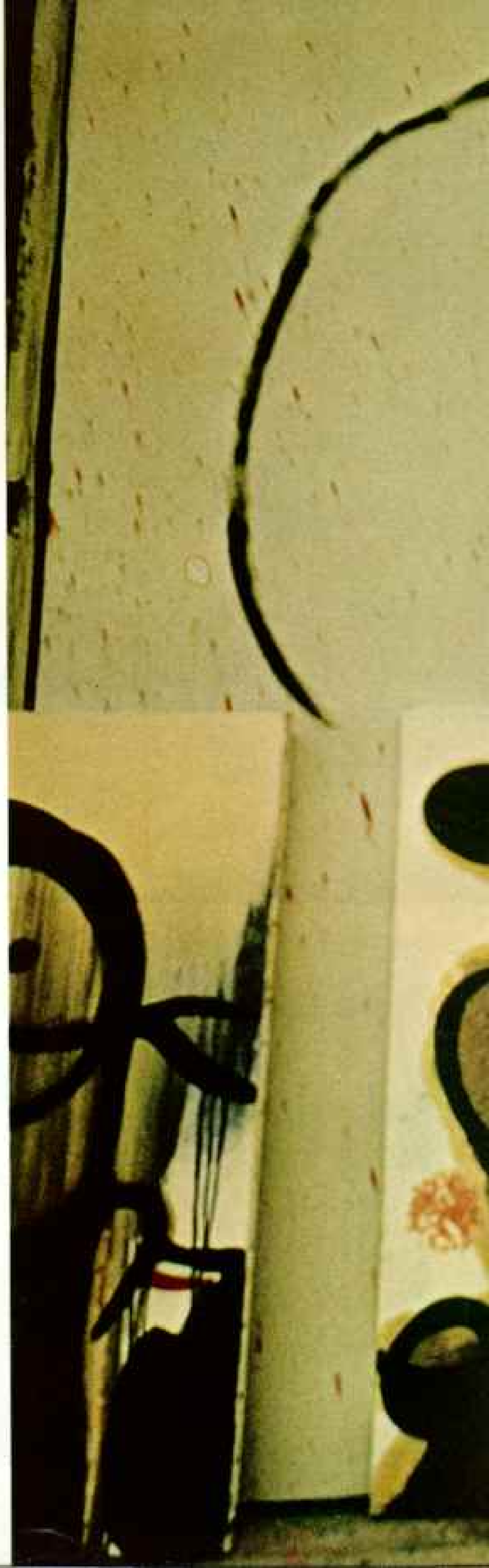
Some three million tourists—mostly from northern Europe—flock to the Balearics each year, lured by balmy weather and irresistibly low-priced package tours. A two-week jaunt from London, for example, can be had for just $163, including round-trip air fare, lodging, and two meals a day.

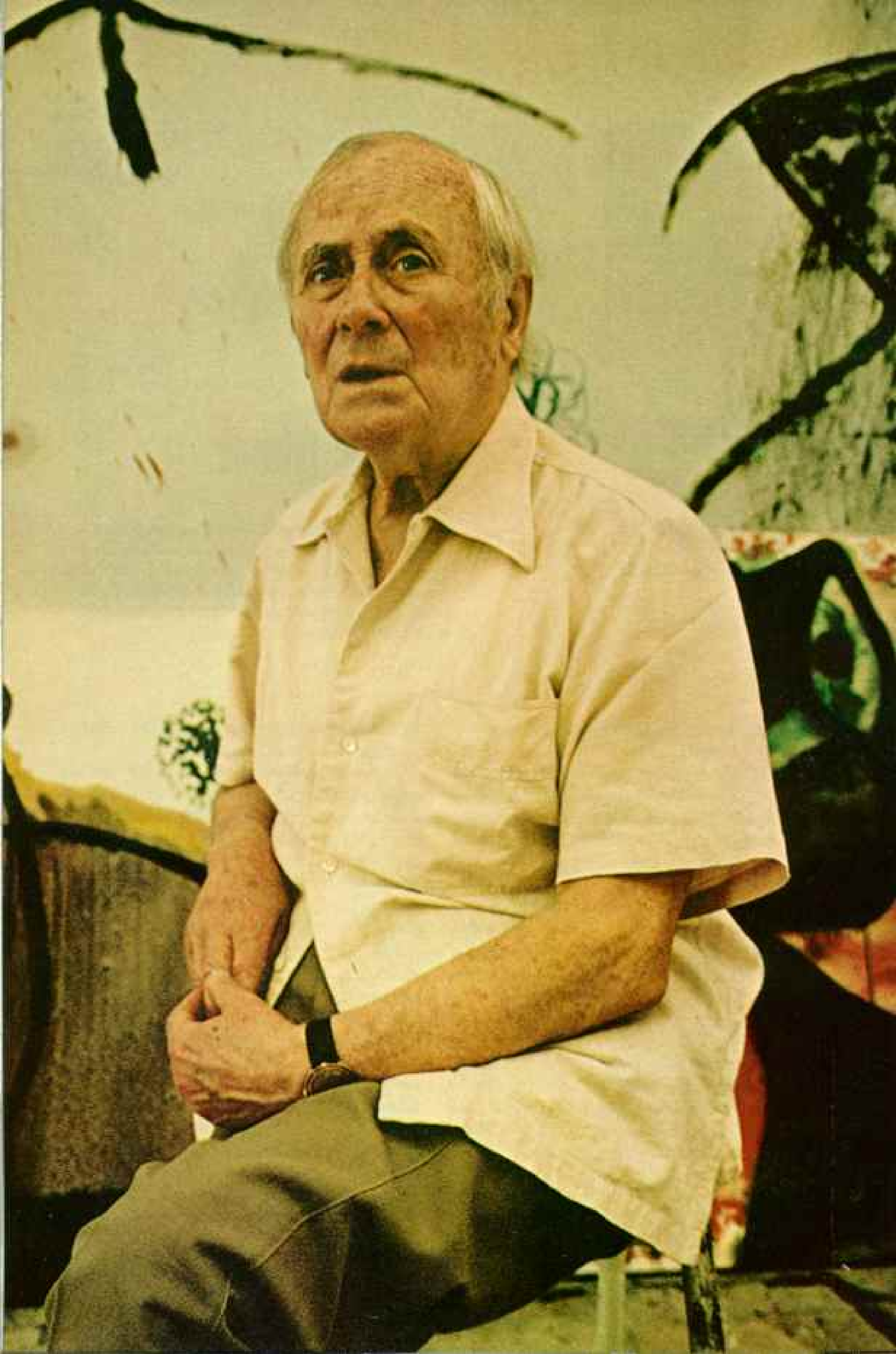
The throngs descend during the hectic summer season, and Palma's airport becomes one of the busiest in Europe. New arrivals at the airport head for some of Mallorca's 800 sight-seeing buses (**right**), which create monumental traffic jams at every point of interest.

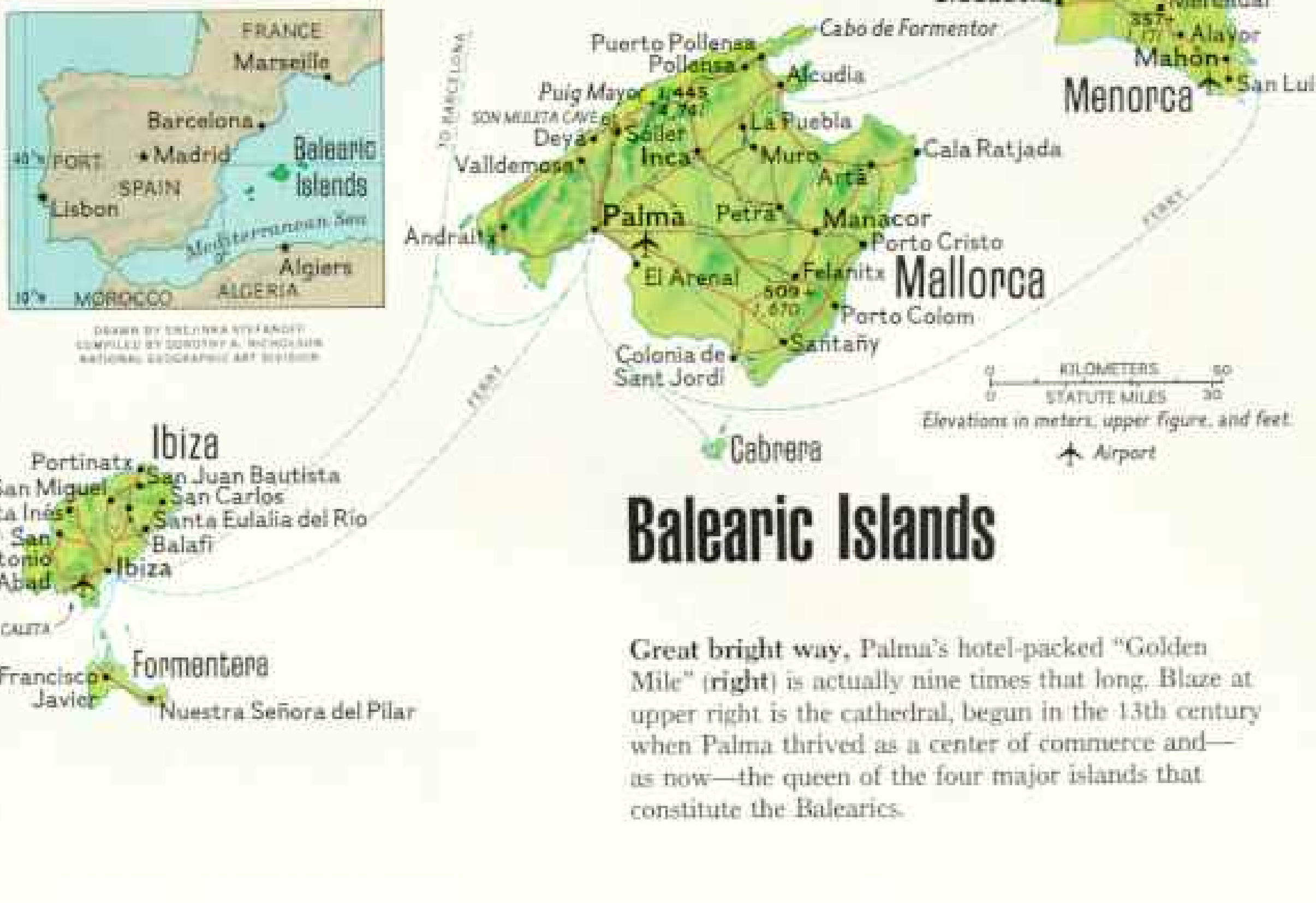
"**I found everything I wanted** . . . sun, sea, mountains, spring-water, shady trees, no politics. . . ," wrote British writer Robert Graves (**above**), a 37-year resident of Mallorca's Deyá. He is one of many notables to follow in the footsteps of famed lovers Frédéric Chopin and George Sand, who wintered in Mallorca in 1838-9.

Spanish painter Joan Miró (**right**) makes his home at Palma, where Spain's new king, Juan Carlos, also has a residence. British comedian Terry-Thomas (**below**) prefers the island of Ibiza, where, zany as ever, he dangles his wine bottle from a string.









Balearic Islands

Great bright way, Palma's hotel-packed "Golden Mile" (**right**) is actually nine times that long. Blaze at upper right is the cathedral, begun in the 13th century when Palma thrived as a center of commerce and—as now—the queen of the four major islands that constitute the Balearics.

the indigenous population, which now exceeds half a million.

After all, invaders are an old, old story here. For the island chain through more than 2,500 years was a coveted prize in controlling the western Mediterranean. Carthaginians, Romans, Vandals, Byzantines, and Moors all came and conquered before Jaime I of Aragon spearheaded Spanish annexation by subduing the Arabs in 1229. Today's prevailing sentiment is *"¿Qué mas da?*—What does it matter? At least the new ones come to enjoy, not rule."

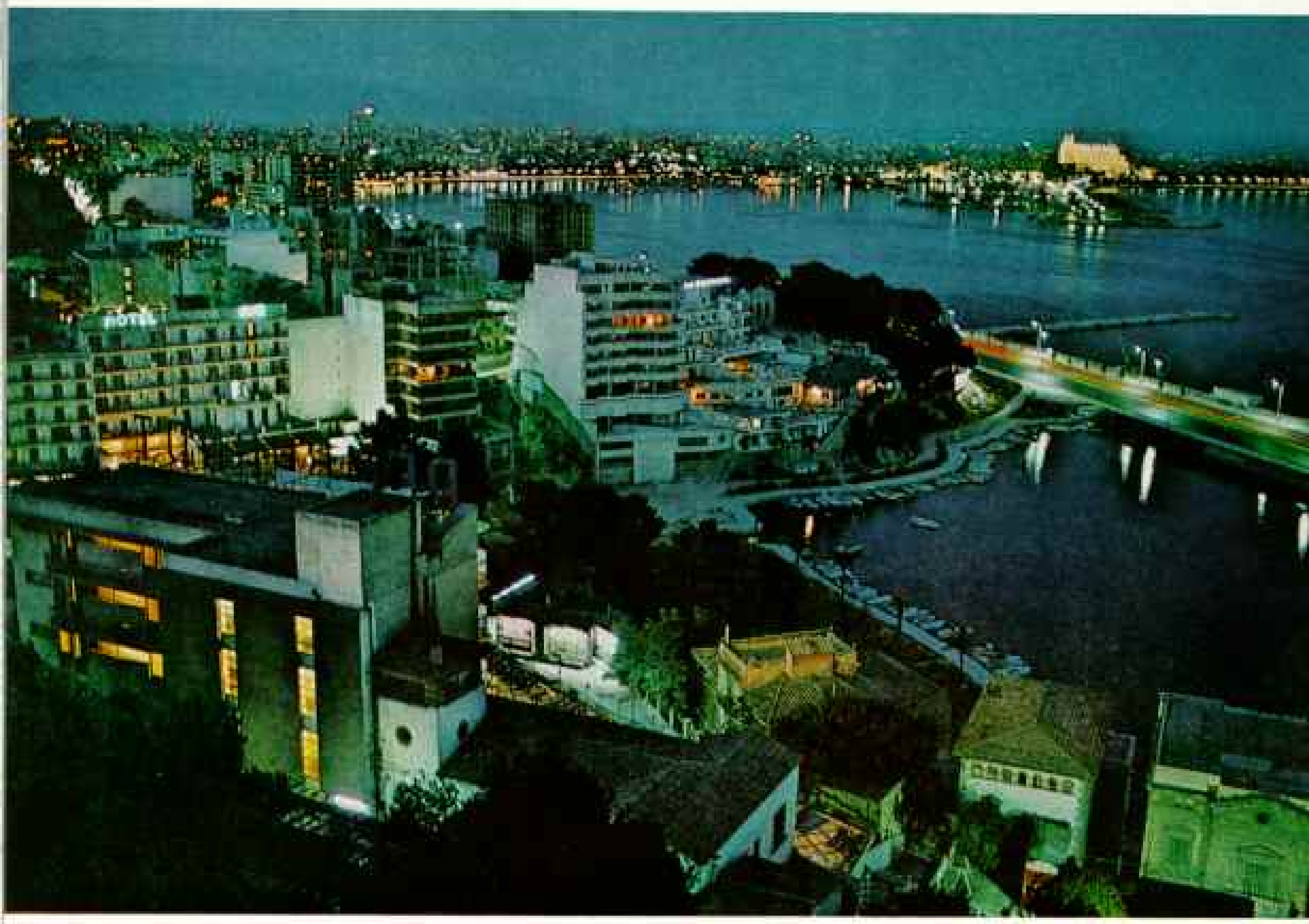
The Good Life Grows Costlier

"Who they are, why they're here, and where they settle follow no fixed pattern," a knowledgeable Dane told me as we dipped from the same punch bowl with a titled Briton, an American heiress, an impoverished Italian painter, and a German fugitive from the law. "I imagine good living at low prices lured most of them. When I moved here six years ago, you could manage comfortably on $100 a month, extravagantly on $300. Now it takes twice as much either way."

The most offbeat branch of the foreign contingent forgathers on the island of Ibiza, where I made my first landfall, disembarking from the Barcelona boat with bundle-bearing Ibicencos and casually clad members of the beard-and-backpack set.

Growing popularity has fringed the old port of Ibiza with multistoried housing, but Dalt Vila, the upper town, appears in its quieter moods much the same as 16th-century artisans left it. Steep stone steps and narrow, cobbled streets twist upward through a clutch of venerable *casas* that nestle like chicks beneath a huge brood hen of a fortress. But quiet rarely reigns: Free spirits from many nations turn its lower tiers into an Oriental bazaar by day, a miniature Montparnasse by night.

Carthaginians first settled this hill about 650 B.C. Until recently, the most notorious resident of the ridgetop was an artist whose ability to imitate the masters' styles once earned millions.



So convincing was Hungarian-born Elmyr de Hory at counterfeiting that his spurious paintings long passed as proper Matisses, Dufys, Modiglianis, and Chagalls. When a "Picasso" was sent to Pablo Picasso for verification—so one story goes—the Spaniard wasn't sure who had painted it. Until he heard the price, $100,000. "If it is worth that much," said Pablo, "it must be mine."

Evidently, Elmyr's antics were contagious. Clifford Irving, a neighbor on Ibiza for 15 years, concocted a whopping fraud of his own: peddling a bogus autobiography of billionaire-recluse Howard Hughes.

Masquerade Ends When Drug Deal Fails

Such in the 1960's and early '70's were the grand gurus of local Bohemian-beatnik society. Today more than 1,500 young and not-so-young pleasure-seeking nonresidents live on this island of 45,000 inhabitants. In Ibiza town many conjure up "castles in Spain" in smoke-blue bistros of Dalt Vila or along Paseo Vara de Rey, which echoes the aims if not the amenities of Rome's Via Veneto.

A bearded Bedouin dropped into a sidewalk seat beside me.

"What brings you here?" he asked in overly precise English.

"Just looking around."

"Ah, a schoolteacher then?"

"No. More of a student."

"I have here some very fine hashish." His grin under a wispy moustache displayed a gold tooth. "You would, perhaps, care to join me?"

"Sorry. I don't smoke."

"A cognac then?"

Again I refused. He rose, ticked two fingers to his forehead, and bowed. "Y'know something, lady? Y'otta loosen up a little; you're in Ibiza now." His spiritual home may have been the Sahara, but his honest accent was born half a world away, in the Bronx or Brooklyn.

Every boat and plane brings reinforcements, for Ibiza remains very much "in" for the outré-minded. I found them living in

Plunderers' prize, Mahón was sacked by the pirate Barbarossa II in 1535.

caves, deserted casas, and age-old *atalayas*, those round stone towers where lookouts once watched for Barbary pirates. Blankets and bedrolls scattered about told me that visitors had even staked a claim on an abandoned lead mine near San Carlos.

Ancient hunters, seeking ammunition for their slings, may have excavated here 2,000 years ago. Balearic slingers were such marksmen that Carthaginian general Hannibal recruited them as shock troops during the Second Punic War.

These days the Balearics bother little about any influx except that of *turistas*, the islands' biggest business. That lodestone known as the package tour has made Mallorca's Palma airport one of Europe's busiest in summer. By shaving fares and block booking space, promoters offer rock-bottom rates almost anyone can afford: round trip from London with lodging and two meals a day for a fortnight, only $165; from Frankfurt, $225.

British, Germans—and spring—had already come to Ibiza when I arrived. Across

The port now invites Sunday sailors.

the countryside the spicy aroma of wild rosemary, thyme, sage, and chamomile blended with the pungent scent of pine.

"It is best to drink *rumani* and *frigola*," a café keeper in San Antonio Abad advised, pouring me two amber aperitifs made with rosemary and thyme. After several swallows the taste of food becomes a very minor matter.

He has had few calls for these island favorites since San Antonio Abad, on the west shore, began catering to foreign tastes. Greatest attraction in this once-sleepy fishing port is its spacious, well-beached bay, partially sheltered by the swaybacked Isla Conejera, where, some say, Hannibal was born.

Across Ibiza I climbed the ramparts of the 16th-century church at Santa Eulalia del Rio, and looked for landmarks author Elliot Paul had reported so vividly before Spain's civil war drove him from the island in 1936.

Most houses of Paul's day have been demolished or are now overwhelmed by a hodgepodge of hostelries blockading the waterfront. Beside the old cemetery I watched workmen erect burial vaults tier on tier. High rises now follow Santa Eulalians to the grave.

Not All Succumb to Modern Riches

Few except expatriates and escapists from elsewhere suggest stemming the tourist tide, for it has brought full employment and an improved economy to all the Balearics.

"And an unexpected turnabout in family fortunes," said a pleasant young Spaniard selling cliff-hanging condominiums near Portinatx. "It has been our practice to bequeath the best farmlands to the oldest son. Beaches and rocky coasts like this were useless; they went to a daughter or some other minor heir. So guess who's living in Barcelona now and has money in the bank?"

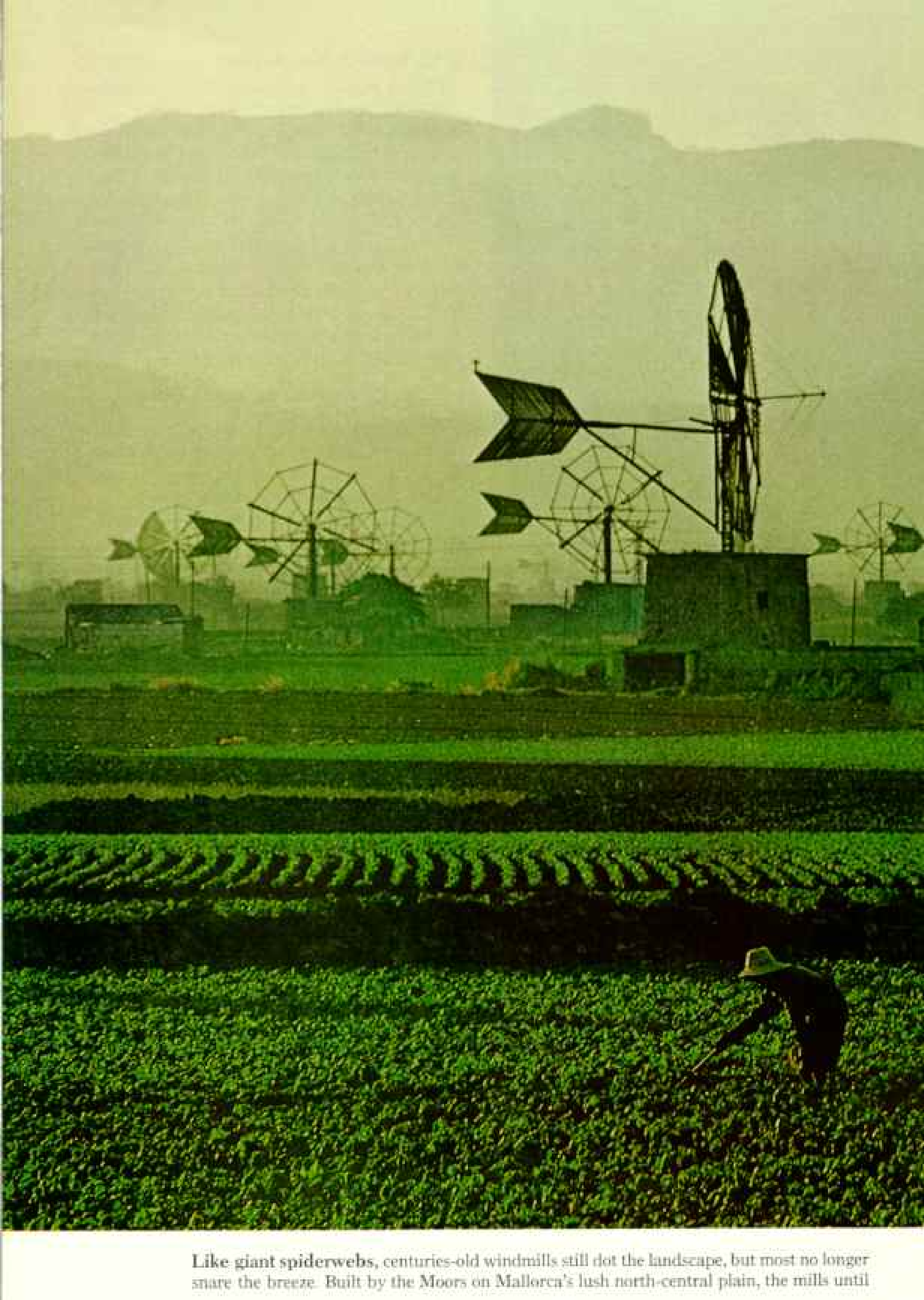
Money is the least of my friend Guillermo's worries: He runs his farm between San Miguel and San Juan Bautista on brawn and barter. With the help of one mule to power wagon, plow, and olive press, his household raises most of its own food—and more.

"What we cannot use, we trade in San Miguel for sweets and salt, coffee and cloth," he said. "There is always enough, and enough is plenty." Nothing in his manner suggested the slightest envy of those who sell their birthright to the building boom.

Besides, in Barcelona there is no *matanza*. And no true son of Ibizan soil would miss this annual family festival that reduces a countryman's prize pig to a year's supply of pork products.

Guillermo was boiling black *butifarra* sausage over an outdoor fire when we met; he was far sorrier than I was that I had missed the early-morning pig killing, the matanza's opening event.

He led me into a long, low room, where kin of all ages processed the last of a 330-pound hog into *sobrasada*, a raw spiced sausage of



Like giant spiderwebs, centuries-old windmills still dot the landscape, but most no longer snare the breeze. Built by the Moors on Mallorca's lush north-central plain, the mills until

recently lifted precious underground water to nourish cotton, wheat, potatoes, and tobacco. Today modern energy sources do the work of all but a few of the old wind machines.


LA
TAVERNA

reddish hue. Pork gushed from a hand-turned grinder into casings of well-washed intestines, which the older women cut to proper lengths and tied. Frequent draughts from a wine cask helped lighten their labors.

The tradition of hard work and hospitality remains well rooted on Ibiza. I found it in the friendly fishermen at Sa Caleta, who offered me driftwood-broiled fillets from their meager catch. And in the toothless chatelaine of a crumbling casa at Balafi, who stuffed my pockets with almonds and dried figs from her scanty stores.

"There will soon be more," she said, pointing to a weedy orchard where broad-bean plants already bloomed beneath weary, braced-up boughs. Ancient olive trees, their trunks contorted by the centuries, were leafing a dusty green; almond trees bore fruit the size of my thumbnail.

Spring is far less flamboyant on Formentera, smallest and bleakest of the four Balearics. But when summer sunshine warms its splendid beaches, the island begins to look and behave a whole lot like adjacent Ibiza.

Marie Ferrer Ferrer of Nuestra Señora del Pilar still prefers tradition to transition. Almost totally concealed in a classic black costume of head scarf, bodice, and full-length skirt, she appears—as she moves gracefully about—to be ever-so-slightly airborne.

"Family" Matters Settled Unofficially

We were leaning over the pigsty admiring the latest litter when she suddenly darted off, out toward a dusty cart track fronting the house. I caught up in time to see her shooing a disheveled young man away from her well.

"Heepees," she explained. "When they come here to wash, they leave soap in our good water. And water is very scarce."

Couldn't she call the police?

"No, no, señora. I would never do that. They are of our own people. Spanish, like us. From Catalonia. We do not ask the *guardia civil* to settle family affairs."

Sunlight held captive by whitewashed walls brightens a game of marbles in Ibiza's old quarter (**left**). Carthaginians, attracted by sea salt found in nearby natural flats, established the city 2,600 years ago, leading a parade of conquerors—Romans, Vandals, Byzantines, and Arabs. All sought a strategic base for attacks on the nearby Spanish mainland and North African coast. Reminiscent of the *matanza*, a family fete held in November, Mallorquins butcher a sow on a street in Deyà (**below**).

Marie may have as many Arab ancestors as Spanish, for not all Moors fled Ibiza and Formentera when their rule ran out. Their influence can be detected in the sugar-cube houses of whitewashed plaster and the swarthy countrymen with an uncanny knack for making things grow.

Charm Remains for Englishmen

Menorca, in contrast, wears a British look. To control Mahón, finest natural port in the Mediterranean, Britain occupied the island —with French and Spanish interruptions— for most of the 18th century. Even today some 1,500 British live there, spending out their days and annuities amid pleasant reminders of empire and "old Blighty."

Excellent examples of Georgian architecture grace both sides of Mahón's fjordlike harbor. English words survive in the local language, and island-made gin—cheaper than bottled water—outsells all other spirits.

The British made their greatest mark on the crisp-looking countryside, where herds of sleek Holstein-Friesians and flocks of haughty hens descend from strains they introduced in occupation days.

But without Menorquin determination, their experiments would have failed. For the island's soil, too shallow in places to plow, needs constant encouragement. Rain seldom falls in summer, and frequent high winds stunt young trees, brushing their branches back into permanent pompadours.

Reginald Wright, a British retiree and occasional real estate salesman, believes in hedging his bets on the future.

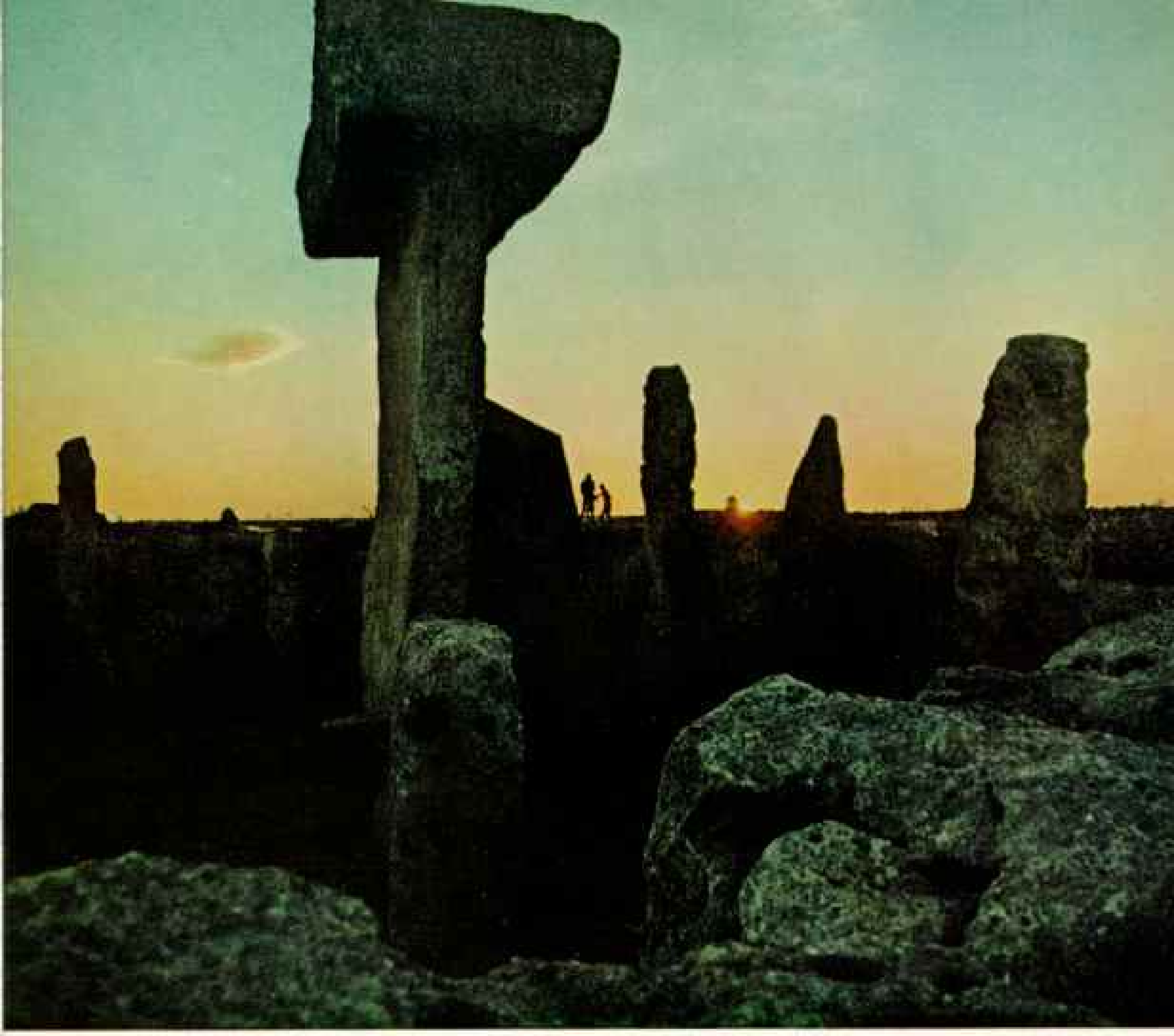
"Menorca is lucky. It has enough exports—mainly cheese, furniture, costume jewelry, and shoes—to be more self-reliant than the other Balearics. The general feeling here is that tourism is nice, not necessary."

Yet *urbanizaciones* designed to attract the sun-hungry already absorb acres of former solitude. Fifty thousand Menorquins may not be in any hurry to expand, but they intend to be ready when their time comes.

After all, they were thinking big and building big as far back as the Bronze Age. The island is sprinkled with prehistoric megaliths of rough-cut rock: *taulas*, T-formations reminiscent of Stonehenge (page 694); igloo-shaped *talayots;* and *navetas*, which vaguely resemble overturned boats.

Etched gray by winter, Ibiza's countryside will unfurl its glory in spring, when millions

of almond trees burst into bloom. The lucrative crop has almost replaced traditional olive cultivation, introduced by the Romans some 2,000 years ago.



Menorquins are less apt to talk about these amazing 3,500-year-old monuments than they are about mayonnaise—first whipped together, they claim, by a Mahón chef to perk up a fish dish for the Duc de Richelieu. Or about the Farragut family from Ciudadela, a charming west-end port refreshingly Menorquin-Spanish, with a dash of Moorish for good measure.

"Farragoot"—as locally pronounced—is an honored name here. Native-born Jorge Farragut emigrated to America, distinguishing himself as both a naval and cavalry officer against the British during the Revolution. His son, "damn-the-torpedoes" David, who served in Mahón when U. S. midshipmen trained there in pre-Annapolis days, became the new nation's first admiral.

I went to sea myself when the little boat plying between Ciudadela and Alcudia on Mallorca decided to sail after spending a week stormbound in port. The weather was conciliatory but far from calm. Cattle bellowed miserably on the open foredeck, and I ate three omelets unclaimed on delivery by some of my fellow passengers.

Climate Attracted Famous Pair

Greater serenity greeted me at my rented villa, part of a former monastery atop El Calvario, a haystack-shaped hill overlooking the toast-brown roof tiles of Pollensa. A precipitous stairway descends in 365 stone steps to the town below. El Calvario's founding monks chose well, surrounding themselves with striking vistas of sea and sierra.

Neighboring mountains—a wild assortment of sharks' fins, jumbled crags, and fluted

Did it honor gods? Was it a sacrificial altar? No one really knows what purpose this 15-foot-high, T-shaped *taula* (**left**) served. Prehistoric man strained to raise it and many other mysterious megaliths on Menorca 3,500 years ago.

Delving into Mallorca's past, William Waldren has found some answers in Son Muleta Cave (**right**), where he has unearthed skeletons of a now-extinct dwarf antelope, *Myotragus balearicus* (**below**). Over the course of thousands of years, some 2,000 animals were trapped in the cave. Waldren's research, supported by National Geographic Society grants, suggests that man inhabited Mallorca about 4000 B.C., two millenniums earlier than previously thought.

NATIONAL GEOGRAPHIC PHOTOGRAPHER OTIS IMBODEN

pillars—form part of a continuous range that walls the long northwest coast from Andraitx to the gnarled finger of Formentor peninsula beyond Pollensa. It was this spectacular cordillera country that produced two of the island's earliest publicists.

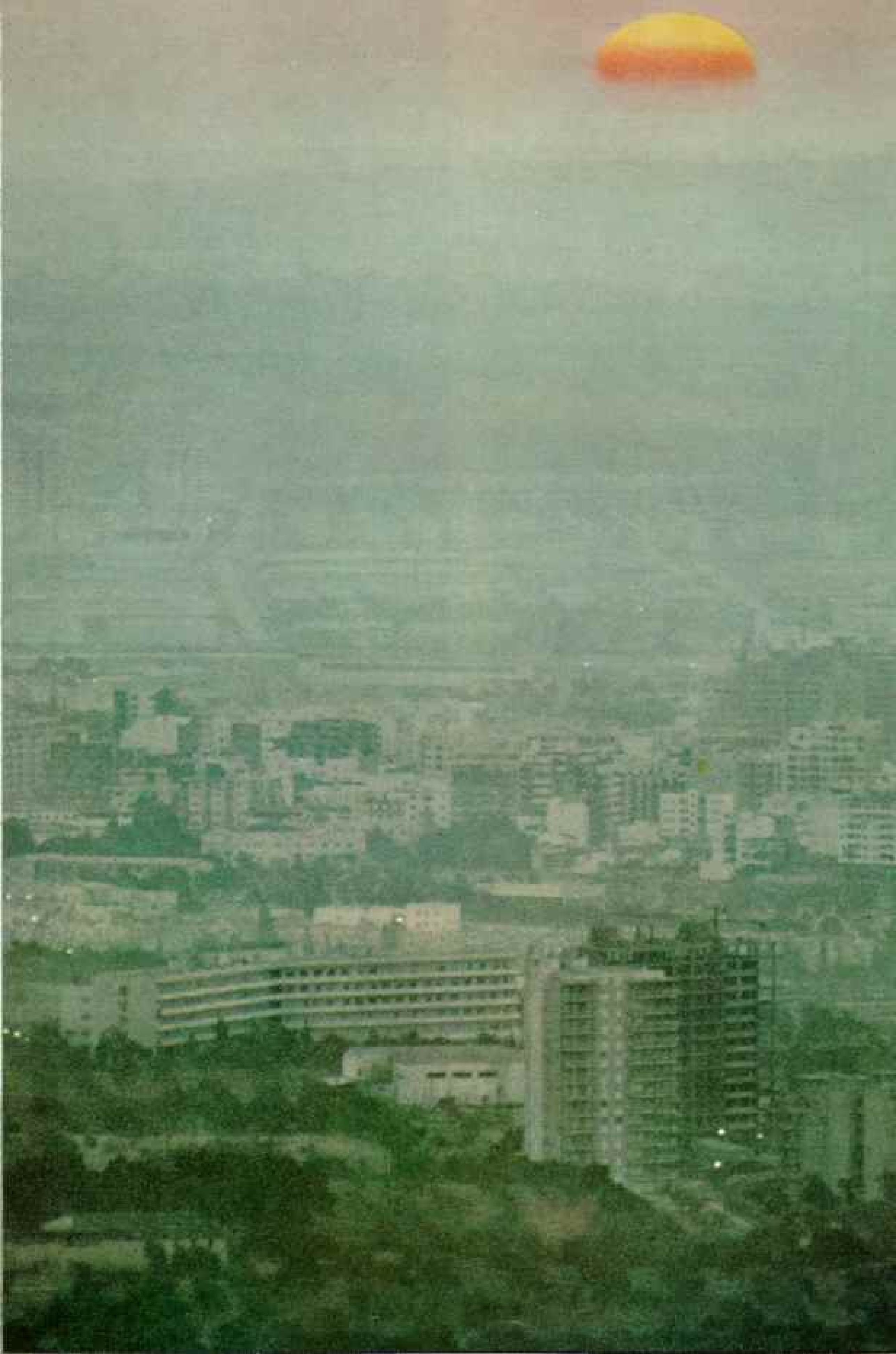
Late in 1838 George Sand and the ailing composer Frédéric Chopin went to a Mallorca monastery in Valldemosa for health reasons. Ms. Sand commented candidly on her unhappy sojourn in *A Winter in Majorca*, a slim volume Mallorquins continue to condemn for its criticism and widely quote for its praise. Last year the public paid some $80,000 to view the rooms the lovers shared.

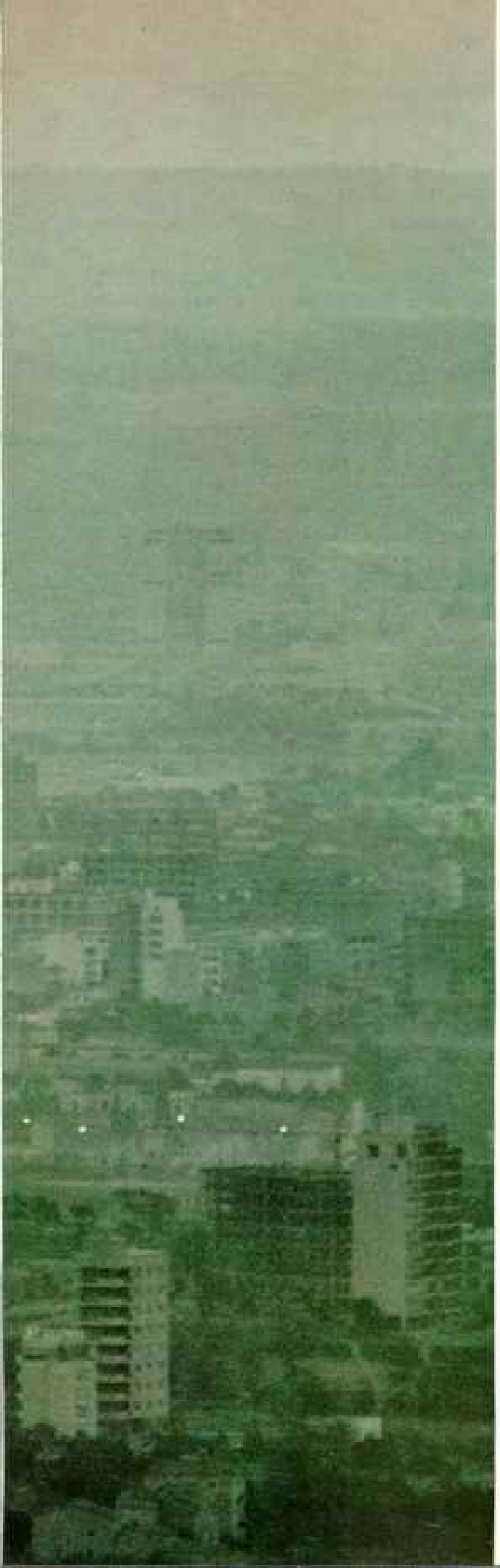
The Balearics are certainly—as one reporter observed—"awash with a sense of lost love." Lord Nelson and Lady Hamilton supposedly trysted in a Mahón mansion called the Golden Farm. And not far from Valldemosa an Austrian nobleman, Archduke Louis Salvator of Habsburg-Lorraine, forsook marriage forever—a vow to his dying fiancée.

In the 1870's the archduke, a prolific pamphleteer in boosting the Balearics, acquired more than six miles of Mallorcan coastline south of Deyá. High above the sea he created two magnificent villas—Son Marroig and Miramar—still owned by his favorite godchild, Luisa M. Vives Ripoll.

Tourist Fees Keep Land in Family

At 75, the delightful Doña Luisa admits that arthritis has slowed her down a bit. She can no longer roll her own cigarettes, two at a time, one with each hand. Easing into a fireside chair at Miramar, she called for coffee with cognac. "In weather like this, it is





also good to have a little heat on the inside."

With her lands far from self-supporting, Doña Luisa must rent Miramar and maintain Son Marroig on admission fees. As for selling off some of her holdings: "I love the natural, untamed beauty of this coast just as the archduke did. It deserves to be protected from man's meddling."

Continuing clockwise along Mallorca's Costa Brava, the road twists through Sóller's vast orange groves. Skirting Puig Mayor, a 4,741-foot peak as crinkled and creased as rhinoceros hide, it finally uncoils to enter Pollensa by the back door.

Tasks Begin in Predawn Hours

Aside from numerous artists in residence, little has altered Pollensa for at least a century. Here day begins (and ends) to the sound of bells—from the church tower and the collars of grazing goats. Housewives dart like swallows through winding near-dark streets on their way to early market. Farm women are already at makeshift stalls in the plaza, weighing produce picked at dawn; my basket quickly fills with more than I really need.

"Pick up another *ensaimada* at the bakery and come have coffee," artist Dick Campiglio calls from the Bar Español; he is seated outside, munching one of those delicious puff pastries that Mallorquins make to perfection.

Inside, the jet scream of a coffee machine dies away; now I can hear the black-suited old men, who must have been born wearing berets, gossiping over dominoes and *palo*, a bittersweet liqueur extracted from carob pods. As market crowds thin, they will regroup outside to follow the sun around the plaza like the shadow on a sundial's face. Similar scenes are found throughout the *huerta*, Mallorca's garden-striped north-central plain, whose tattered windmills suggest Don Quixote may have won a few jousts here.

Recognizing prime real estate, the Romans began colonizing the island in the second century B.C., settling first around Alcudia. They

Dawn hangs a veil over Palma, enveloping the city's skyscraper hotels in a haze that the morning sun will burn away, leaving—in composer Chopin's words—air "as pure as that of Paradise."

then pushed south to found Palma, now capital and principal city of the Balearics, on a broad, inviting bay.

Little remains of that long-gone era, or later ones for that matter. "Every new ruler wanted to remake the city in his own image and tore down what went before," said lifelong resident Andres Garcia as we dined beside El Borne, a promenade in the historic heart of Palma's old quarter.

Despite his gloomy assessment, a massive sandstone cathedral, commissioned by Jaime I, "El Conquistador," in the 13th century, and Almudaina Palace, a memento of the Moors, dominate a rise only a few blocks away. Down spiderweb streets that lead from Jaime's Gothic colossus lived the cartographers and goldsmiths who made medieval Palma the equal and envy of major maritime centers throughout the Mediterranean.

Urban Life Tempts the Young

On high ground two miles west, the conquistador's son, Jaime II, built Bellver, a unique castle-in-the-round, for country living. Today it is besieged on all sides by an ever-expanding metropolis already crowded with 60 percent of the island's 460,000 inhabitants.

For Palma is a place in motion, focusing on tourist hordes. In recent years the "Golden Mile" edging the bay has expanded into a solid nine-mile front of high-capacity hotels, cabarets, restaurants, and souvenir stands. The town of Inca, 17 miles northeast, stakes its fortune on 140 leatherworking firms, once a major source of island income. Here, *turismo* is not altogether a blessing.

"It is now not easy to keep our industry going," said Gabriel Marques Melis, Jr., vice-president of Melis Marques & Cia., makers of shoes, coats, and accessories. "Always before, sons followed fathers into this business. Young people today want more money and excitement in places like Palma. Competition from abroad is bad enough; now we have it at home too."

Countrymen also drift cityward in search of an easier life. "We're replacing them with help from the Spanish mainland," I heard from Juan Capó Porcel, secretary-general of the civil government. "Also we're subsidizing farmers so they can enjoy some urban comforts without leaving the land."

Had tourism caused any other problems?

"Measured against benefits, I would say no. Of course, we must maintain a balance. We are regulating building now, but we can still absorb an increase."

In an underworld garden, oil lamps light a harvest of mushrooms (**above**). A week's work in these man-made caves nets Mallorcan pickers 700 pesetas—about $12.

Pursuing another occupation in an age-old way (**left**), workers skim oil from boiling olives with a long-handled scoop. The fruit had been crushed in a 400-year-old press.

Modern methods prevail in manufacturing such other Balearic products as shoes, leather goods, glassware, and pearls, the last undergoing inspection in Manacor (**right**). A secret mixture of mother-of-pearl and fish scales goes to make the famous fakes.

TED H. FUNK

Song of the wild may yet be heard along Menorca's

Sixty-two small old hotels closed on Mallorca in 1975; 16 big new ones opened, for a net gain of 600 beds. At one point province-wide travel was off 45 percent, with the heaviest loss among the British. Signs of a slowdown were in the wind. But it would be hard to imagine Balearic citizens in a panic; they just aren't built that way.

Fishermen should be the first to fret; catches in Mediterranean waters have been declining for years. José "Pepe" Font Martí of Puerto Pollensa was among those hard hit; once-plentiful tuna and *caramel* sardines had almost disappeared from Alcudia Bay. He was now setting his nets for *langosta* off Formentor peninsula. At the current dock price of 1,000 pesetas a kilo (a whopping $8 a pound), he hoped to recoup his losses.

I reached his open boat *Virgen Milagrosa II* at four in the morning for a bone-chilling trip to the lobster grounds. Once there, Pepe and his supporting cast of Tomeu, Mateu, and Joan performed without cue or comment for eight straight hours, winching in two miles of nylon net from 400-foot depths, removing catch and debris, then resetting the net by hand where it would remain overnight.

With the last langosta bedded in wet burlap, fishes sorted and boxed, Pepe signaled thumbs up, said "*basta*—enough," and turned toward home. One hand on the wheel, he tipped a *porrón* above his upturned face and refreshed himself with a well-aimed stream of wine. Then he passed the bottle to me. The pitching deck of a small boat is not the ideal place to practice such marksmanship, and

northern coast, where horses and donkeys roam free.

I have a purple-tinged sweater to prove it.

The day's effort brought in about $150 for crew, fuel, and payments on the $30,000 diesel-driven craft. Pepe admitted it was a poor showing and graciously blamed it on the moon. I had neither the heart nor the vocabulary to tell him that most Maine lobstermen believe women aboard bring bad luck.

Reminders of Other Times Live On

On one of my last excursions, a mountaintop citadel near Felanitx invited investigation. Beating my way through brambles, I stormed Santueri Castle and its only defenders—a bunch of bored-looking sheep.

Within crenellated walls, still remarkably well preserved, people of the lowlands sought safety from attack. Light and shadow parqueted the valley floor below me; from the heights I could scan much of Mallorca and the tideless seas that brought both good and bad fortune to its shores.

"What do you do with a castle?" I later asked owner Judge Salvador Vidal, who lives in Pollensa and upholds laws there.

"Do? Why, nothing. Who would tamper with something originally built before the birth of Christ? It serves no practical purpose except as a reminder of things past."

Life is changing in the Balearics, but if no faster than the ancient *castillo*, Robert Graves's descendants will be able to enjoy what he looked for and found—a place "where town was still town; and country, country; and where the horse plough was not yet an anachronism." □

The Tarahumaras: Mexico's

By JAMES NORMAN

ONLY A TARAHUMARA INDIAN could be zigzagging so swiftly down the steep canyon path. When he saw us, he abruptly halted, silent and wary, a copper-skinned man from across the centuries, wearing loincloth, shirt with puffed sleeves, and tire-tread sandals.

"Kwira-bá," I greeted him in his own language. Stony silence. My guide, Eliseo, a young Spanish-speaking Tarahumara, took over. After terse words, Eliseo said, "He searches for a lost goat." We had spied a goat on our way up two hours earlier, grazing on a ledge of this great Mexican canyon.

Wasting no time, the man set off at an easy

Blazing a nighttime trail, pine torches illumine a game of *rarajípari*, or kickball. Tarahumara Indians, famed for their endurance, propel a wooden ball through wild mountain country, sometimes covering 200 miles or more in days-long races. As reclusive as they are hardy, the Tarahumaras shy away from an outside world that increasingly threatens their way of life.

Long Distance Runners

Photographs by DAVID HISER

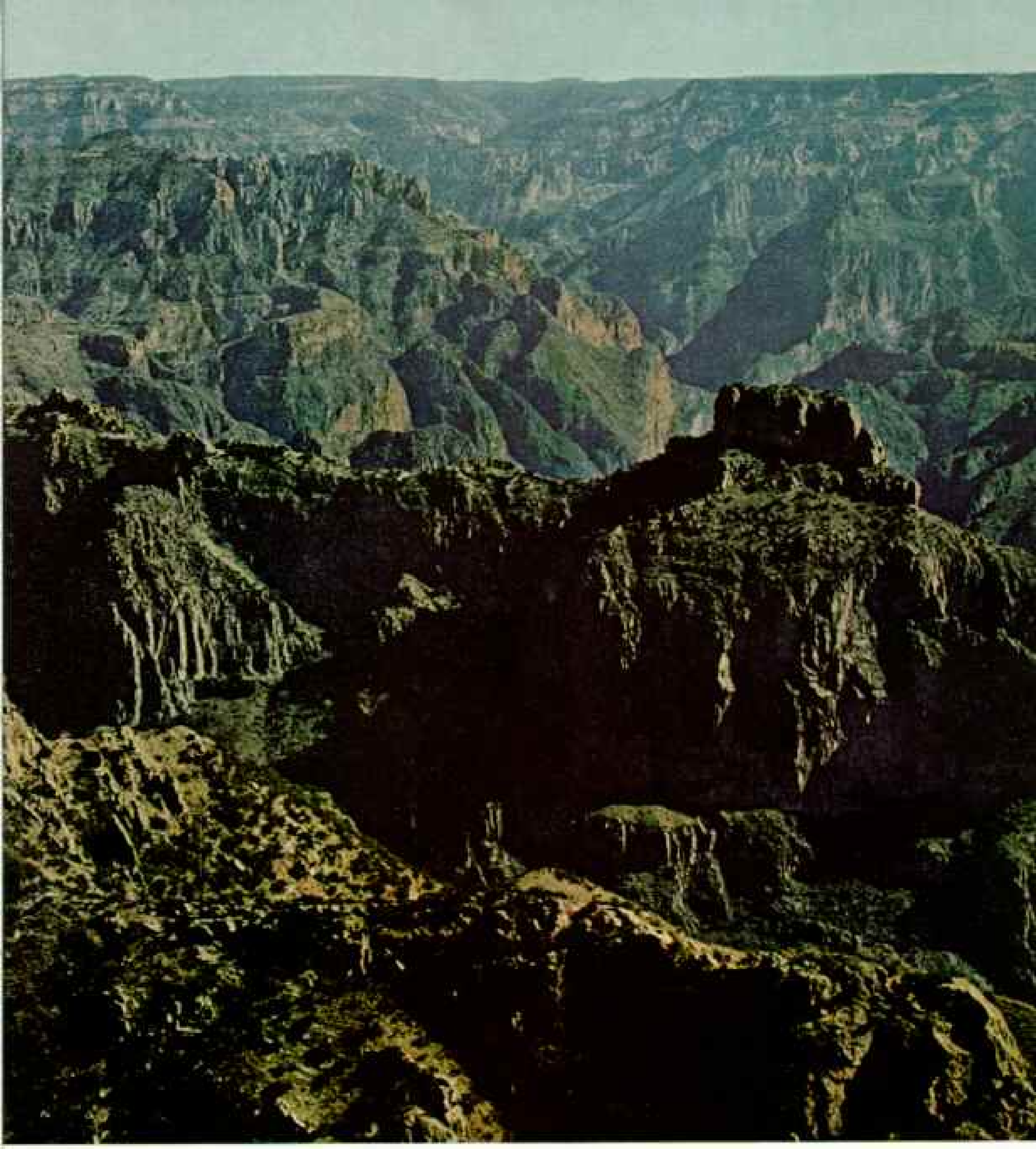
trot down his near-vertical highway. We resumed our grueling climb toward Guagueybo, an isolated Tarahumara community high above. After a couple of hours, while we were still short of Guagueybo, the runner reappeared, goat on his shoulders.

I squeezed to one side, letting him pass, and noticed that he wasn't winded. Yet he had run a few thousand feet down from the canyon rim, had retrieved his goat, and now jogged past us on the upward trail.

Eliseo also demonstrated the stamina of the Tarahumaras. At the end of our arduous climb, I took his pulse and my own. Mine was a thumping 170, his a steady 70.

A tribe of long-distance runners living in the high sierra and canyons of southwestern Chihuahua State, about 300 miles from El Paso, Texas (map, following page), the Tarahumara Indians call themselves Rarámuri—"foot runners" in their Uto-Aztecan language of the same name. In this wild infinitude of gorges, buttes, and mesas, it is often safer and faster to travel afoot than on horse or burro; the Tarahumaras have made running an important part of their life-style.

In the old days, Tarahumaras hunted deer by pursuing them on foot for days. When the prey finally toppled over in exhaustion, the hunter would *(Continued on page 707)*



Land of only two directions—up and down—rugged barrancas of the Sierra Madre Occidental in southwest Chihuahua State rival the grandeur of the Grand Canyon. The Tarahumaras concentrated here centuries ago, taking refuge from Spaniards seeking forced labor for their mines. Today about 40,000 of the Indians live in the region,

mostly in scattered dwellings accessible only by trail. Often living in summer atop cool plateaus and descending into warmer, deep canyons in winter, they eke out a meager existence. Life's harshness is tempered by frequent recourse to a mildly alcoholic corn beer called *tesgüino*, here being prepared over an open fire by a Tarahumara woman (**right**).

(Continued from page 703) throttle the animal.

Running is sport as well. In *rarajipari*, the men's kickball game, two teams, often barefooted, each kick a light wooden ball tirelessly across the countryside. They run various numbers of laps over courses ranging from two to twelve miles. A short game lasts from noon to sunset, an extended affair 24 to 48 hours. No matter the length, the contestants cross the finish line breathing no harder than I do after climbing a dozen steps.

The runners pause only to drink water or a corn gruel called *pinole*. For long races they wear belts of rattles to keep them awake, and at night friends run with them, holding torches so they can find the ball.

Years ago two Tarahumara men represented Mexico in the 26½-mile marathon at the Olympic Games in Amsterdam. The runners, José Torres and Aurelio Terrazas, lost first place by several minutes, but perhaps it was not their fault. No one had told them where the race ended. They crossed the finish line and continued running till stopped. Amazed that the marathon was over, they complained, "Too short! Too short!"

New Ways Spurned by Canyon Dwellers

The grueling climb to Guagueybo marked my third journey in 12 years to the sea of tormented stone locally called Sierra Tarahumara. The Mountains of the Tarahumaras are a tangle of deep gorges and rugged plateaus sprawled over 10,000 square miles.

The Tarahumaras—numbering about 40,000—have preserved much of their pre-Spanish culture, inhabiting caves and crude huts and practicing age-old rituals and mysticism. Reserved and reclusive, they have an unusual culture. Almost every settlement, called a rancho, has shamans who perform "cures," and each community of ranchos democratically chooses a governor. The tiny ranchos are scattered like seeds through the sierra and canyons, and each of them—usually made up of five or six families—may extend over 80 square miles.

Although a Tarahumara often runs or trots from place to place, time means nothing to him. He spends almost a third of his year celebrating at festivals, where he drinks copiously. To the traditional Tarahumara, money is unimportant; he rarely works for wages. But he will not go hungry, for under

Foot power is the only mode of transport through most of Tarahumara country. Family on the move (**above**) shuttles between their upstream orange grove and their downstream settlement. Tribesman (**facing page**) carries a load of brooms the 20 up-and-down miles or so from road's end at La Bufa to the isolated village of Batopilas; for a two-day trip he earns about 50 pesos—four dollars.

a tribal welfare system known as *kórima*, the more fortunate Tarahumaras are expected to take care of the less fortunate in times of need.

At dusk Eliseo and I reached Guagueybo, a tiny Mexican and Indian settlement with a handful of stone and log houses. There was no electricity or running water. We dined that night on cold canned beans and sardines, and slept miserably on the earthen floor of a deserted schoolhouse.

Indians Seldom Mix With Mexicans

Guagueybo rests on a terrace in Urique Canyon, about 3,000 feet above the Urique River and some 1,200 feet below the surrounding high country. The climate permits the growing of apples and peaches, but the best orchards and fields belong to the Mexican settlers. The handful of Indians living in Guagueybo rarely socialize with the Mexicans. Though some may work for them, they don't share in their festivities, nor is there intermarriage between the two groups.

An hour's hike away lay a rancho called Awriachi where Eliseo's uncle, a shaman, lived. The community, strung along a narrow canyon shelf, covered only four or five acres but supported ten families.

We crossed a tiny cornfield and passed a cave into which a woman and child darted, hiding from us. We skirted a stone hut whose entire roof smoked like a chimney. Suddenly Eliseo shouted at a man and boy working in a corral not far away. Only among relatives is such a thing done. When a Tarahumara calls on an unrelated neighbor, he seldom goes directly to the house or cave; he simply waits until someone decides to come out.

Eliseo and his uncle approached each other solemnly and brushed extended palms in greeting. The uncle, Dionisio, had known the outside world; he spoke halting Spanish and wore Levi's, a store-bought shirt, and sandals made from truck tires. He told me that a decade ago he had worked as a railroad section hand. He was the only man among 21 in his community who had ever worked at a steady job.

I gestured at the corral. Made of long slim logs, it measured less than 15 feet on each side. "I move it to feed the earth," Dionisio said. Every week or so, he added, he and his 10-year-old son took the log fencing apart, assembling it in another section of his small field. At night they corralled his flock of goats and sheep there to fertilize the poor soil.

"You are rich?" I asked.

He nodded his head. "Twenty goats, a cow, three sheep."

"Do you slaughter them for meat?"

He shook his head. "The goats give milk for making cheese. The sheep give wool. The cows pull the plow. And all the animals give us fertilizer."

"But you do eat meat?"

He pointed to his son. "He traps field mice. Good meat. And there is hunting, sometimes a deer or squirrels." Corn is the staple, supplemented by beans, squash, and game. Tarahumaras kill and eat their livestock only at important ceremonies.

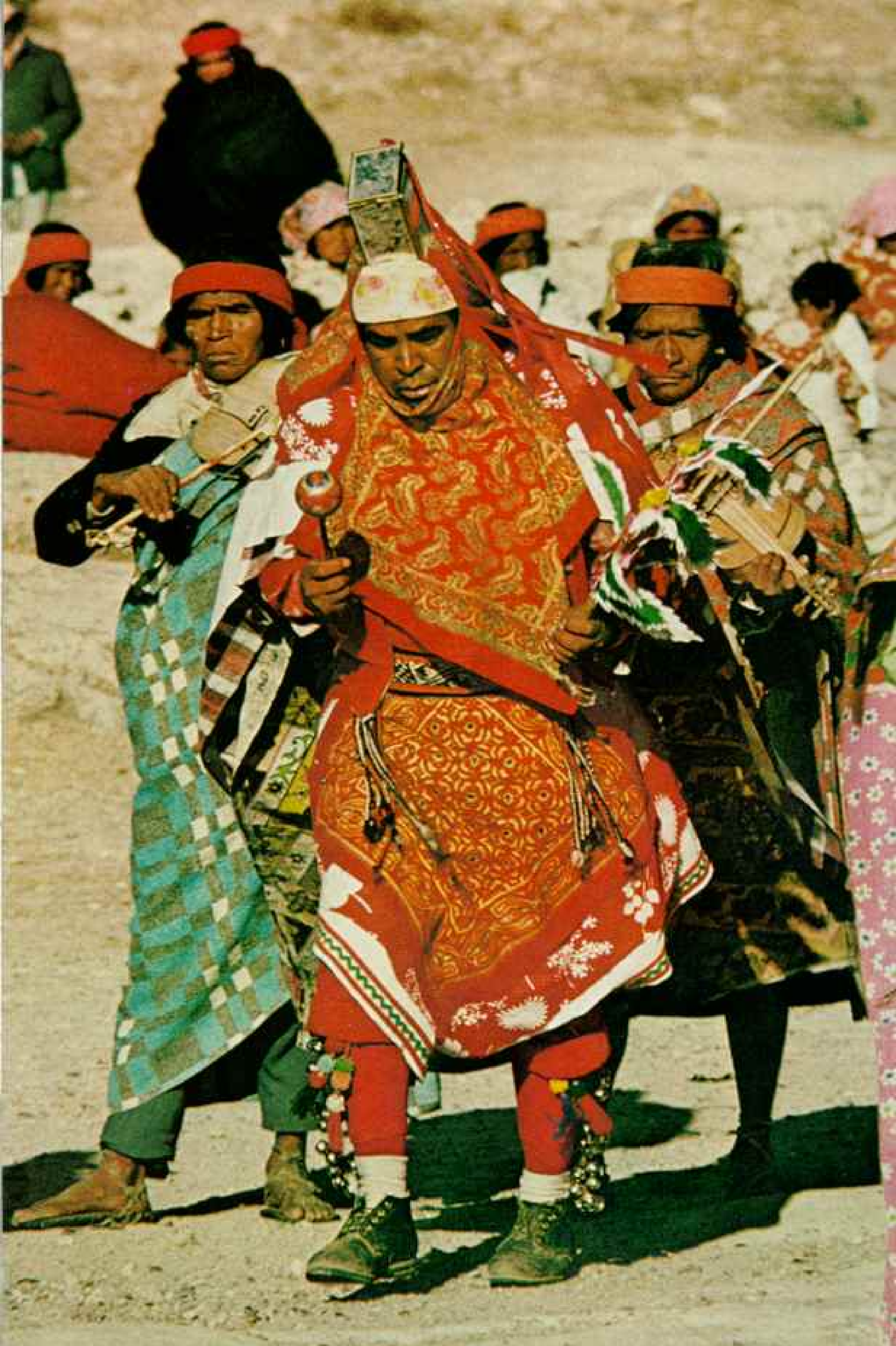
Dionisio led us to his house, a one-room plank-roofed stone hut constructed without mortar or nails. Inside, his wife knelt to grind corn on a stone metate. She was preparing corn flour to make pinole, the Tarahumaras' principal food. It is a thickish drink, made by adding ground roasted corn to water.

Shaman Battles Wizards' Spells

As I peered around the smoke-filled hut, I could see no furniture, no beds, no cabinets—little more than the metate, clay pots, a number of wooden spoons, a homemade violin, and bundles of clothes and blankets. Like many Tarahumara abodes, this one lacked a chimney. Smoke from the open fire escaped wherever it could, blackening walls and ceiling along the way.

Later, while I sat in the morning sun with Dionisio and sipped pinole, he reluctantly explained his shaman duties. "*Sí, yo lo hago*—yes, I do it," he said. His primary functions

Arrayed in fiesta finery, dancers at a Christmastime festival in Norogachi stomp and whirl for hours on end to the accompaniment of violins and rattles. Fueling themselves with copious draughts of mild corn beer, participants—who may attend as many as 90 parties, or *tesgüinadas*, in a year—find in group celebrations an emotional release from the physical drudgery and poverty of everyday life.



as a shaman are to counteract spells cast by powerful wizards, *sukurúames*, and to perform preventive cures.

"Each spring after the planting," Dionisio continued, "I cure the fields, so the growing corn will not be damaged. I cure all the people of the rancho so they will not be struck by lightning."

The Tarahumaras revere the sun, moon, and certain plants and animals. They fear Onoruame or Tata diosi, the father god and creator, a menacing deity who causes illnesses and disasters. Though most Tarahumaras have had contact with missionaries and profess Christianity, their religious beliefs remain quite Indian. On the other hand, even those few who totally reject Christianity have incorporated certain of its concepts into their own native beliefs.

I knew that today Dionisio would attempt a cure. Presently he rose, and I accompanied him to a cave home. Men and women were waiting on the patio before the entrance. Inside the cavern a woman lay paralyzed on the dirt floor, unable to move one arm and one side of her face.

Dionisio began his shaman's ritual, dipping a small wooden cross into a bowl of *tesgüino*, the traditional corn beer. (The Tarahumaras may have used crosses even before Europeans entered their world.) He gestured with the cross toward the four cardinal directions, then made signs over the woman.

Suddenly he performed an odd hopping dance. Then he crouched beside the woman and applied a short hollow reed to her face, neck, and arm, sucking through it. Rising to his feet, Dionisio spat small, wormlike things into his palm. They were the *gusanos*, he said —the maggots that had caused the ailment.

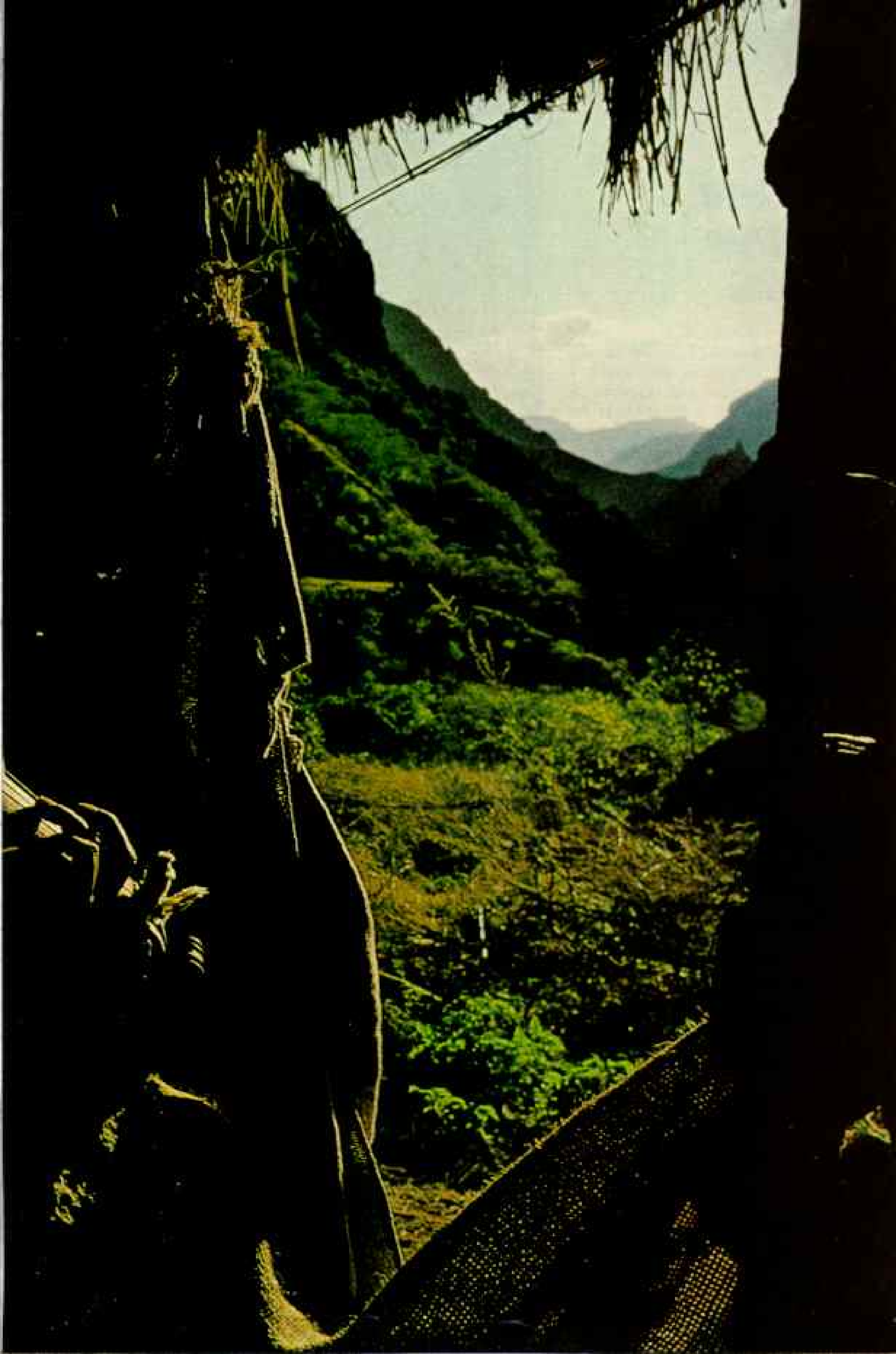
I saw no cure. The patient remained motionless. The shaman said he was unsure of success because the woman's husband suspected some wizard had sent a *nawiari*, an invisible force, to make her sick.

Tourism Gnaws at Indian Ways

The community of Awriachi has known little change over the years. But modern civilization is encroaching on Tarahumara ways in Creel, a large town at the northern edge of the canyon country. Creel used to be a Mexican outpost. Twelve years before, I had seen a *(Continued on page 715)*

Warm glow of domesticity brightens a Tarahumara rock shelter (**left**) in the depths of a canyon. Just behind stands a neighbor's simple home. Firewood is cut and carried from the high slopes above. Within the primitive rock dwelling (**above**), devoid of furniture, a woman grinds cornmeal on a metate for a typically frugal—and meatless—Tarahumara meal.

FILLING THE SILENCE
of his canyon realm, a Tarahumara scrapes out a simple sequence of notes, more drone than melody. His handmade violin, carved from native woods, copies models introduced by the Spanish.



Death—and the proper farewell

DELIVERED FROM the travails and sorrows of this world, a Tarahumara's soul requires a ritual send-off to its abode in the world to come. For a man, communities stage three separate ceremonies over several months; a woman gets four. A tribesman explained, "A woman's soul is harder to cut loose."

Only by performing the appropriate "cures" can the living be assured that the spirit of the deceased will not hover about permanently. Offerings of food (**right**)—most to be eaten by celebrants—are bestowed to ease the dead man's transition to the other world.

Man with rattle (**below**) has been chanting and drinking corn beer since the previous evening. Behind him stands a makeshift altar, before which an animal, usually a cow or goat, has been sacrificed. The three crosses have a traditional as well as a Christian symbolism to the Indians.

A shaman (**right**) singes the hair of a celebrant with burning corncobs to "cure" him—that is, to keep evil from befalling him, in a Tarahumara version of preventive medicine. Credited with supernatural powers, the shaman ranks high in the local hierarchy. To incur his displeasure is to risk the possibility of reprisals from the supernatural realm.

(Continued from page 711) Wild West kind of place with log houses, and a few stores catering to miners and lumbermen. Now almost everything had changed except the altitude, more than 7,500 feet.

I hopped off the Chihuahua-Pacific train and found station wagons waiting to drive tourists to new motels sprouting in the canyonlands. Heavy machinery was building a new highway that will span the area. The town itself had running water, electricity, and a normal school.

I needed a jeep and a guide to visit Sisoguichi, a Catholic mission center tucked away in the rugged mountains east of Creel. There a shortwave transmitter was broadcasting lessons both in Rarámuri and Spanish to 60 "radio schools" at distant communities.

Father Luis G. Verplancken, an energetic Jesuit here for 21 of his 47 years, told me: "There is a dirt road. Do you want Felicitas to take you? You do remember Felicitas, eh?"

Who could forget? Twelve years earlier, photographer Tor Eigeland and I had become her temporary foster parents. We had gone with Father Verplancken to Ojachichi, a remote rancho, to visit a radio school. A Tarahumara was conducting classes in a log hut. He called on Felicitas Guanapani.

A thin, winsome Tarahumara child of 7, she had attended the school less than four months. Yet her accent was perfect as she read from a Mexican textbook. Suspecting she had memorized the text, I asked her to read from a Kodak-film data sheet printed in Spanish. She pronounced even the technical terms without faltering. Then Father Verplancken surprised us, saying, "She reads and

writes the Spanish, but she doesn't know what it means. She only knows Rarámuri."

Eigeland and I were so impressed by the child that we "adopted" Felicitas and her younger cousin, Lucia Nava, and took them to Sisoguichi to board and study at a school run by nuns.

Now, in Creel, I met the girls again. Felicitas had grown into a petite young woman, dressed in a skirt-and-sweater outfit. Lucia wore a trim pantsuit. Both spoke excellent Spanish and had acquired English during a two-year stay in the United States. Felicitas had finished high school and was at the normal school. Lucia worked in a clinic for Indian children.

Both girls could handle a four-wheel-drive Scout with a trucker's skill. They chauffeured Father Verplancken and me over twisting mountain trails to Sisoguichi and other places in the grip of change. At Gonogochi, Lucia said of the new mission school there: "It has everything. The children board five days a week. They have beds, good food, hot water, and guess what?—they experiment!"

Education for Self-defense

Father Verplancken explained. "We are dropping the radio schools and building more schools like this. It has an experimental farm where we grow crops, suitable to this soil, that the Indians never heard of. The children not only learn their Spanish lessons; they also learn new ways of farming."

"It is good," Felicitas added. "In the past the *chavochis* [white men] robbed our people and took the best fields. Now the railroad is completed, and the new highway is being

FATHER LUIS G. VERPLANCKEN

Tough as their menfolk, Tarahumara women do chores in year-round sandals after one of the region's infrequent snowfalls. If theirs is a hard life, it has its compensations. At the festive tesgüinadas, the usually shy Indian women may take the lead in initiating courtship. And they can inherit property from husbands as well as from parents.

built. These will bring in more strangers. We must learn to defend ourselves."

"Defend yourselves?"

"Yes. We must learn Spanish so we cannot be tricked. We must learn accounting, better farming, and hygiene. Many of our parents want us to learn."

Bidding Felicitas farewell, I made an excursion into Barranca del Cobre country, along cliff-hanging La Bufa road. At tiny Basiwari, I came on a dispatching-of-the-dead ritual and its accompanying *tesgüinada*, the drinking spree that caps most Tarahumara social events. My young Mexican driver, Juan, said that an Indian had died months before, had been buried, and now the traditional final rites to speed his spirit into the next world were taking place.

Juan and I looked on from a hill above an old mission church. My eyes kept returning to a wooden altar standing at one end of the churchyard. A knife was stuck in its surface. "The knife is for the killing," Juan said.

Soon several young men led a scrawny brown cow to the altar. There the shaman gestured symbolically over the animal with a bowl of smoking incense. Then he drew the knife from the altar and slit the cow's jugular. A wooden bowl captured the blood. He dispatched two goats the same way.

Juan said, "The meat will be boiled with corn, beans, and herbs—a big feast."

The ritual *tutuguri* ceremony followed: a cacophony of chanting, fiddles, rattles, guitars, stomping dancers, shouts, raucous laughter, and howling dogs. Both men and women dropped out to drink corn beer (they rarely drink anything stronger) and soon were staggering about in a stupor.

Beer Cult Costly in Time and Grain

The mass drunkenness that marks every Tarahumara gathering is a strange and sad phenomenon. For a people as poor as they are, the Indians expend tremendous resources and time on their beer cult. Though they rotate the task of supplying the beer and sacrificial animals, the celebrations remain costly. During the year each family makes tesgüino at least six times, using a minimum of 200 pounds of corn. Depending on how many ties he has to other families, a Tarahumara may take part in as many as 90 parties a year. The average Tarahumara spends an estimated one hundred days a year preparing, drinking, and recuperating from the effects of tesgüino.

When a Tarahumara builds a house, weeds his fields, or harvests a crop, he calls on his neighbors for help. Their pay is corn beer, drunk on the spot. They expect nothing more. No one refuses an invitation to a "work tesgüinada," even though he must walk for

hours to the job and labor for a few days. He follows a tradition that began before the Spanish conquest, and outsiders' attempts to suppress the ritual drinking have always failed. Tesgüinadas are too much a unifying part of the Tarahumaras' social, religious, and economic life.

Other ceremonies, however, stabilize and uplift the Indians, as I saw at Samachiqui, a thriving community west of La Bufa road. Once a bleak mission village, it now has a government school, hospital, and some running water and electricity. On a Sunday morning there, I attended a tribal assembly and court of justice held outdoors before an 18th-century church. I met the *siriame* or *gobernador* (governor) of the Indians at Samachiqui, a strong, intelligent man. Elected by the males of his community, he held absolute authority.

I asked how long he would serve in office.

"No set time," he answered. "I can be siriame for as long as my people want me."

"How do your people pay you?"

"No pay," he replied with dignity. "It is my duty. I have no special privileges. I am the judge when wrongs are done, and I impose punishments. I sometimes represent my people before the state authorities. I order religious ceremonies. I deliver sermons. I settle inheritance disputes."

"Does anyone disobey you?" I asked.

He shook the cane he carried, his symbol of office—a yard-long silver-knobbed brazilwood staff called a *disora*. "When I speak over the disora, I have authority," he said quietly. "A Tarahumara would sooner kill himself than disobey his siriame."

Ritual Mixes Religion and Justice

For an hour Indians had been trotting down trails to the churchyard. The siriame, his captain, and two assistants seated themselves on a stone bench. A hundred Tarahumara men, women, and children stood before them in the chill wind, and the siriame gave a sermon in Rarámuri about God and proper behavior at fiestas, and then spoke of the new highway about to open up the region.

Afterward, a basketball-size rock—the witness bench for the court of justice—was set in the open space between the siriame and his people. Indian after Indian sat on the rock to register complaints. The last person brought before the court was a young man accused of fighting at a fiesta. After three witnesses were heard, the siriame sentenced the defendant to seven nights in the wooden jail beside the church. Then the young man brushed palms with the siriame, showing that there was no resentment.

On my last morning before leaving the land of the long-distance runners, I hiked through rock-strewn highlands south of Creel. Walking miles along the new highway, I passed a construction crew and waved to a workman in Levi's, boots, and a hard hat. He was operating a pneumatic drill. A Tarahumara? I couldn't be sure.

I recalled Father Verplancken saying, "Change is coming, but I hope the Tarahumaras do not become slaves to civilization."

Change Inevitable in the Long Run?

Then I thought of an astonishing incident of a week earlier. I had descended 4,000 feet into Barranca del Cobre—Copper Canyon—and my legs felt as if they had been stretched on a medieval torture rack. Suddenly two Tarahumaras, stripped to their loincloths, came running barefoot down the trail. Each carried a ten-foot wooden beam on his shoulder. They paused to share a cigarette, and I asked the purpose of the beams.

"For place down there," one said in Spanish. The beams, I learned, were used as shorings in the small gold mines below.

"How much money do you get for them?"

"Ten pesos," he replied—about 80 cents, for the labor of cutting a tree on the rim of the canyon, shaping it with simple tools, then delivering it at a run to the canyon mines.

"Why do you *run* to the mines?" I asked.

The reply was simple: "To go there."

The reasons may be more complex. Perhaps the Tarahumaras developed this ability because of the deer chases. Also, their neighbors, the Yaquis, were noted runners; so were such other North American Indians as the Apaches, Navajos, and Pimas.

The Tarahumaras shyly saluted me, shouldered their beams as though they were Little League baseball bats, and trotted off down the precipitous trail. An hour later, while I was still descending, they passed me on their way back.

These runners had a modest lumbering business, but they did not seem about to become slaves to civilization. □

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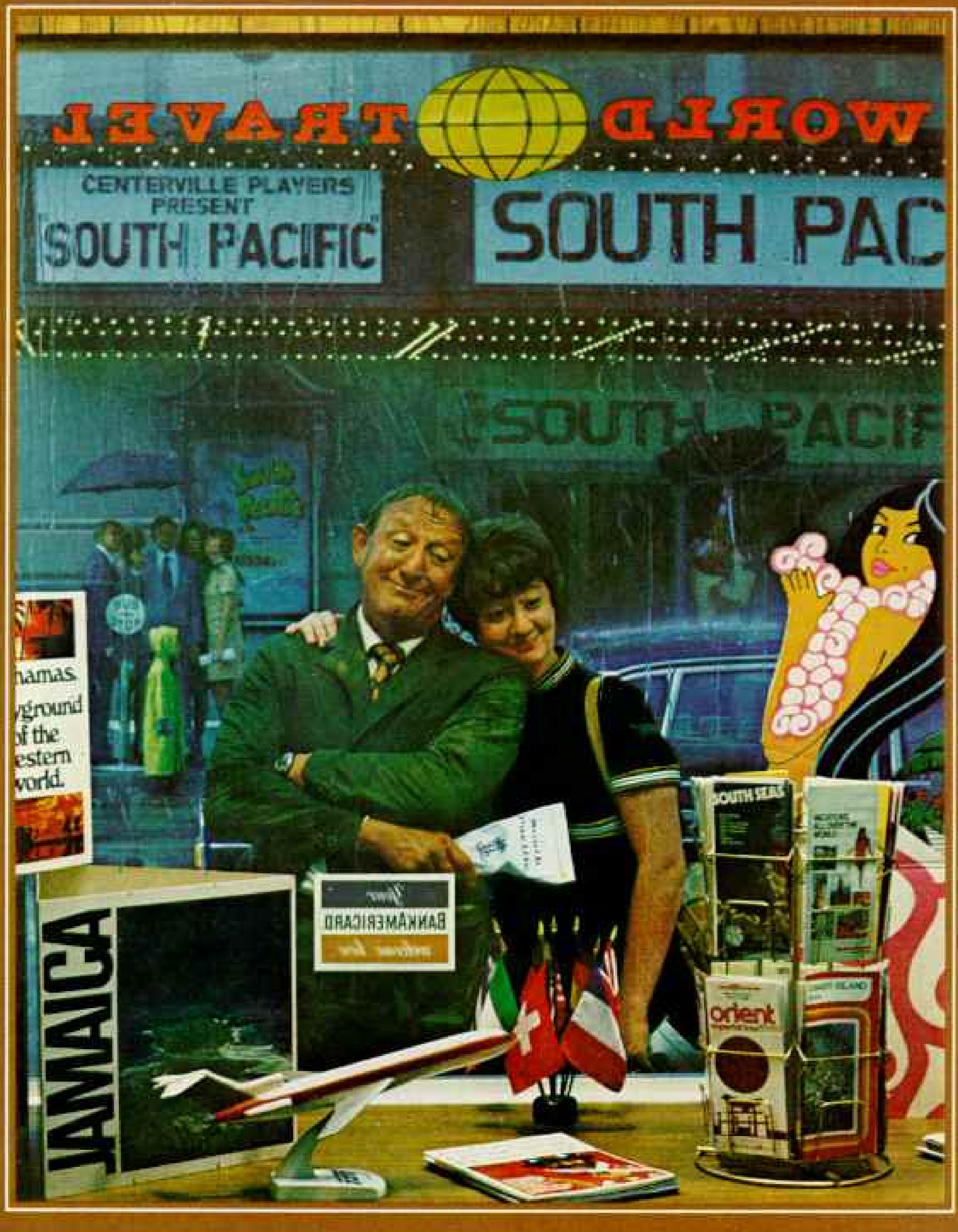

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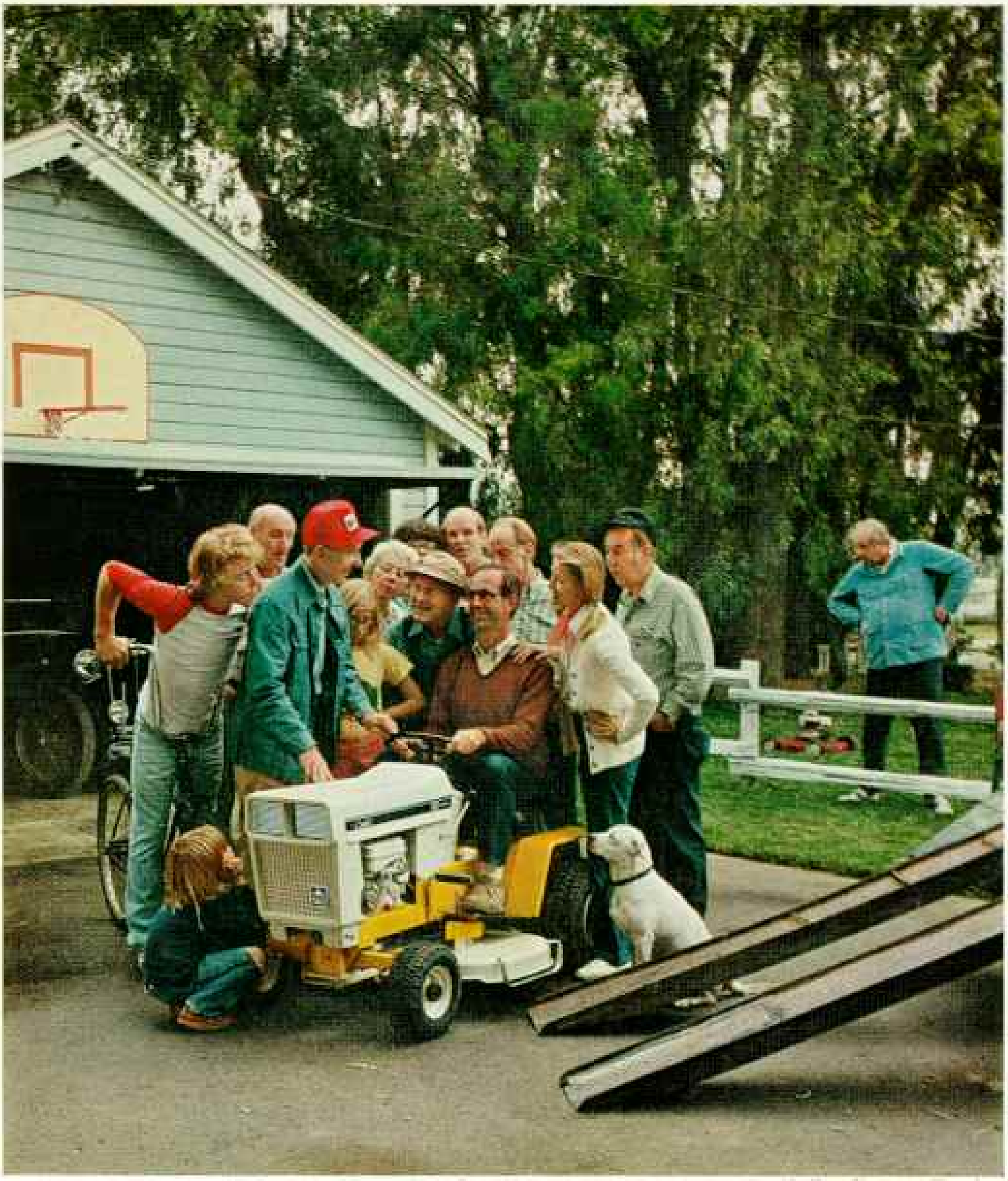

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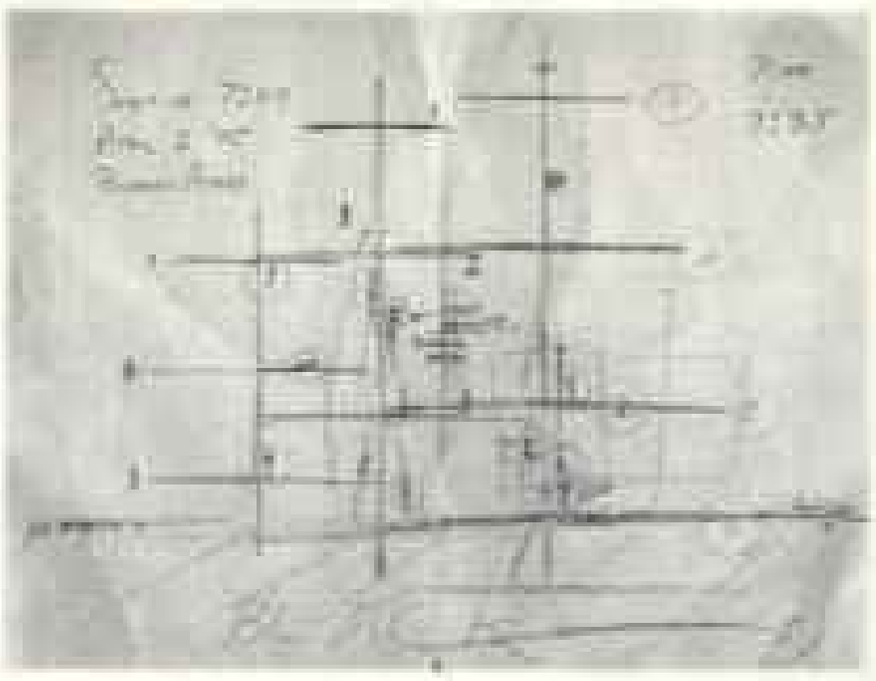
Navigating a photograph to "see" Magellan



TO PHOTOGRAPH SCENES of Ferdinand Magellan's pioneering circumnavigation of the earth for next month's GEOGRAPHIC, staff photographer Bruce Dale set off to capture those "spontaneous moments" that reveal the past in the present. Yet "about once an assignment" Bruce sees a situation that demands somewhat more advance planning.

In Buenos Aires he found the full-rigged Argentine training ship *Libertad*—and an idea. Bruce showed deck officer Mario Enrique Garcia (**above**, center) Polaroid prints of the approximate effect he wanted, while in a sketch (**above, right**) he noted the best placement of crewmen in the rigging at sunrise.

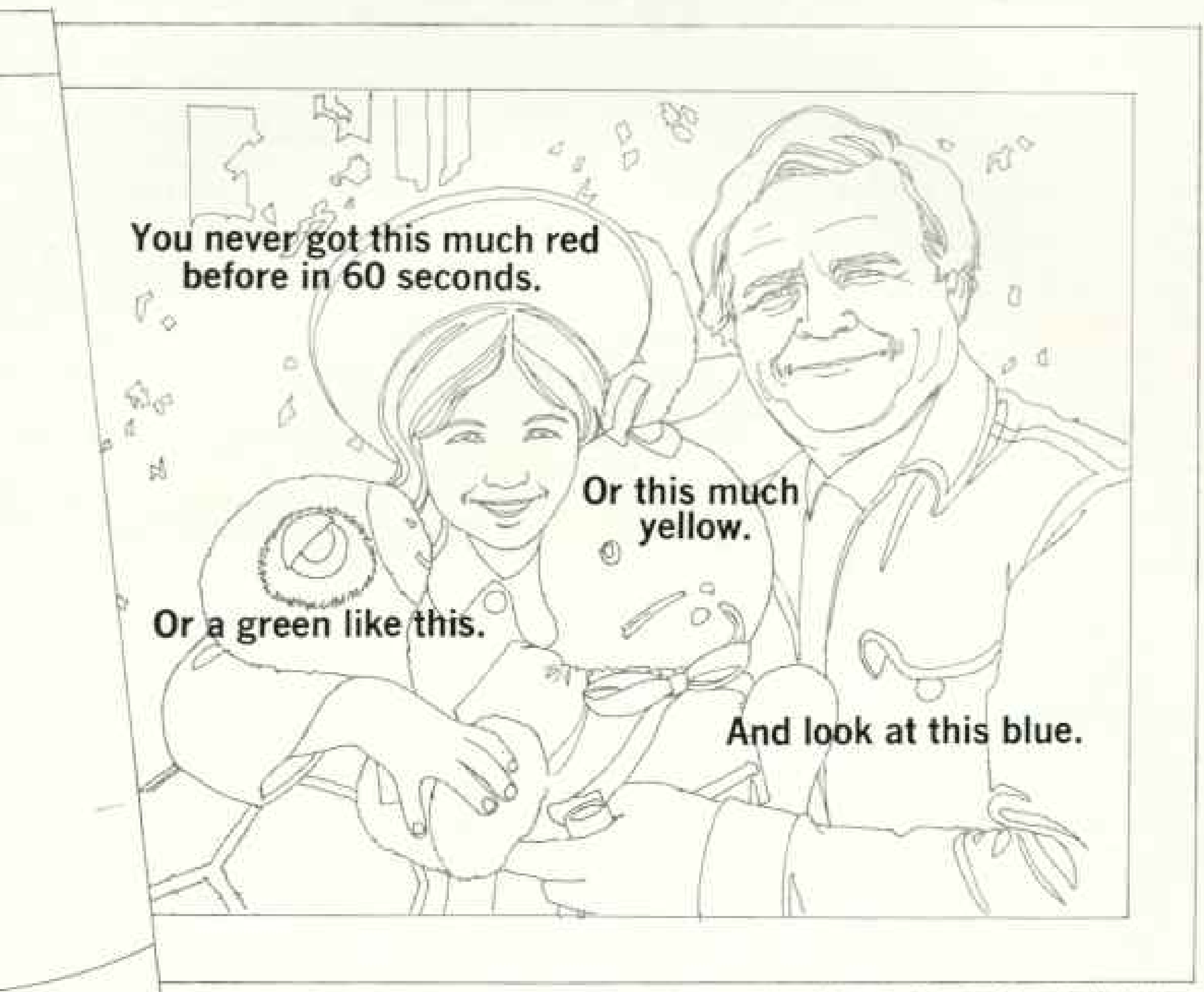
Using a table of sun declinations and a compass, "a small exercise in navigation and geometry," Bruce plotted the precise time when the rising sun would be directly behind mast and yardarms. Then, at a range of a quarter of a mile, he took a picture with a 1,000-mm lens (**right**) that evokes Magellan's era of sail.

Share with your friends the results of such technical skill in the service of imagination. Nominate them for membership on the form below.

The 60-second

Polaroid's $28* Super Shooter for the Super Colors.

masterpiece.



This is Polaroid's Super Color. It was taken with our Super Shooter Land camera. This remarkable camera costs only $28 yet actually uses 5 different kinds of instant film—and the most dramatic is our Polacolor 2.

Special metallized dyes (the same dyes we developed for our SX-70 film) now give your 60-second pictures an amazing brilliance—more red, more blue, more yellow, more green than you could ever get before. These colors are also surprisingly fade-resistant and last longer than most other amateur prints.

The Super Shooter comes with an electric eye and electronic shutter for automatic exposures for all 5 films, as well as a sharp 3-element focusing lens, and a built-in flashcube attachment with automatic advance.

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According to EPA estimated mileage results, the Aspen sedan and coupe got 27 MPG on the highway and 18 city. The wagon got 30 MPG highway and 18 city. All were equipped with a 225 Six and manual transmission. (Your actual mileage may differ, depending on your driving habits, the condition of your car, and optional equipment. In California, see your Dealer for mileage results.) Bravo, Aspen!

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Blue crab: main cog in an "immense protein factory"

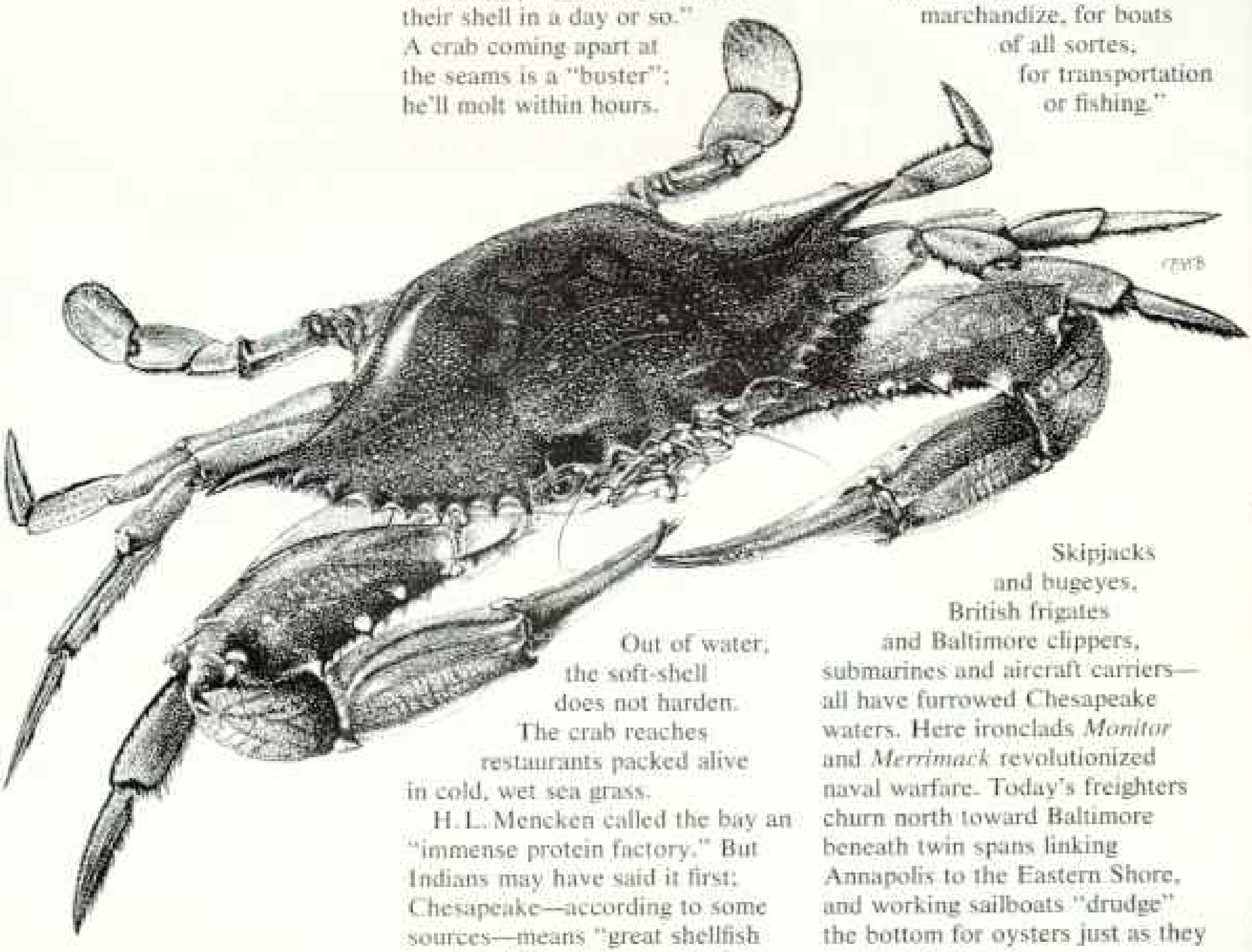
Chesapeake Bay watermen annually harvest millions of pounds of the blue crab *(Callinectes sapidus)*. The succulent crustaceans will be steamed, stuffed, deviled, shredded into salads, patted into crab cakes, and, in their soft-shell state, eaten whole.

Baymen keep a sharp eye out for crabs about to shed their exoskeletons. A Tangier Island packer can spot a peeler by its paddlelike backfin: "Crab with a white edge to his paddle, he's got about a week to go. Pink rim, he'll shed in three days. When they gets red in the paddle, they'll shuck their shell in a day or so." A crab coming apart at the seams is a "buster"; he'll molt within hours.

Clams and crabs abound. To hear a waterman talk, it's a good thing only two or three crabs survive from the million or more eggs a female carries. Otherwise, "the world'd be et up by crabs."

Some 150 rivers, branches, creeks, and sloughs bearing names such as Crab Alley, Ape Hole, and Bullbegger flow into Chesapeake Bay. From the mouth of the Susquehanna to the Virginia capes, the bay washes more than five thousand miles of shoreline.

Capt. John Smith observed in 1612: "the waters, Isles, and shoales, are full of safe harbours for ships of warre or marchandize, for boats of all sortes, for transportation or fishing."



Out of water, the soft-shell does not harden. The crab reaches restaurants packed alive in cold, wet sea grass.

H. L. Mencken called the bay an "immense protein factory." But Indians may have said it first; Chesapeake—according to some sources—means "great shellfish bay," and it is that yet. Despite the overfishing that depleted the world's finest natural spawning beds, the bay still leads the country in oyster production.

Skipjacks and bugeyes, British frigates and Baltimore clippers, submarines and aircraft carriers—all have furrowed Chesapeake waters. Here ironclads *Monitor* and *Merrimack* revolutionized naval warfare. Today's freighters churn north toward Baltimore beneath twin spans linking Annapolis to the Eastern Shore, and working sailboats "drudge" the bottom for oysters just as they did a century ago.

The Chesapeake Bay waterman is but one of the unique people readers meet in the wide-ranging pages of NATIONAL GEOGRAPHIC.

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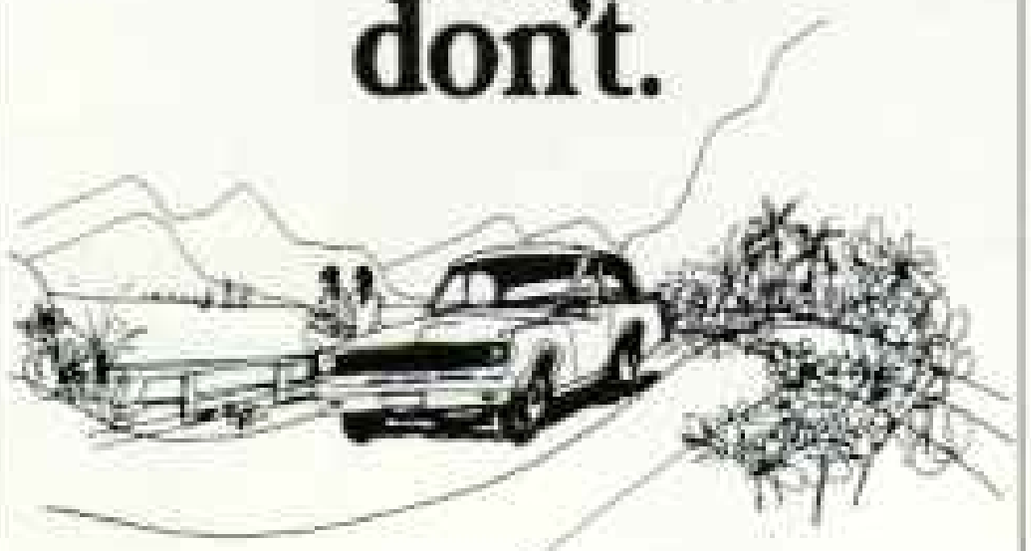

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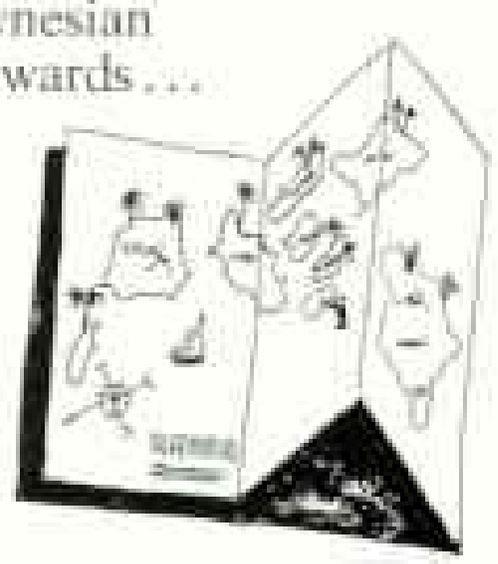

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Now that she is a little past 40,
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A diamond is forever.

152 reasons why

If you travel a lot you know the kinds of surprises we're talking about. Like lost reservations, lumpy beds and prices that inflate overnight.

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A room with no surprises.

When you pull into a Holiday Inn location, you know what's waiting for

you. A big comfortable bed (1) with fresh sheets (2) and soft pillows (3). Your room will be in top condition (4-5), and so will the equipment in it (6). There will be a comfortable sofa or lounge chair for you to relax in (7), and a free TV (8). We've got 49 other standards (9-57) that just cover your bedroom and bath. Things like the thickness of your carpet, the required number of hangers, the condition of your individual year-round temperature control, the firmness of your mattress, the soap, the towels and the all-over cleanliness of every square inch of your room.

We don't cook up surprises.

We don't make wild promises about our restaurants. Just that you'll get a tasty, nourishing meal (58), presented appetizingly (59). Our meats, vegetables and desserts are top quality (60) and will be served the way you ordered them. 7 other restaurant regulations (61-67) mean you get good food and prompt service in clean surroundings. We are very finicky about our glasses and silverware and tables and restrooms, even our kitchen floors. Everything.

Service without surprises.

Is it possible that no one would ever be surprised by anything in a Holiday Inn room or restaurant? Our Innkeepers and Food and Beverage Managers are going to try. They are required to know our rules inside out (68). Each is a graduate of extensive training at the multi-million-dollar Holiday Inn University (69) and is required to take refresher courses every year. Holiday Inn employees receive specialized training too. They've got 12 rules of their own to live up to (70-81), including being well-groomed and courteous and offering you at least 14 hours of continuous room service daily, and being able to refer you to a baby sitter or a dentist or a doctor quickly.

Don't look for surprises in our lobby.

They're tough to come by. Our lobbies are neat and uncluttered (82) with plenty of helpful information from an area map and schedules (83) to brochures on attractions (84). There's even a church directory (85). Plus six other standards (86-91) that deal only with keeping the lobby clean, comfortable and safe.

Some other things that won't surprise you.

Free Holiday Inn swimming pools (92) are well-maintained (93-96). And we have standards that cover things like hallways, mechanical rooms, and storage rooms (97-99).

There are 13 more standards (100-112) that cover miscellaneous items, from housekeeping supplies to parking space to security.

Our unsurprising prices.

We offer reasonable rates and we stick to them. 3 regulations (113-115) assure that. We also guarantee the

American Express Card will be welcomed for payment of your room and meals. So don't leave home without it. If you don't already have an American Express Card, there's an application in every Holiday Inn room. And children under 12, when they're in the same room as their parents and require no rollaway beds, are always free.

Probably the most important rule of all is that every inn is inspected several times each year to make sure it lives up to the 151 other rules (152).

Stay with us soon. And give us a chance not to surprise you.

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the best surprise is no surprise.

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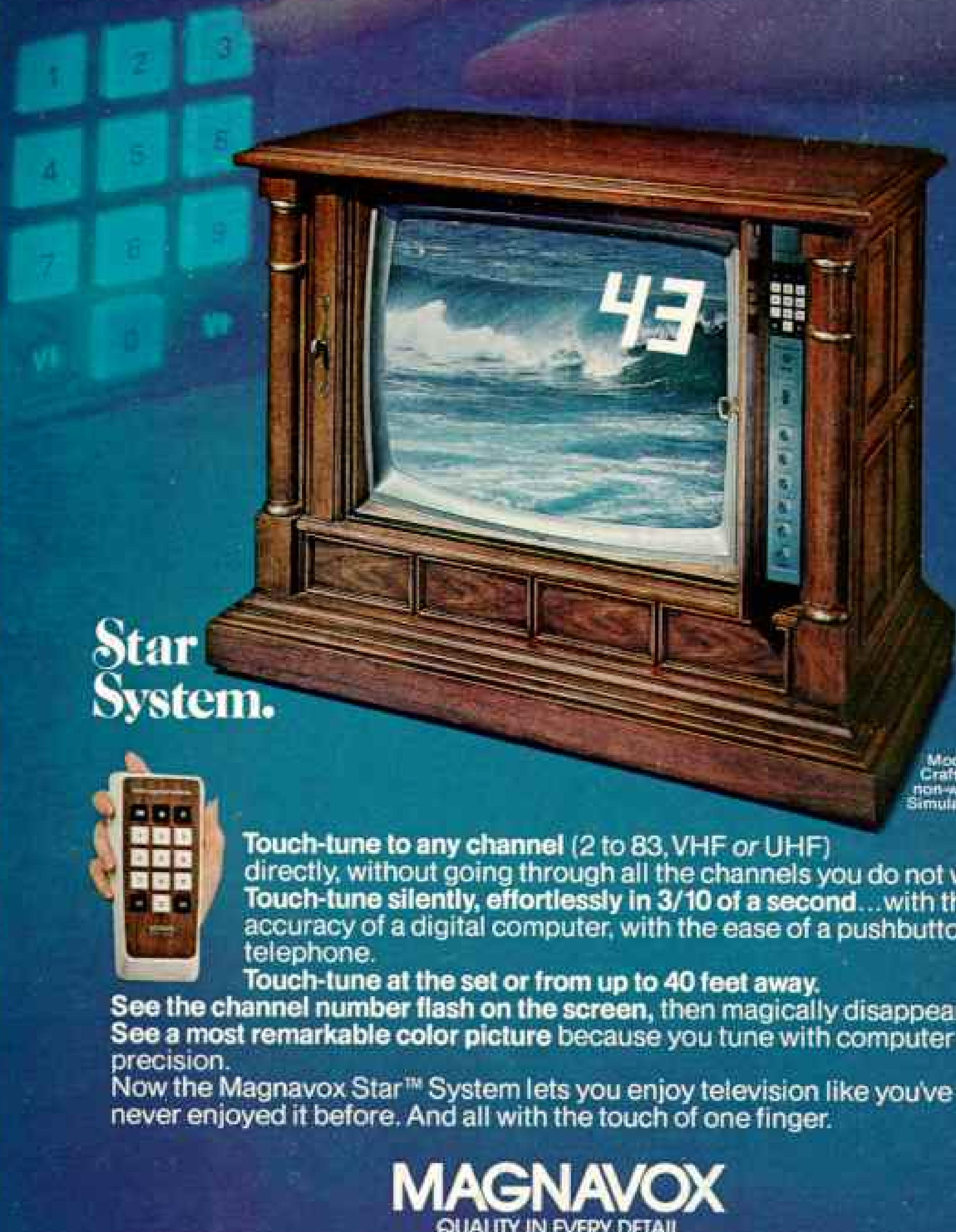
The most advanced electronics. At your fingertip.



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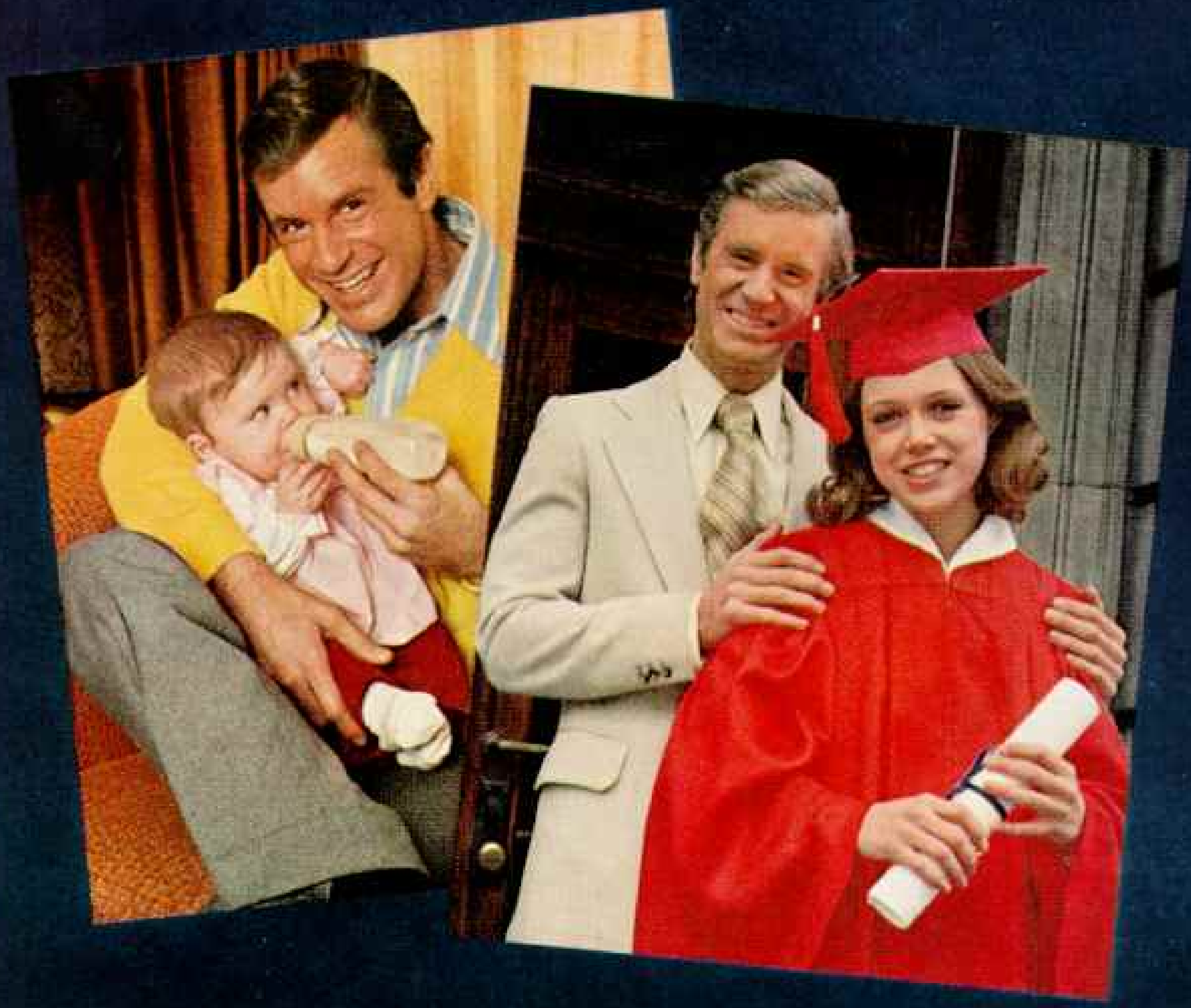

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"Mining is destroying that mountain."

Two opposite views. Each expressing a basic human need. Which should have priority?

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Others perceive the mountain's wealth another way: as minerals basic to energy, communications, shelter and transportation requirements, harvesting food. According to the U.S. Dept. of Interior, each year 40,000 pounds of raw minerals are used for each person in the country. Reductions in our mineral supplies would alter our lives drastically.

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