VOL. 160, NO. 3 SEPTEMBER 1981

NATIONAL GEOGRAPHIC

TROUBLED ODYSSEY OF VIETNAMESE FISHERMEN 378

SILVER

A MINERAL OF EXCELLENT NATURE 280

MANHATTAN—IMAGES OF THE CITY 317

OMAN: GUARDIAN OF THE GULF 344

NAHANNI: CANADA'S WILDERNESS PARK 396

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

AMONG the very first letters from members published in NATIONAL GEOGRAPHIC was one datelined Paris, April 1897. An informed and bothered reader, M. Ernest de Sasseville, complained of a mistake he found in an English map. ". . . Mr. Philip ought to know that the use of a brush and some color to make a territory appear to be either English, French, or Turkish, according to one's patriotic ambitions, does not make it so." The area in question was a small base, which provided, according to M. de Sasseville, a key to French colonization of the Indian Ocean.

French colonization in that region has come and gone, but the area's strategic importance remains, and the big powers—now the Soviet Union and the United States—contend for the best military bases. In this issue we take a look at Oman—which occupies one side of the Strait of Hormuz and which recently granted the U. S. access to several facilities for military use.

Also in this issue, 84 years after M. de Sasseville's letter, we inaugurate the first formalized "letters from members" column. MEMBERS FORUM, which appears in our advertising section, will permit us to publish a few of the many letters we receive.

Of the 18 million pieces of mail received last year, 150,000 contained inadequate return addresses—in many cases none. Some 700,000 were inquiries requiring personal answers. More than 13,000 were comments on editorial content of Society publications or TV Specials. Some are unusually critical. A photograph of three cheetahs killing a gazelle, for example, drew 244 criticisms. Other articles receive unusual praise. Our Mount St. Helens coverage was commended by 590 correspondents and criticized by only 20.

Happily, 77 percent of your letters are complimentary, but you are often critical—sometimes irate—about our oversights, questionable positions, and outright mistakes. MEMBERS FORUM will permit the correction of these occasional errors, air contrary opinions, and allow us to share a few of the informative and humorous tidbits you send us. But most important, we hope it will enhance your sense of belonging to and participating in the Society's work.

Wilbur E. Garrett

EDITOR

NATIONAL
GEOGRAPHIC

THE NATIONAL GEOGRAPHIC MAGAZINE VOL. 160, NO. 3

COPYRIGHT © 1981 BY NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C. INTERNATIONAL COPYRIGHT SECURED

September 1981

Silver: A Mineral of Excellent Nature 280

The story of an extraordinary metal mirrors man's ageless striving for faith and healing, riches and beauty. By Allen A. Boraiko, with photographs by Fred Ward.

Manhattan—Images of the City 317

New York's best known borough vibrates with problems and newfound promise. John J. Putman and native New Yorker Jay Maisel capture its heartbeat in words and pictures.

Guardian of the Persian Gulf 344

In a rare look inside strategic Oman, author-photographer Thomas J. Abercrombie reports how petrodollars and a forward-looking sultan are propelling a medieval land into the modern age.

The Wanderers From Vung Tau 378

Fleeing Communist takeovers in their homeland, Vietnamese fishermen and their families hope Biloxi, Mississippi, will yet provide the peaceful haven they yearn for. By Harvey Arden, with photographs by Steve Wall.

Nahanni: Canada's Wilderness Park 396

Exploring a far-north river the Indians revered, Douglas H. Chadwick and photographer Matt Bradley find a masterwork of grandeur and solitude—canyons, falls, mountains, and forests.

COVER: *A young Vietnamese refugee in Biloxi, Mississippi, dons festive costume for Tet, the lunar new year of her people. Photograph by Steve Wall.*

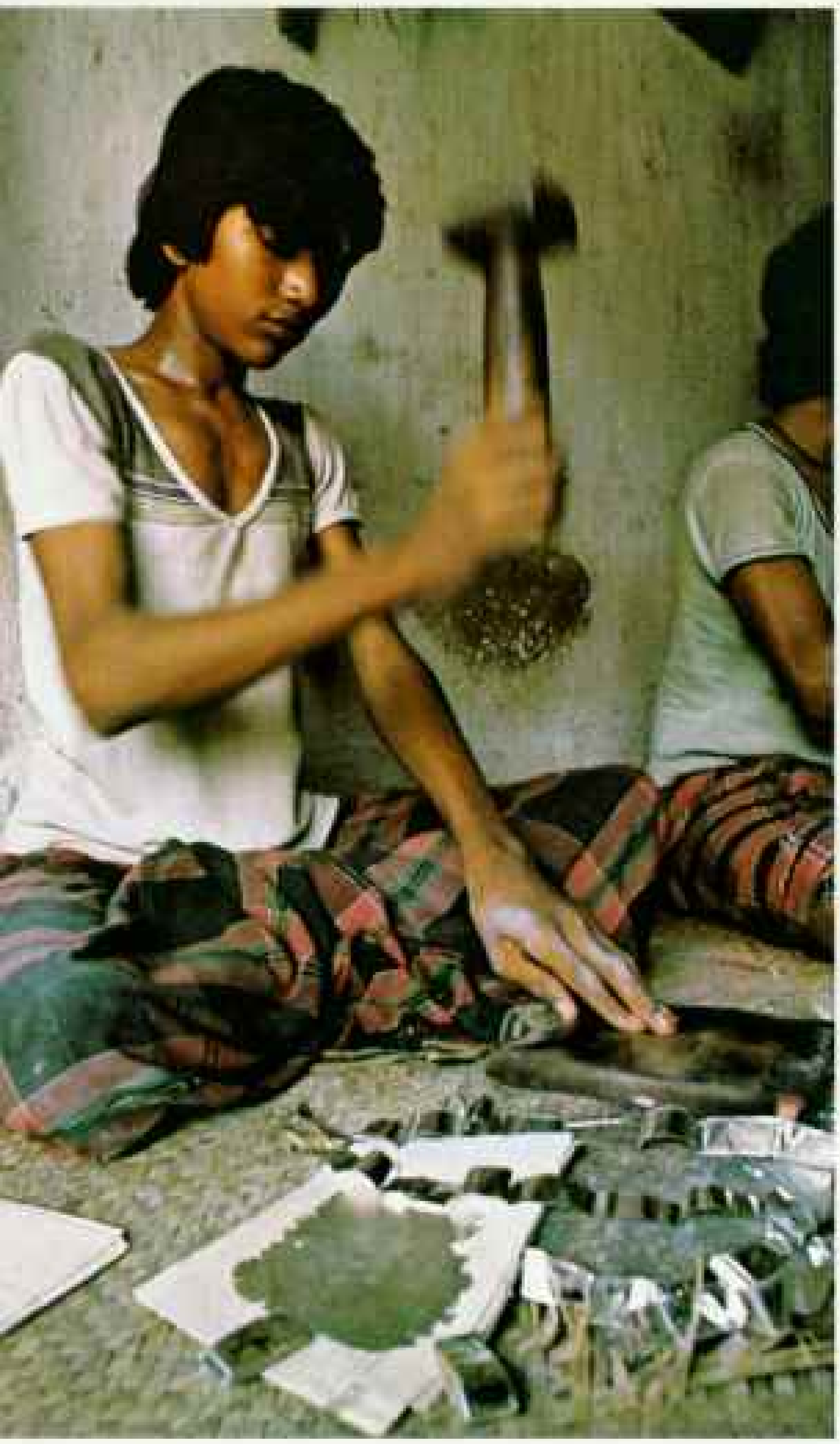
A Mineral
of Excellent
Nature

SILVER

By ALLEN A. BORAIKO
NATIONAL GEOGRAPHIC EDITORIAL STAFF

Photographs by FRED WARD
BLACK STAR

From the world's treasure chest of silver, heirlooms by the ton were sold, compressed, and melted during a recent price boom. As versatile as it is precious, silver constantly changes hands and forms. More than a symbol of wealth, it has emerged as a remarkably practical metal, useful in photography, medicine, even in solar energy.



With silver enough to eat, *India does exactly that. In Hyderabad silverbeaters* (**above**) *transform the highly malleable metal into a featherweight foil to be applied as decoration on food, a widespread tradition that brightens festive meals. An elixir in this land of few luxuries, the tasteless and benign foil also serves as coating on arthritis pills* (**facing page**) *and in other remedies. India claims four to five billion ounces of silver, about 15 percent of the world's total supply. Much is owned by women in the form of anklets, bracelets, and other jewelry that represent portable savings accounts—and some financial independence in marriage.*

THE PEOPLE CROWD under the druggist's awning—backs to the southern Indian sun, noses out of the drifting dust—and crack his coriander seed between their teeth. With their tongues, they assay his cinnamon. They sniff his saffron and crush his mint. Pharmacologic epicures, they specify elixirs by ingredient. For mother's weak heart, a paste of rose water, ground pearls, honey. "And don't forget the powdered silver. None of your tin!" Nutmeg, cloves, cardamom, and ginger for grandfather's ancient joints, compounded into a pill and coated with silver foil. "Two silver pills a day for 40 days will make him as loose-limbed as a puppy!"

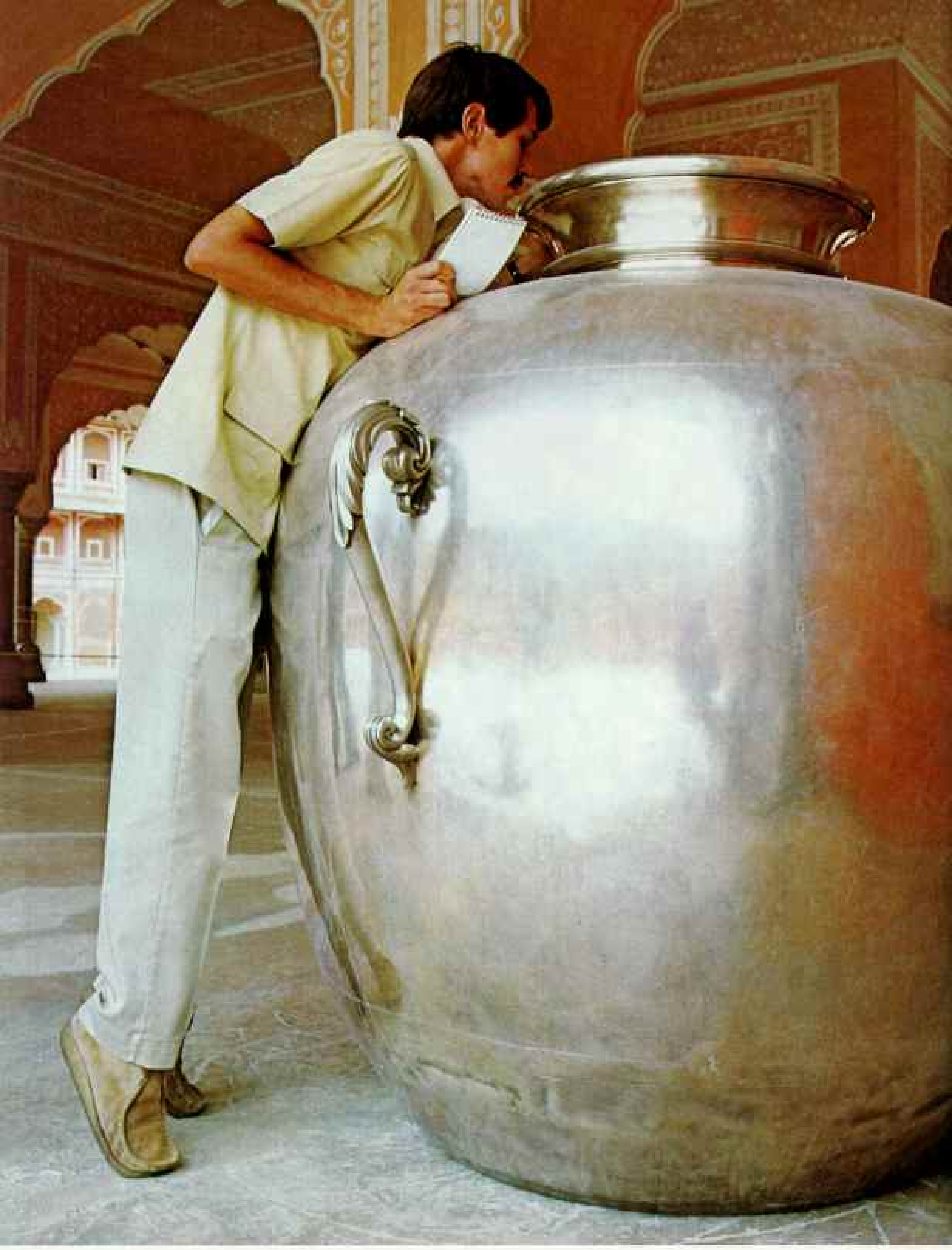
Mohammed Moin supplies the foil. Fifteen, slim, loose-limbed himself, he is a former tailor's helper who once embroidered silk saris with threads of silver, finery for Hindu brides. He outgrew that placid occupation, but still commences his labor with a murmured verse from the Koran.

"I begin . . ." He uncurls a ribbon of sheet silver and tears it into 160 squares each the size of a thumbnail. Then he pads each piece with a crackly sheet of dried goatskin, stacks metal and membrane, and slips the sandwich into a buffalo-hide pouch. ". . . this work . . ." The iron head of Mohammed's hammer swings to smash the hide against a slab of black granite. ". . . in the name of Allah!" The blow cracks across the bazaar, oddly like the hard, sharp clap of wood on wood. Its authority turns people's heads.

Mohammed settles into the work, the hammer haft planted against the callus at the heel of his right hand. His arm pumps smoothly and steadily; if Mohammed had more flesh on his frame, he would have the biceps of a blacksmith. Already he is a fledgling drop hammer: Two times a second, 120 times a minute, the iron pounds hide.

After 18,000 blows, Mohammed stops. In the pouch the silver squares have metamorphosed into airy sheets as broad as a man's hand, but too delicate to touch. Mohammed lays a knife beside one piece and puffs air at it. The silver curls around the blade like a living thing, and he deftly transfers it to backing paper.

The druggist's boy comes to buy 75 silver sheets for more arthritis pills. A fleshy matron, her sweet tooth in command, takes 25



From the age of empire, *a water jug in Jaipur, India, proves intriguing to the six-foot author, who knows of no larger silver artifact. The Maharaja of Jaipur had two made to carry his drinking water from the sacred Ganges to England when he went there for the*

coronation of Edward VII in 1902. Silver coinage from centuries of trade built much of India's fabulous hoard.

sheets to decorate betel leaves and candy. An ambitious mother buys the rest of the featherweight foil; guests will eat silvered roast chickens at her daughter's wedding.

Mohammed picks up his hammer and resumes pounding in crisp double time. Though the work tires him more, he would rather beat silver than sew silk. No particular reason for it, he simply likes silver.

MOST OF US DO. For no more apparent cause, we search clouds for silver and not copper linings, lend an ear to silver-tongued orators, and find silver hair distinguished. Ancient Egyptians were clearer about the source of their bias: They called silver "white gold."

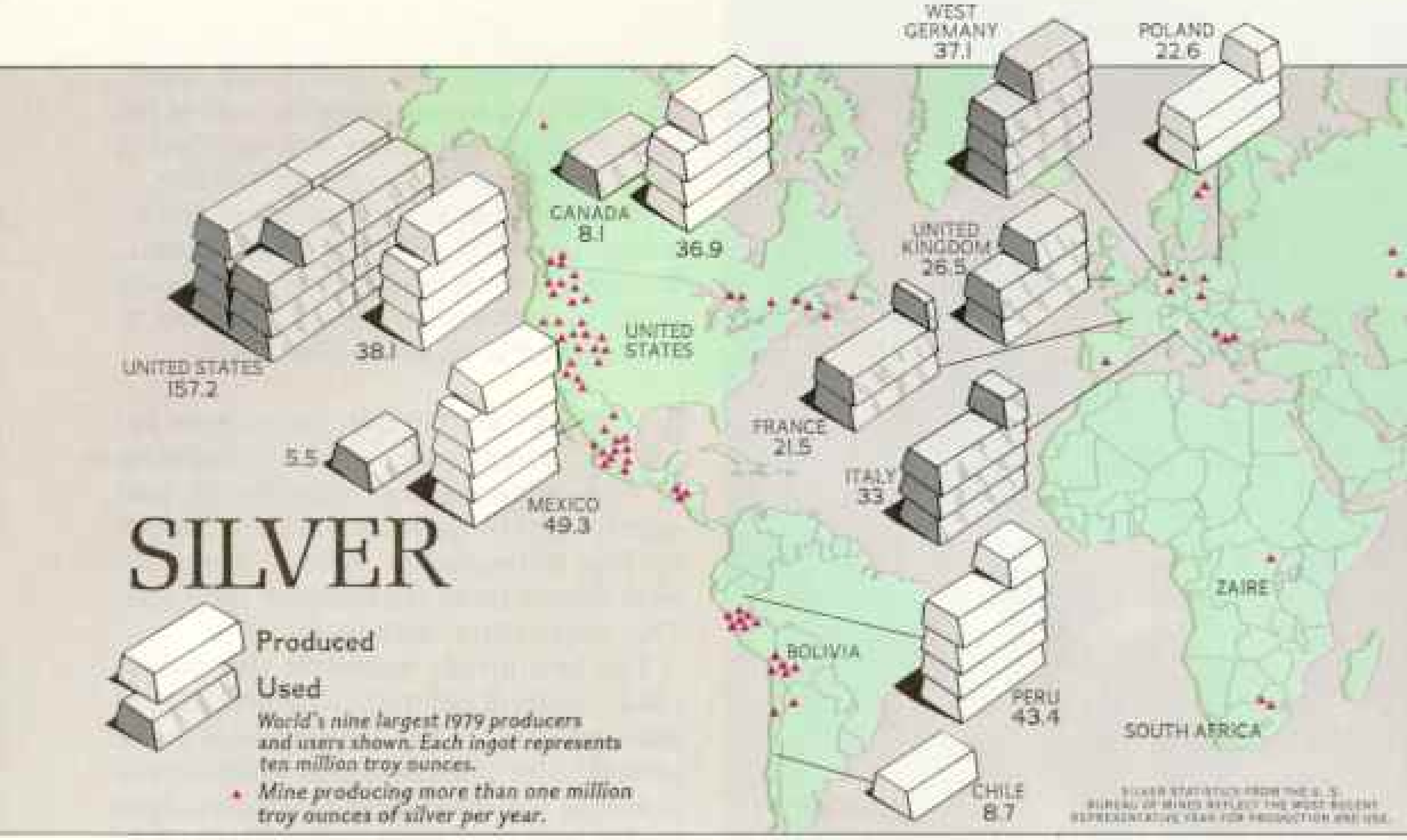
The two metals united in the earliest coins—made of electrum, a natural alloy of gold and silver. They are neighbors in the periodic table of the elements, where silver's resistance to most acids and corrosion aligns it with gold as a noble metal. Only silver rivals gold's ability to bend and stretch. A smith can draw one grain of silver—about five-hundredths of a troy ounce—into 400 feet of wire, or beat it into leaf nearly 150 times thinner than this page. And, like gold, silver is enduring wealth and security in the hand. It won't rust and anyone will buy it. Melt it and hide it, and it escapes identification and taxes. It outlasts banks and paper money—buys bread and milk.

All is not gold that glisters.

—MIGUEL DE CERVANTES, "DON QUIXOTE"

Silver has still more advantages. Nothing else reflects light so well and uniformly, qualities that give silver its characteristic pale white luster. Even the thinnest sheet will reflect 95 percent of the light striking it. Silver concentrates sun rays on solar collectors, backs the best mirrors, and, in extremely fine layers, protects the heat-reflecting gold films on office windows.

Silver will activate oxygen to kill bacteria, and in some swimming pools charcoal filters impregnated with silver eliminate germs and the need for irritating chlorine. European airlines purify their drinking water with silver; surgeons disinfect burns with silver creams and mend bones using cement containing antibacterial silver salts. Silver won't prevent tooth decay, but each year



SILVER

World's nine largest 1979 producers and users shown. Each ingot represents ten million troy ounces.

▲ *Mine producing more than one million troy ounces of silver per year.*

SILVER STATISTICS FROM THE U.S. BUREAU OF MINES REFLECT THE MOST RECENT REPRESENTATIVE YEAR FOR PRODUCTION AND USE.

From earth's crust, where silver is nearly a million times scarcer than aluminum but forty times as abundant as gold, came some 345 million troy ounces of new silver in 1979. Expanding industrial uses help keep annual

Americans put the bite on, so to speak, more than 60 metric tons of silver dental work.

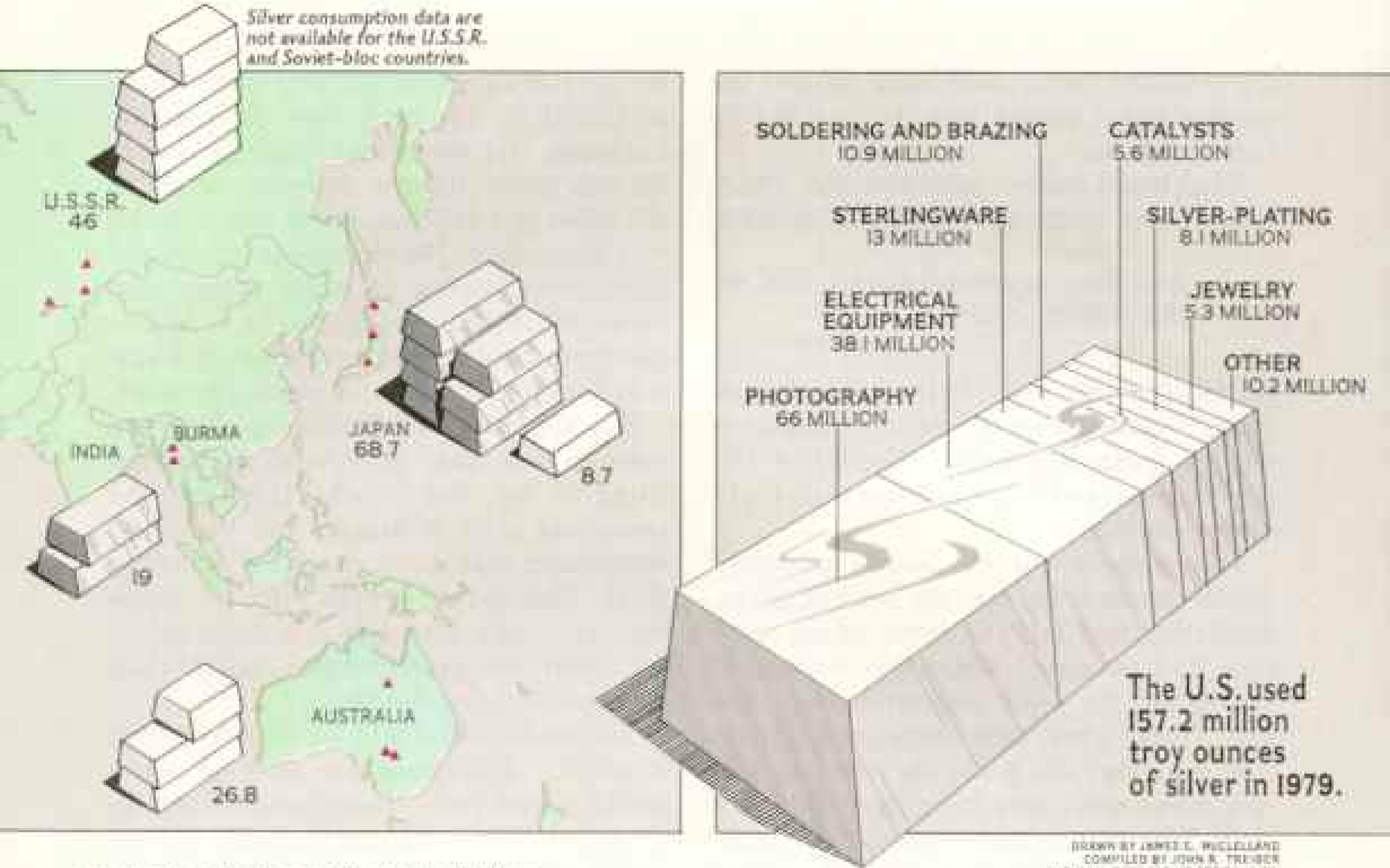
No metal—not even copper—conducts heat and electricity so efficiently as silver. Silver wires lace silicon solar cells, and silver oxide batteries power hearing aids and calculators, submarines and satellites. Hardened with tungsten or molybdenum, miniature disks of silver tap together and switch current from wire to wire in cars and lights; silver-plated disks do the same in telephones and computers. A dishwasher timer alone may have 50 such electrical contacts, which open and close without excessive heat or friction because silver is a natural dry lubricant, good reason to plate it on the bearings of jet engines and diesel locomotives. In the main engines of NASA's space shuttle, silver seals reduce friction and prevent sparks that could set off the shuttle's explosive liquid-oxygen propellant.

Silver can be prepared as crystals of silver iodide and seeded into a cool cloud to become the core of raindrops and snowflakes. One-thirtieth of an ounce of silver iodide will form ten trillion ice crystals, annually enabling parched California cities to wring billions of gallons of extra water from winter storms. In film, crystalline silver salts instantly detect light falling on them and permanently record it. Process the film, and the salts become silver grains that amplify the image a billion times, producing a picture. An ounce of silver packs enough image-making power to manufacture 5,000 color photographs.

WITH SO MUCH USE—even aside from jewelry, tableware, and coins—there must be quite a lot of silver around. I've spent recent months looking for it, and discovered that . . . well, there is and there isn't.

Tiny traces of silver not worth extracting accumulate in algae and trees, human bones and seawater. There are chance outcrops of the pure stuff in desolate ravines high on bald mountains. But surface deposits usually give out quickly. For more silver, we dig, mining it in troy ounces (there are 14.5 to the pound) and by the metric ton (2,204.6 pounds). Experts think that in the past 5,000 years we have mined 933,000 tons of silver, three-fourths of it in the Western Hemisphere and half of it in the past century.

Cast all of that metal in customary



DRAWN BY JAMES E. McCLELLAND
COMPILED BY JOHN R. TREIBER
NATIONAL GEOGRAPHIC ART DIVISION

consumption ahead of world mine production. Recycling old silver makes up the difference.

thousand-ounce bars of "triple nine"—silver refined to 99.9 percent purity—and it would pave 12 miles of four-lane highway in a layer one foot thick, or stack up into a silver brick pillar almost three times the volume of the Washington Monument.

That seems plenty, yet if all the silver ever mined were divided equally among the world's people, we would each receive only 6.7 ounces, barely enough to make a six-piece place setting of sterling silverware. In an actual division our shares would be even smaller because we've lost some silver back to the earth. Think of sunken Spanish silver fleets. Or missing money. In the first 50 years of this century people fumbled and lost an estimated 100,000 tons of silver coins. Not exactly small change.

We put other silver out of reach deliberately. X-ray films carry comparatively large amounts of silver to lessen patient radiation exposure, and about 40 percent remains behind in the film after processing. Filed for years in hospitals, clinics, and doctors' offices, used X rays hold perhaps 3,000 tons of silver. A like amount and more lies in bedrock vaults in New York City, Chicago, and London, the deposits of bullion dealers and investors who buy and sell silver on the world's three great metal exchanges.

Governments lock up silver. The United States Treasury stopped trading it for paper money in 1968, and the U.S. Mint has struck no silver coins since 1976. But more than 4,000 tons rest in federal strong rooms in San Francisco and West Point: the nation's strategic stockpile.

SILVER GOES INTO USE and into vaults so widely and rapidly that for decades mines alone have not met world demand. That, the U.S. Bureau of Mines estimates, was a little more than 16,000 tons in 1979. Two-thirds of this amount came out of the earth.

We made up the difference by tossing old coins, silverware, computer wiring panels, and other silver scrap into the melting pot. More silver washed out of film during processing and was recovered; silver was recycled from catalysts used to produce the ingredients of antifreeze and the fibers of polyester dresses and suits. Happily, we can melt down and refashion our old silver almost endlessly because little metal is lost at each transformation. Strange to think that my wedding band could have crossed the palm of Judas, part of the bribe for which he betrayed Jesus.

That blood money, most probably Phoenician coins, might have paid a harvestman for four months' labor in the biblical vineyard. No one knows for certain, because of silver's fluctuating value. The Great Depression knocked it down almost to dirt—25 cents an ounce.

> *And they covenanted with him for thirty pieces of silver.*
>
> —MATTHEW 26:15

But suppose supply doesn't promptly match demand. Up goes the price of silver. Collecting and refining scrap silver takes time, and, once used, some silver stays out of circulation for years; remember your fillings. Workers may strike mines or refineries (last year they did both, for months), and new mines don't open overnight. To sink a shaft, bore tunnels, and develop a low-grade deposit may cost ten years of sweat and 500 million dollars. Mexican miners say, "It takes a gold mine to open a silver mine."

Until recently, at least the direction of silver's price seemed easy to predict: upward, slowly. So much new silver would come out of mines each month; so much scrap would go to refiners. Industry would use so much more per year, and investors worried by war in the Middle East or worldwide inflation would pay so much, but no more, per ounce. Not much mystery there.

"Silver's as good as gold!" It's late 1979, and all year long people have been doing the unprecedented; paying six, seven, eight, ten and more dollars for an ounce of silver. Dull financial pages turn dramatic: "Silver Prices Up Sharply"; "Silver Climbs to Highs"; "Silver Soars to Records." By December, silver bought at five dollars a year earlier fetches $35, returning a 600 percent profit. Gold, priced much higher, is up only a third as much. Partisan investors jubilate, "Silver's *better* than gold!"

Silver's gone mad, a frantic broker tells me one morning on the chaotic trading floor of COMEX, the New York Commodity Exchange. He never really sees the metal: He only trades futures, contracts to buy or sell silver in 5,000-ounce lots at a set price on a future date. His clients—investors and speculators hoping to make money and industrial-silver users trying to save it—purchase futures with good-faith deposits called margin money and go long or short.

"If you go long," the broker explains, "you agree to buy silver at so many dollars per ounce in, say, two months. If by then the prevailing price is higher, you get metal worth more than it cost you. Nice! Sellers go short. They expect silver's price to fall, so that before they must deliver it, they can buy the metal they promised you for less than you agreed to pay them for it."

The broker adds that it's even riskier than it sounds: Whenever the price of silver moves against you—down if you're long, up if you're short—you must quickly put up more margin money to guarantee your obligations. If you own many futures, that can be millions of dollars.

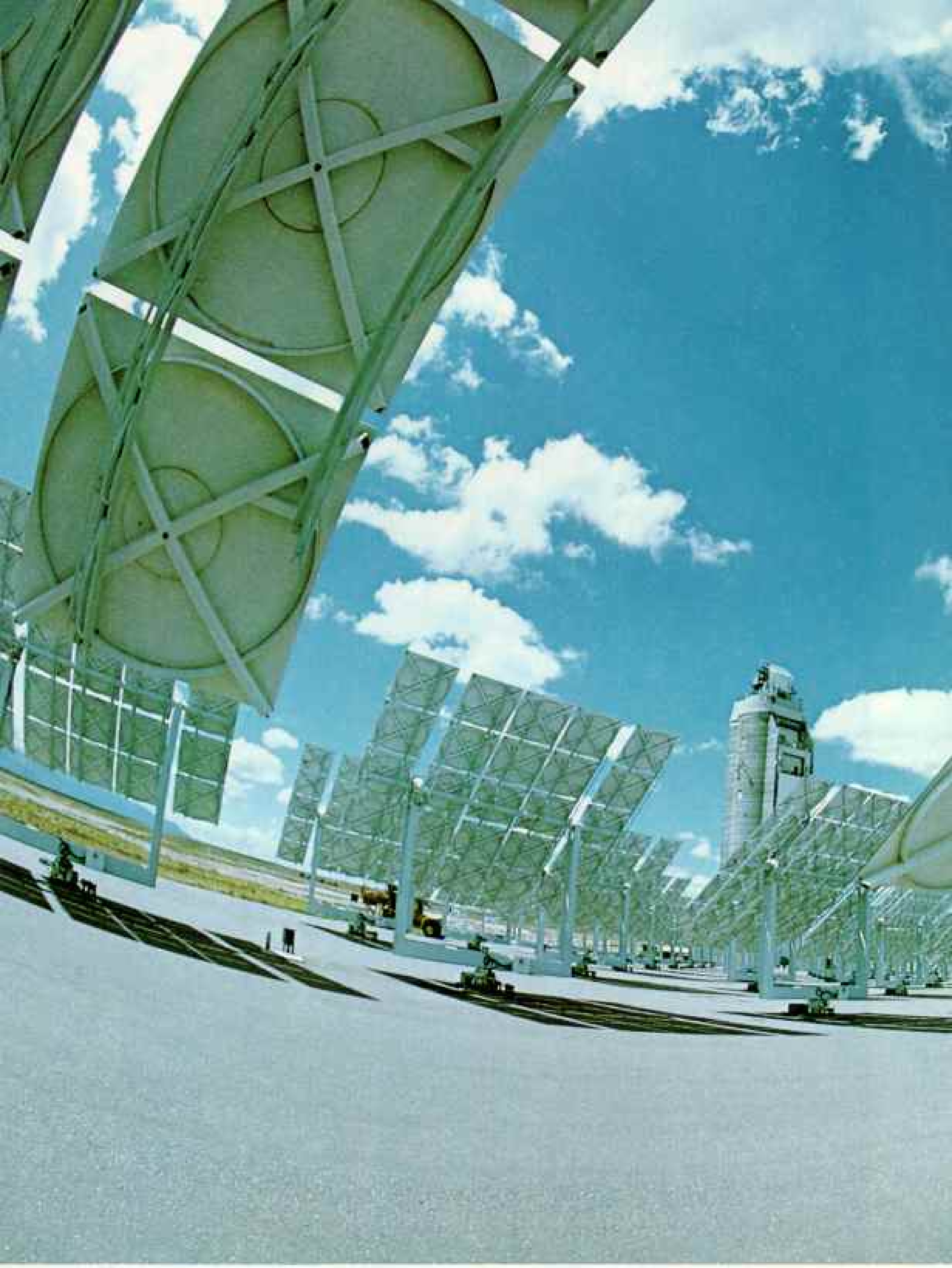
IDLE SILVER ties up money and costs something to insure and store, so speculators seldom care to accumulate it. Instead they balance long and short contracts to avoid losses and come out ahead, with cash. But lately, the broker tells me, mysterious big buyers have been taking delivery of the metal, disrupting the markets, and amassing huge stockpiles of silver. Big buyers . . . Kuwaiti bankers? Oil sheikhs? Interests in Hong Kong?

"Who knows?" I'm with a bullion dealer, possibly the world's largest, also in New York City. He says it's not his business to speculate, figuratively or literally; he simply moves metal.

In his trading room, clerks juggle telephones, punch calculators, and take instructions from clients and other bullion dealers in Zurich, Hong Kong, and Beirut. The dealer picks up a shrilling phone—it's

For thirty pieces of silver, *Judas Iscariot delivered Jesus to His enemies. Perhaps the fateful currency was Phoenician coins struck in Tyre between 126 B.C. and A.D. 65, like these shown here before Domenico Fetti's haunting 17th-century painting "The Veil of Veronica." They are one likely answer to an enduring mystery: What kind of coins bought Christ's betrayal?*

PAINTING, NATIONAL GALLERY OF ART; COINS, SMITHSONIAN INSTITUTION



Focused on the future, *thousands of silver-backed mirrors track the sun and direct its light onto a solar tower to heat a solution to nearly 2000°F at*

a U. S. government test center for solar energy in New Mexico. Just 222 ounces of silver provide the reflective power for two acres of mirrored surface.

London calling: "New York, silver has been fixed at $37.50."

The firm's representative at the London Silver Fixing has compared notes with men from the two other bullion trading houses that form the London Silver Market; they've called Frankfurt, Manila, Bombay. . . . Together the three men have matched buy-and-sell orders, mirroring the world's mood about silver that day.

Do the dealer's clients wish to buy or sell? "Sell?" asks the London man. "How many ounces? Great demand in Tokyo at that price." The London price holds for only a few seconds; in that time a screen flickers in the dealer's trading room: He's just sold 25,000 ounces to a Texas calculator manufacturer.

In mid-January 1980, I browse cutlery at an exclusive store; silver is above $40 and rising. That lovely silver spoon . . . $101? It won't soon be in the mouth of any newborn I know. This elegant pistol-handled dinner knife comes with a spoon and two forks. How much? The saleswoman scans her price list: "$1,047." She looks apologetic. "My list is a few weeks old—by now the price may be higher."

I stop by the maker, Kirk Stieff Company in Baltimore. Charles Stieff II escorts me through the country's oldest silversmithing firm, where men hand-engrave teaspoons and buff forks on spinning wheels of walrus hide. At one workbench a smith indents a creamer with hammer and small spike-shaped tools to form a rich relief of intertwined chrysanthemums and roses.

Because pure silver is too soft to bear constant use, silversmiths fashion the best tableware and jewelry from sterling: 925 parts per thousand of silver and 75 parts of another metal—typically copper—added to strengthen fork tines and necklace links. Both pure and sterling silver react with sulfur compounds in the air, forever renewing a film of gray-black tarnish.

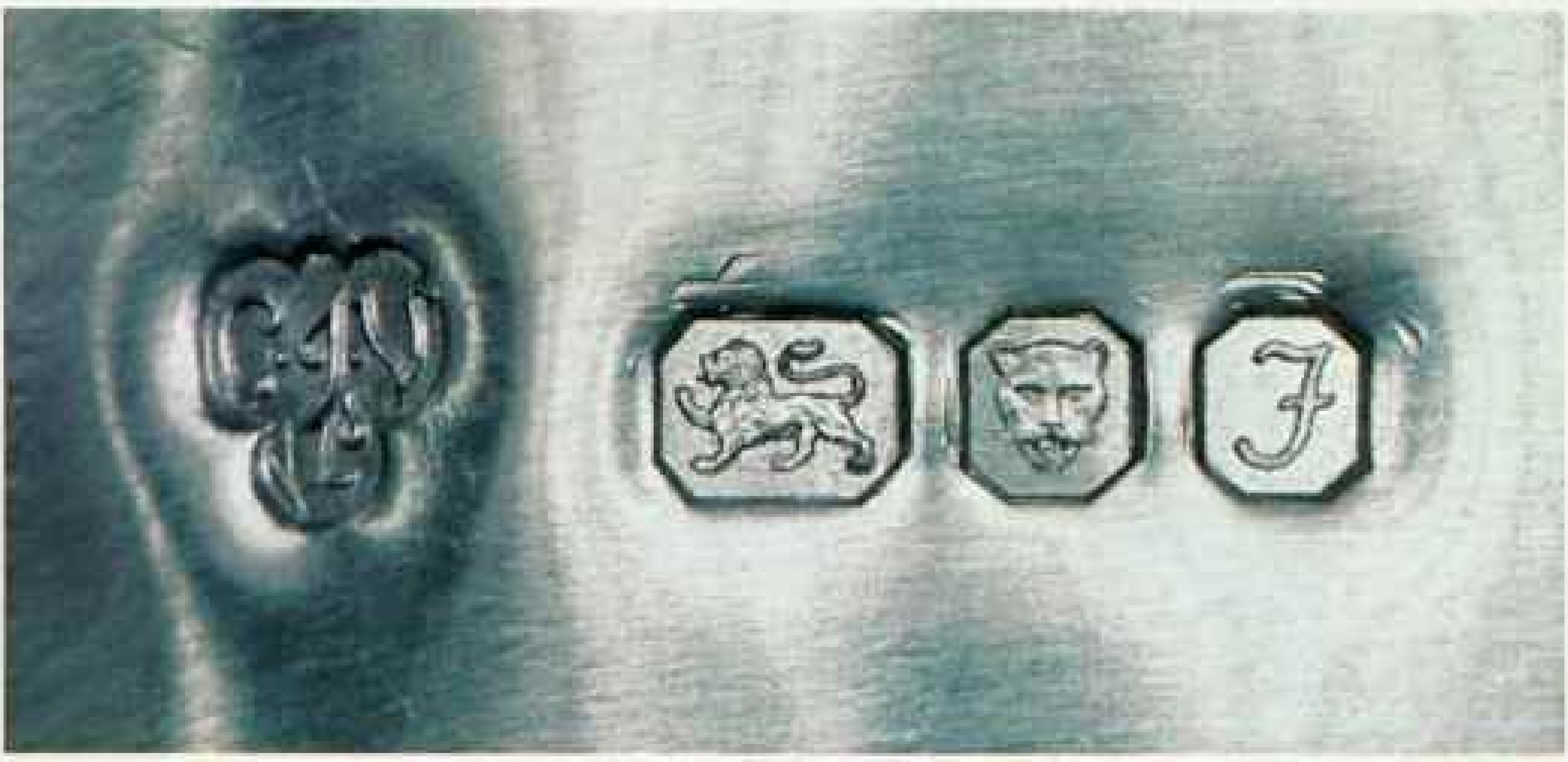
Other metal mixtures or silver-to-copper ratios may look like sterling, but aren't. Not nickel, or German, silver—actually an alloy of zinc, copper, and nickel—or coin silver, a hard combination of silver and at least 10 percent copper. Silver electroplated to copper or nickel-silver tableware yields silver plate. Rarer is silver rolled and fused onto sheets of copper—English Sheffield plate. A smith can tell a plated from a sterling candlestick just by look and feel, but he double-checks with a drop of nitric acid. If it's silver plate, the acid eats through to base metal.

"We're using more base metal these days," says Mr. Stieff, waving at racks of bright pewter cups and bowls. Apprentices no longer practice on silver; instead they use pewter, and Kirk Stieff tries to sell more of it. "We have to, to survive." Poor sterling sales force other companies to cancel store promotions, lay off smiths, and even refuse new orders.

But the skyrocketing price of silver tempts others to take a quick profit. In another corner of the plant, drums of bent and blackened silverware—some with Stieff's chrysanthemums and roses, some stamped

PHIL SCHOFIELD (ABOVE AND LEFT)

Trouble and treasure *come from Idaho's Coeur d'Alene Mining District, where 40 percent of U. S. silver is mined and 18 percent refined. Smelting lead, the Bunker Hill Company gleans silver as a by-product—and discharges pollution that at times infects the morning fog (**left**). The company now meets federal standards for sulfur dioxide emission, a retardant for forest growth, and gives seedlings destined for burned-over slopes a start in a ventilation tunnel (**above**). Most silver comes from ores richer in other metals. This silver vein in Peru (**right**) glimmers more from quartz and lead.*



***Silver knights** and noble vigilance: At Goldsmiths' Hall in London a Victorian candelabrum bedecked with silver statuary* (**left**) *harks back to the 14th century, when silver- and goldworkers, known collectively as goldsmiths, were granted their first royal charter. Great Britain's oldest consumers' protection organization gave the word "hallmark" to the language. Today all silver wares sold in Britain must bear four stamps. They are* (**above,** *from left to right): A manufacturer's or sponsor's mark, a standard of refinement mark (the lion indicates at least 92.5 percent, or sterling silver), the actual "hall" mark showing where the metal was assayed (the leopard stands for London), and a date stamp (in script above, F indicates 1980).*

At guild banquets members dine off place settings worth more than $8,000 each. Silver steward John Cunningham (**right**) *battles daily against tarnish—a residue caused mostly by sulfur in the air. "Regular washing reduces tarnishing," he advises, "so if you have silver, use it."*

"Kirk"—wait to be melted in a glowing crucible. A silversmith, to cut his need for costly new silver, will buy back his work from the public at a reduced price.

But it troubles an engraver that people will so eagerly sell family treasures for paper dollars. "I see silver come in, and I recognize the work of artists now dead," he muses sadly. "People don't realize that the craftsmanship in their fine silverwork is worth more than the metal. Melting it is like slashing a famous painting in the Louvre."

Spoons, ladles, and butter knives tip into the crucible. A graceful serving fork—perhaps a long-ago wedding gift—teeters on the lip of the melting pot. I nudge it, and delicately sculptured roses slowly turn to quicksilver droplets. In the intense heat they seem to flow like tears; foolish sentiment, or do I really see it so? "Silver's so high, people feel money is worth more than memories," says the engraver.

"WE SURELY HOPE NOT." So I hear a few months later in Rochester, New York, from an executive at Eastman Kodak Company, the giant maker of photographic paper, chemicals, and silver film.

Relief and a little worry mingle in the executive's words. Silver is down now, he says, from a record $50.35 in January 1980, but millions of snapshooters have been confronted with an increase in the price of film. Will they pay more for the luxury of memories preserved in pictures?

> *A Mineral of that excellent Nature.*
>
> —WILLIAM BADCOCK,
> "A NEW TOUCHSTONE FOR GOLD AND SILVER WARES"

Silver has a rare quality. Nitric acid and the right salts will transform it into microscopic light-absorbing crystals. If these are applied to specially treated plastic film, loaded into a camera, and exposed to the light reflected by, say, a tree, a speck of metallic silver will sprout from nearly every crystal. Bathe the film in chemical developers, and each speck converts its crystal into a grain of silver. Collectively, the grains form an image: bark, limbs, and leaves.

This "mirror with a memory" is faithful, permanent, and works instantly, says Dr. Jack Thomas, director of Kodak Research Laboratories. He adds that a tiny silver salt crystal could detect the light falling onto the earth from a candle on the moon.

"I have great respect for that sensitive little crystal. You can record images in other ways—with TV cameras or the electrostatic ink in some photocopying machines, for example. One day we may imitate the chemistry of the eye. But nothing does as many photographic jobs as well as silver. We'll never entirely replace it."

No other industry uses so much: In 1979 U. S. film manufacturers bought more than

When prices get hot, *crucibles get hotter at silver firms like Kirk Stieff in Baltimore, Maryland* **(facing page)***, where in early 1980 owners eager for cash lined up to sell heirlooms.*

Criminals, too, own smelters. A master thief, operating in and around Washington, D. C., was arrested before he had time to melt down thousands of dollars in silver, here displayed **(above)** *for victims to identify their possessions.*

2,000 tons of silver. They treat it like gold, and a massive share comes back to them again and again.

Roll by roll, the film we shoot on vacations contains scant silver, as little as a hundredth of an ounce. But Kodak prospects diligently for it—and annually recaptures 20 million ounces. It all comes out in the wash: Dyes replace the silver in color film during processing, and while some silver remains in a black-and-white picture as the image, most rinses into the chemical solution that develops the photograph. There's no sense, Kodak's chemists long ago concluded, in tossing out the baby with the bathwater.

Still, in a Kodak factory, I'm surprised to find forklifts trundling bins of glittering plastic dots. White, yellow, black, and red, they're sprocket holes punched from the borders of millions of rolls of new film. I've watched them being washed and then roasted, to ash, for their silver.

MEN GO TO EXTREMES for silver in other ways too. I see this most clearly at Casapalca in the Peruvian Andes, in a mine a mile deep, inside a mountain 14,000 feet high. I've never climbed so high upon the earth, nor gone so far into it.

Most of the world's silver comes out of the corrugated backbone of North and South America—the Rockies, the Mexican Sierras, and the Andes. There's more in eastern

Canada, Australia, the Soviet Union (map, pages 286-7). Much lies locked up in copper, lead, or zinc ore, but some silver collects in meandering fissures called veins, only a few inches or a few feet wide, carried there in superheated molten rock. At Casapalca 800 men chase ten veins, each a foot thick; for every ton of rock that they blast and hoist, they recover about five ounces of silver.

Out on the mountainside, melting snow puddles into icy ponds, but where I stand it's 95°F and humid as a jungle. In this dark, lofty mine the thin air seems to hold less oxygen than water. It weeps, hot, from the working face, where miners stand shoulder to shoulder, wrestling jolting pneumatic drills. Cold water sprays from hoses, to dampen the dust and cool the drill bits. They're eight feet long, clattering on the rock like steel spears. I ask a gray smudge how long he's been drilling. "Twelve years." His voice sounds brittle in my ringing head; for me, twelve minutes would be enough.

A medical breakthrough *of the 1960s, silver sulfadiazine is a lifesaver for burn victims like this child* **(above)**, *held by her mother at University of Texas Parkland Burn Center in Dallas. Applied to exposed tissue* **(left)**, *the soothing silver compound prevents bacterial growth that can lead to fatal infection. Surgically, silver is a vital ingredient in bone cements.*

Silver ore is ground to dust, loosed from barren rock in tanks of foaming water and chemicals, and recovered as ash gray sludge. Refineries turn this into silver grains, then gleaming bars the size of bread loaves.

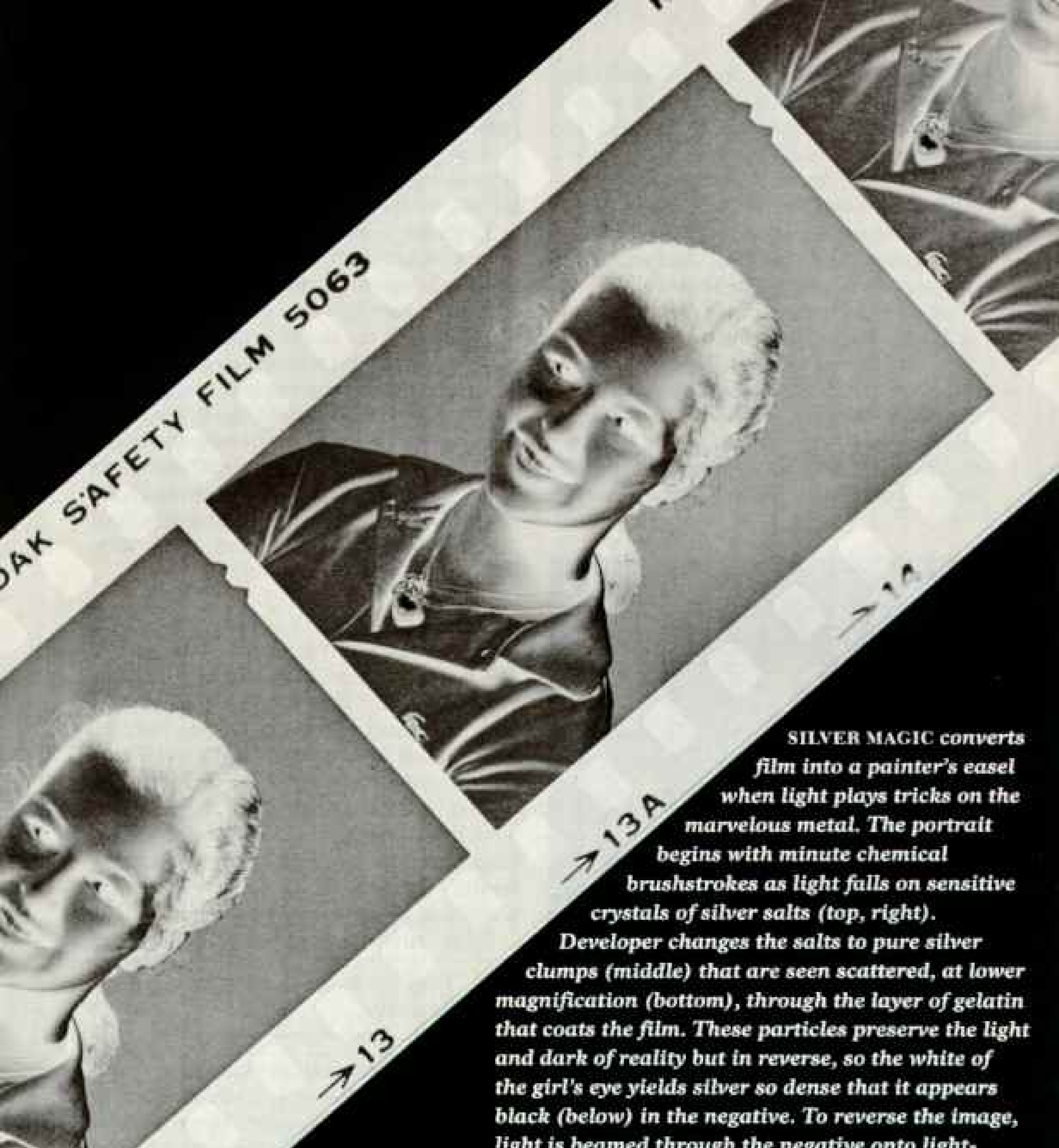
It's dazzling, this metallurgical baking. A silver ingot starts out radiant orange—liquid fire bubbling in an iron mold. It cools to red, hardening, then hits the refinery floor a spluttering incandescent bar. Blisters mar it: too much oxygen. A plunge into a crucible, some charcoal to draw off oxygen, and the silver pours into another mold, now smooth, lustrous, and perfect.

A SILVER INGOT, weight about 70 pounds, sorely tempts me one day in a vault of the Central Reserve Bank of Peru, in Lima. "Take any ingot you can lift with one hand," urges a guard. But, he adds, I must lift the bar from the top; I may not scoop it up in my palm. Since even the biggest man cannot wrap his fingers much more than a third of the way around a standard ingot, I see little hope of sudden wealth. Yet silver is silver, and I try anyway; once, twice, a third time, a fourth. . . .

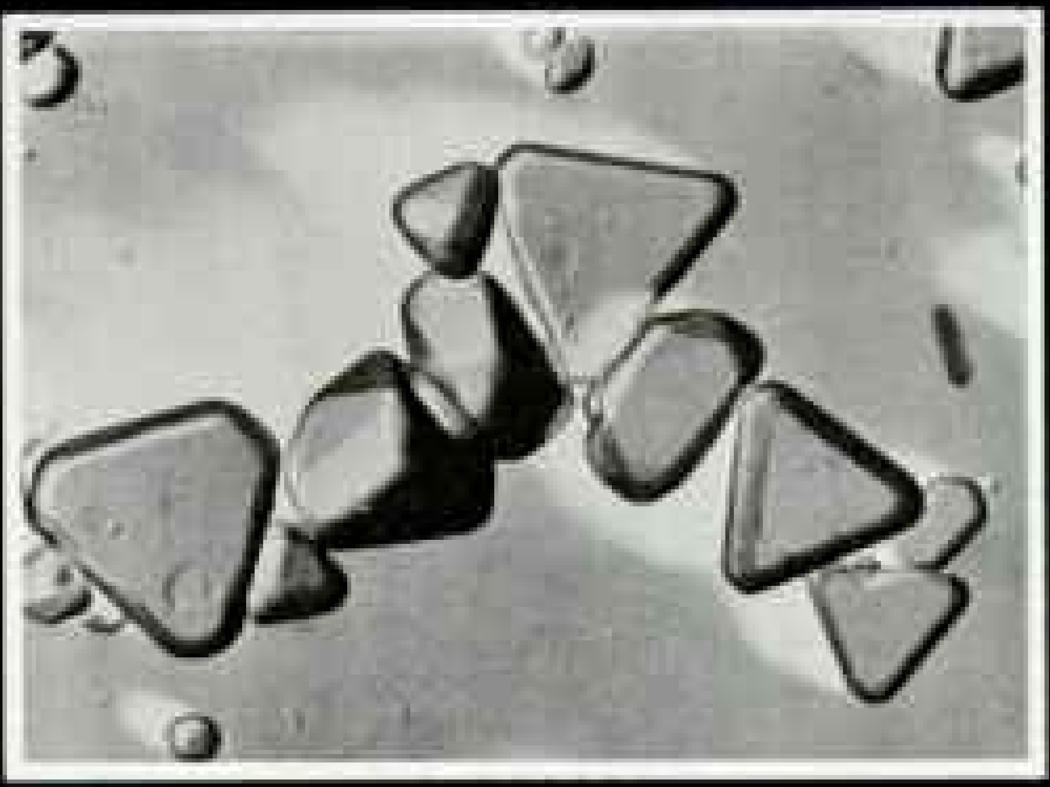
> *They . . . love silver better than their own lives.*
>
> —RABELAIS, "GARGANTUA AND PANTAGRUEL"

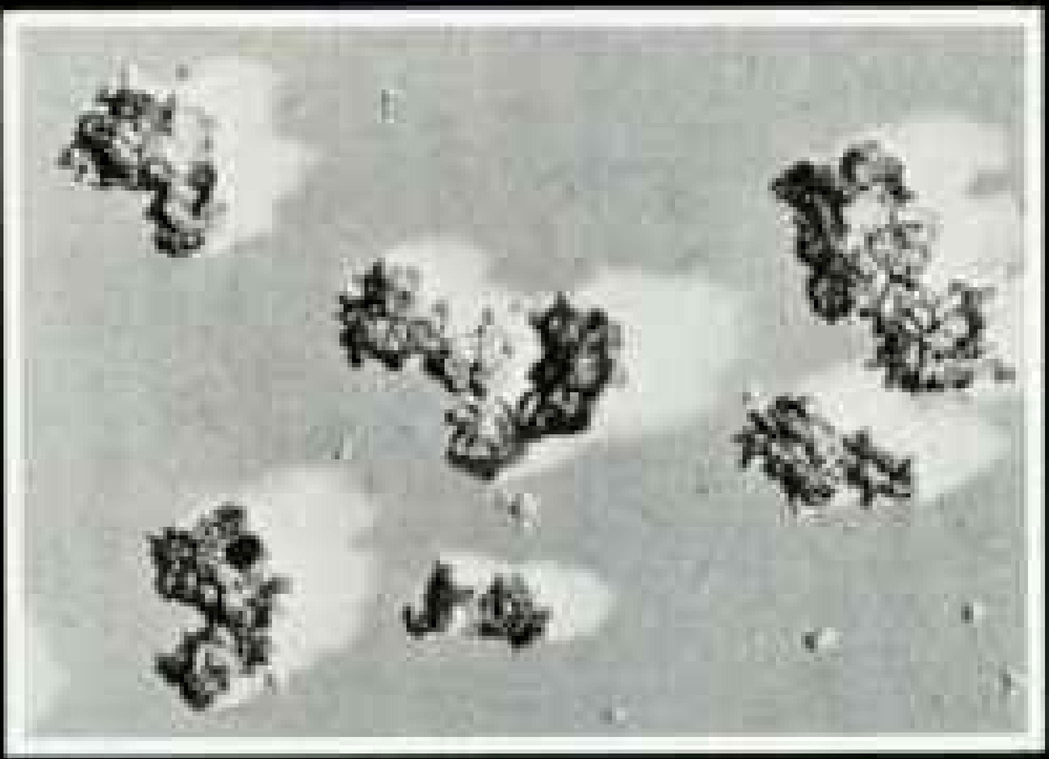
Bright silver has power to capture more than just the imagination. Spanish conquistadores scoured the viceroyalty of Peru for silver, and extorted a roomful from the hostage Inca king. Later they mined it by the mountain at legendary Potosí, using thousands of Indian slaves. And everywhere they stole it: ceremonial silver knives, silver ear ornaments, silver masks and idols.

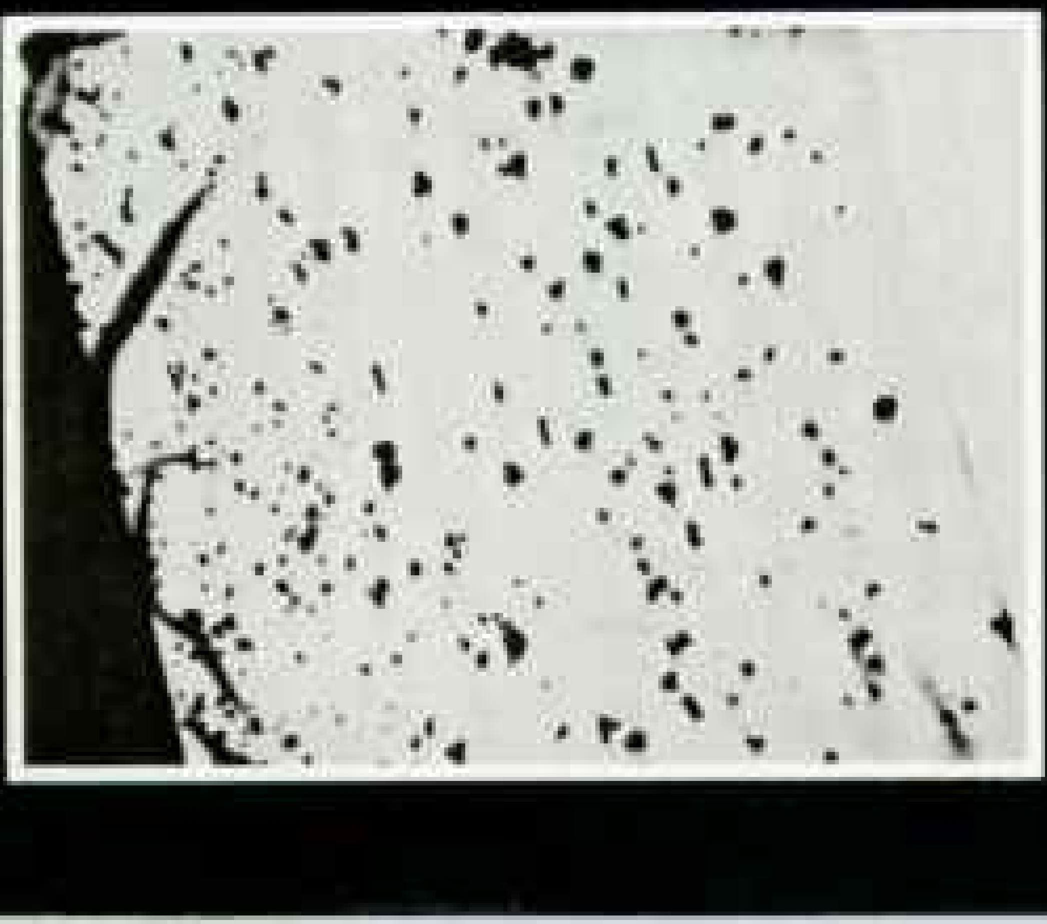
A few silver things—too few to warrant a museum of their own—escaped the Spaniards and survive today in Lima's Gold of Peru Museum. There I soon find a favorite piece, the pert head of a llama. It's an Inca tumbler, with ears pricked up and a whimsical half smile beneath golden eyes (page 303). What other treasures those eyes might



SILVER MAGIC *converts film into a painter's easel when light plays tricks on the marvelous metal. The portrait begins with minute chemical brushstrokes as light falls on sensitive crystals of silver salts (top, right). Developer changes the salts to pure silver clumps (middle) that are seen scattered, at lower magnification (bottom), through the layer of gelatin that coats the film. These particles preserve the light and dark of reality but in reverse, so the white of the girl's eye yields silver so dense that it appears black (below) in the negative. To reverse the image, light is beamed through the negative onto light-sensitive paper, producing a positive print. In most color film, the silver is replaced by dyes.*







Business with a silver heart, *the Eastman Kodak Company of Rochester, New York, consumes some 50 million ounces of the metal a year in producing much of the nation's film. Cast from Kodak's giant smelter, 10,000-ounce bars* **(above)** *each contain enough silver for a million rolls of high-speed black-and-white film. A full 40 percent of the silver used is recovered from scrap film and developing solution, some of which is bought from thousands of film processors around the country.*

have seen is anyone's guess: Most of the Inca silver was melted for King, Spain, and God.

God's share of New World silver reappeared in Spanish colonial churches as crucifixes, chalices, and sumptuous silver altars. The king's portion, or "royal fifth," helped finance ruinous wars and inflate and wreck Spain's economy in a flood of silver coins called reals. Some of the first, minted at Lima in 1568, were thin and small and hardly seem the root of so many evils. The Lima mint also struck hefty Spanish dollars; until 1857 they were legal tender in the coin-short United States.

We're still short of silver coins. In 1965 U. S. dimes and quarters—previously 90 percent silver—became sandwiches of nickel and copper. Quarters briefly reappeared as 40 percenters in 1976, together with half-dollar and dollar coins, to mark the Bicentennial for collectors. Now all are coveted investors' items.

Ever skeptical of paper money, the French regularly coin millions of ounces of silver. So do West Germans, who in this century twice suffered postwar inflation that shrank a basket of paper marks to the value of a pat of butter. Conservative Mexicans put their faith in silver 100-peso coins, in one-ounce medallions of silver bullion called onzas, and in their country's position as the *numero uno* silver producer in the world.

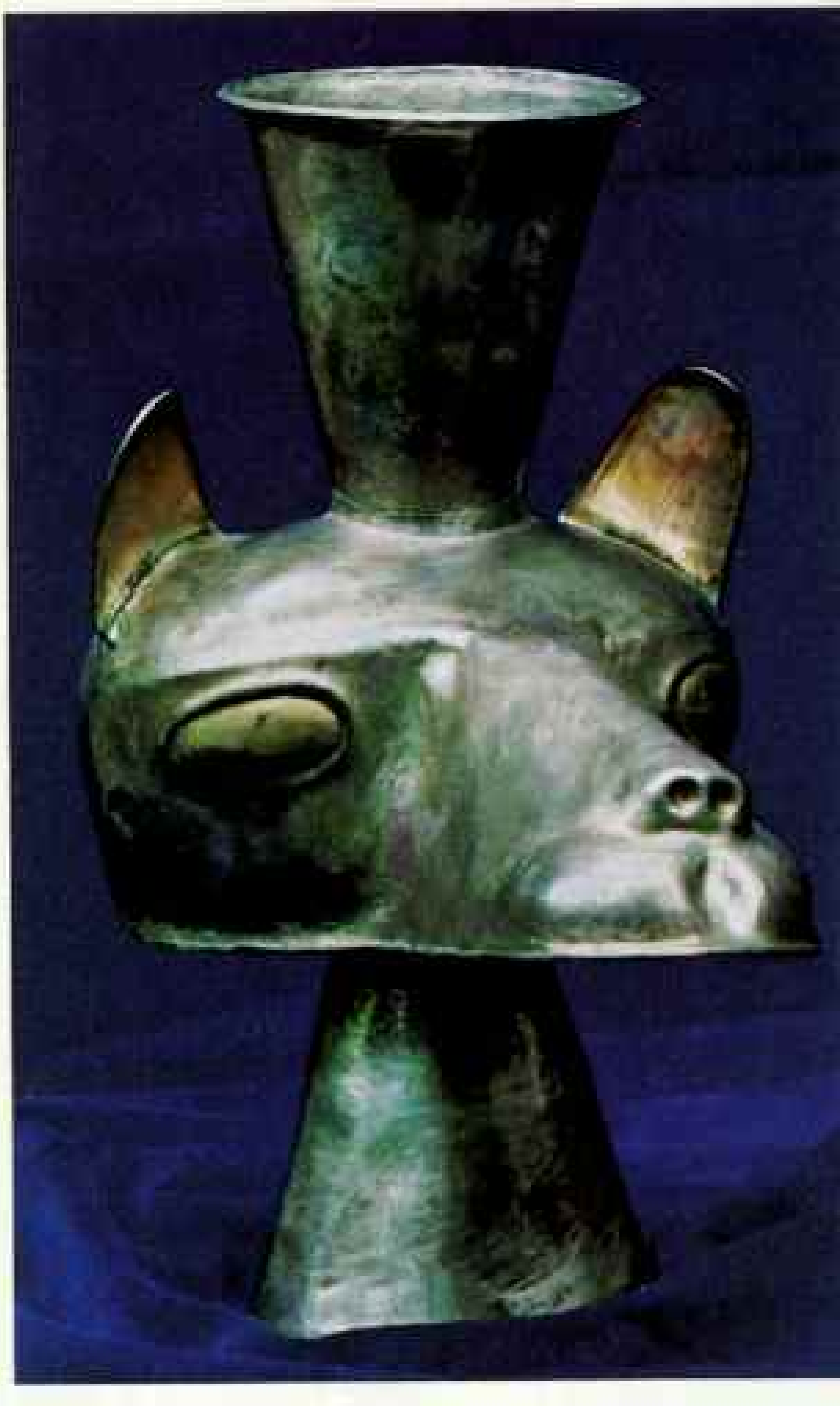
THIS TRUST IN SILVER has built a town, Taxco, in the mountains southwest of Mexico City. By some estimates 10,000 Tasqueños hammer and cast silver, and their attachment to the metal runs so deep it borders on obsession.

There's a deep depression in the 550-year-old town, the director of the chamber of commerce tells me when I arrive. He owns a silver store and workshop on the main plaza, below the Church of Santa Prisca, a cathedral-size baroque confection in pink stone. A Spanish don started it in 1751, thanksgiving for the wealth he'd extracted from silver mines beneath Taxco.

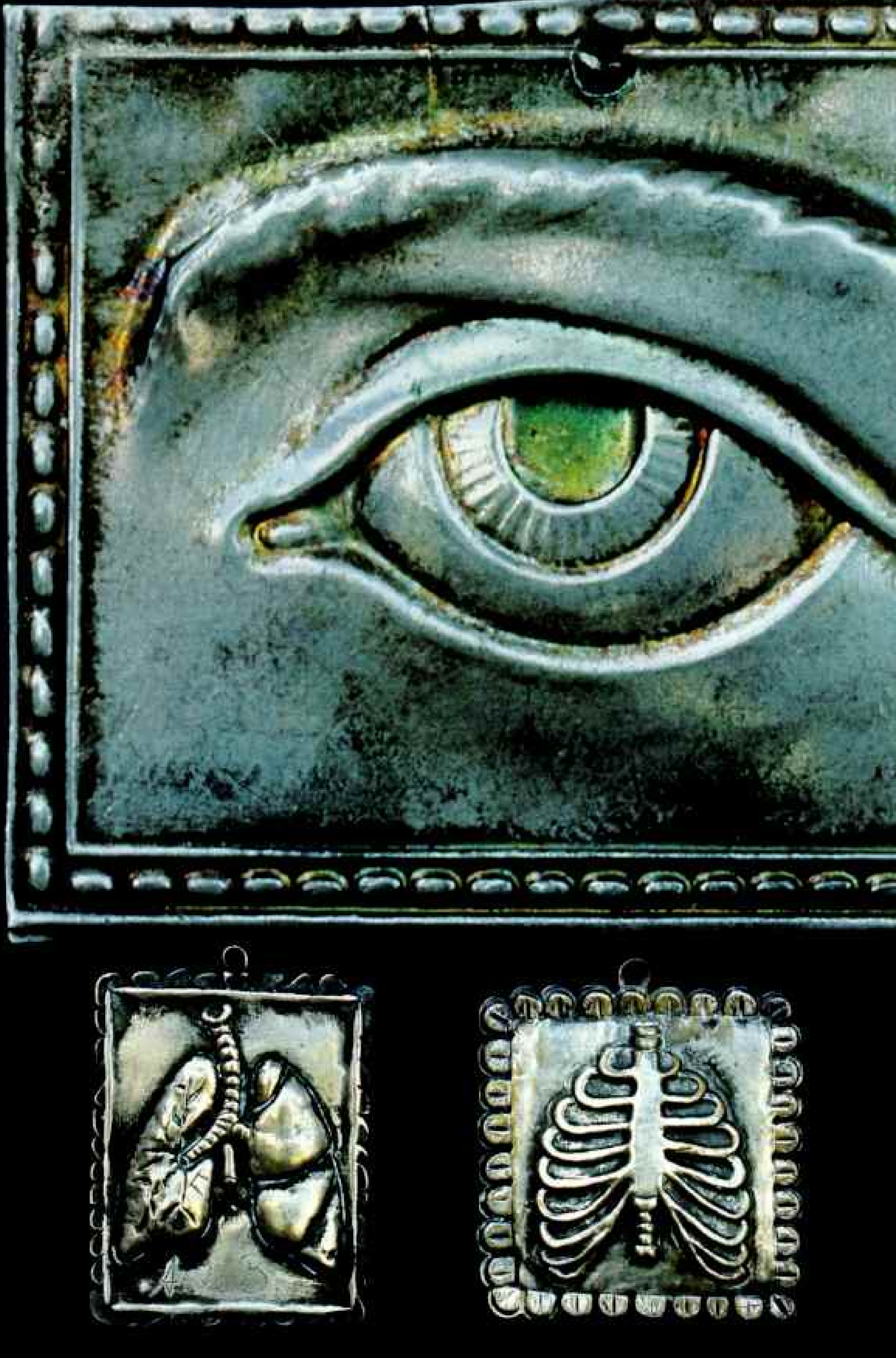
It's Wednesday, and the shopkeeper hasn't had a customer this week. He blames the high price of silver. Yes, that's to blame, repeats the mayor; to blame, echoes an idle silversmith. The price has come down, true, but not enough to lure back all the tourists.

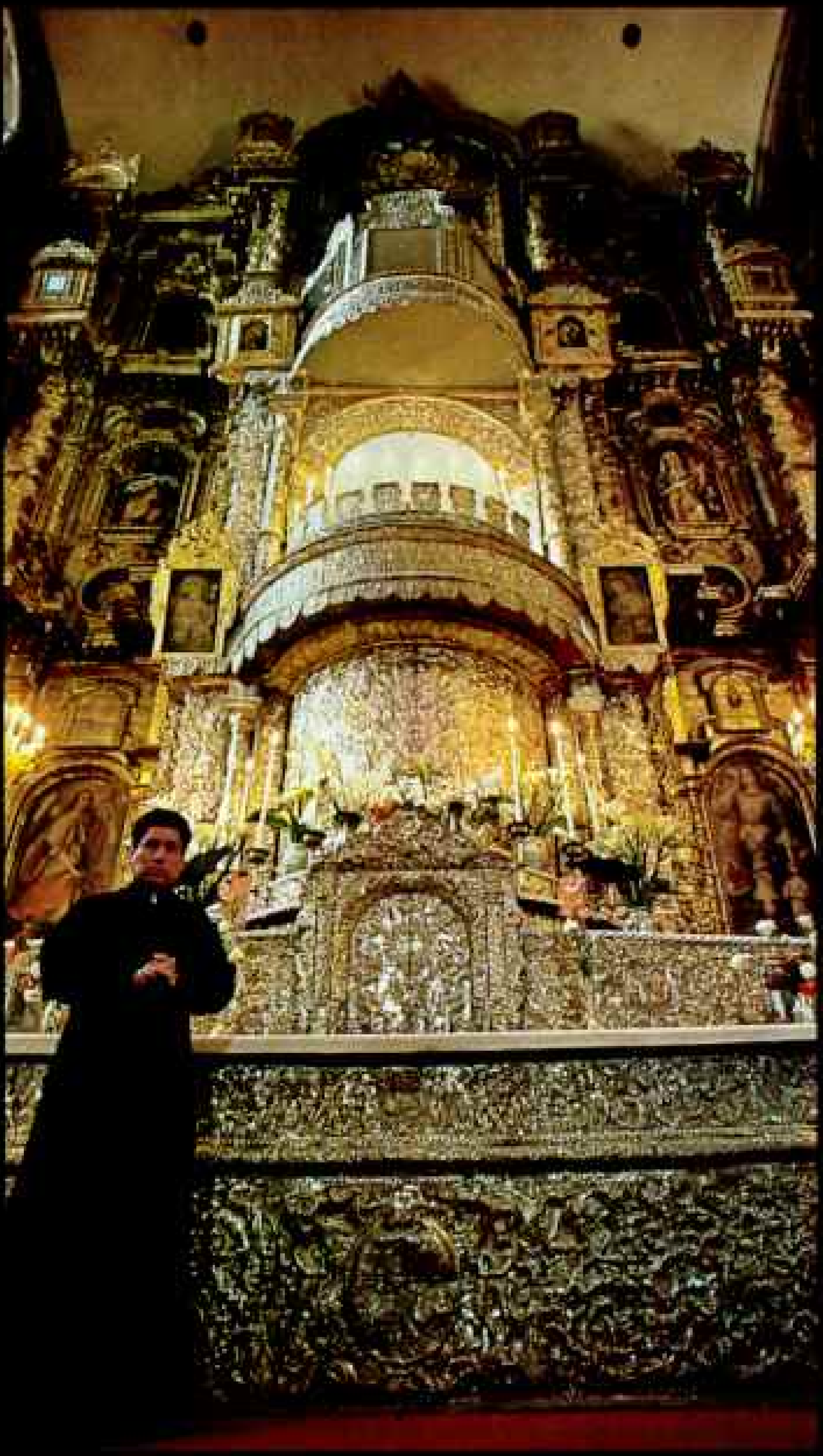
Mexican artisans must buy their silver at government banks, and on my way to the local branch I check a few plaza shops. La Perlita: a clerk, no buyers. La Conchita: one customer studying olive forks and ignoring teapots. La Margarita: On impulse I buy almost the first thing I see—a pair of sterling dice—to cheer up the cashier.

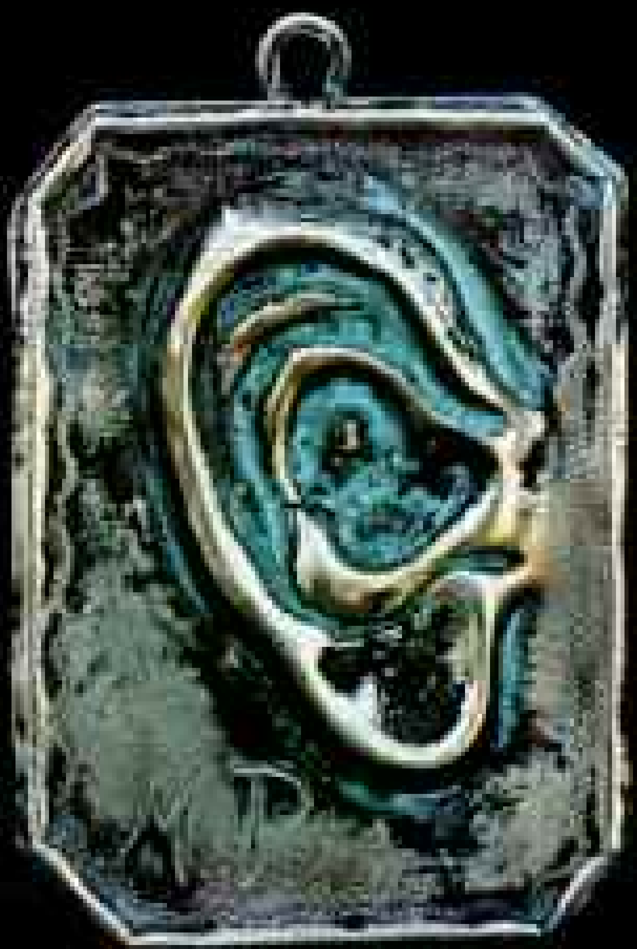
There's gloom at the bank. Deposits have



Witness to the plunder *of an ancient civilization, a llama head—with gilded eyes and ears—is a rare survivor of Inca silverwork. Untold tons were melted down and shipped to Spain in the 16th century. From a later age is Enrico Poli's Spanish colonial silver collection* ***(facing page)****. Here the Lima hotelier displays some of the 1,350 pieces that he scoured the Peruvian countryside to find and acquire.*





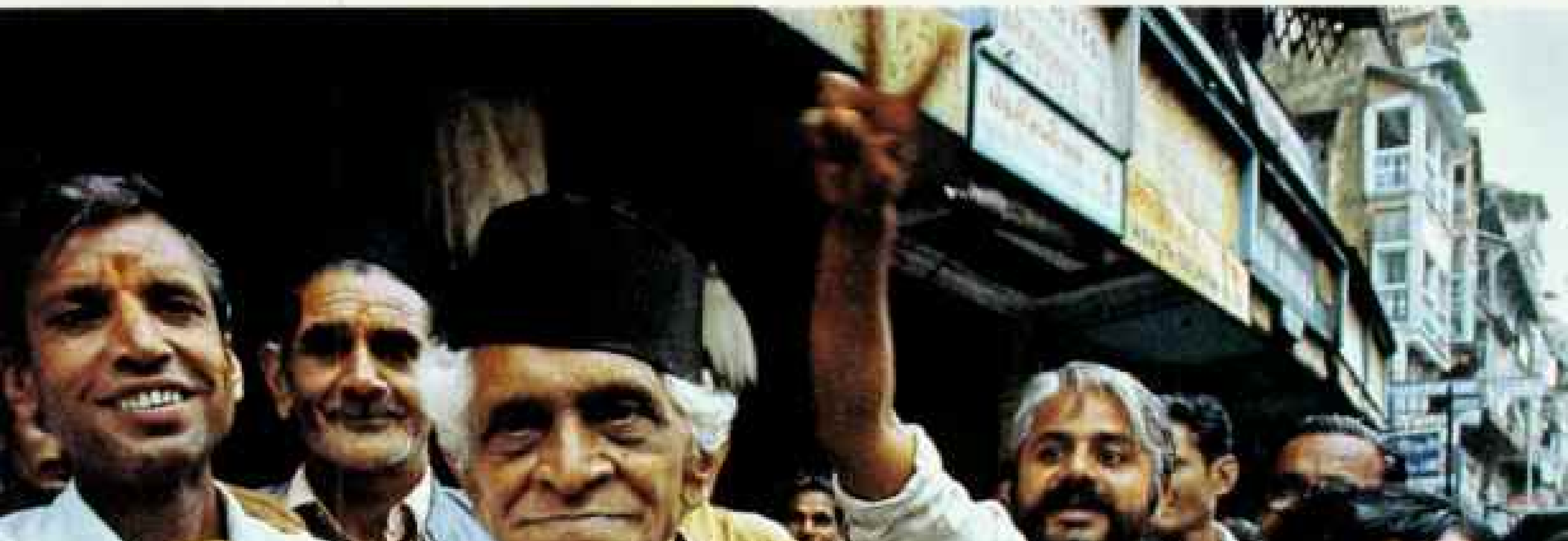


TORRENTS OF SILVER, *laced with gold, embellish countless churches along the cordillera from Mexico to Chile – the origin of an estimated 60 percent of all silver ever mined. Cuzco, Peru, once the capital of the Incas, is a city famous for such churches. At Our Lady of Belén (above) silver hammered over carved wood composes most of the altar, while liberal gilt enriches its baroque opulence.*

Thanksgivings in silver, ex-votos, like these (left) from a private collection, are still left at such altars by grateful suppliants. Each depicts a body part whose affliction has been cured through prayer.

__Street savvy__ governs the silver market in Bombay, where much Indian silver changes hands. As a bullion dealer (__right__) accepts orders from Delhi, brokers beneath his window (__below__) convey their best prices using a traditional sign language.

Through restrictive export laws, which help hold prices below world level, India tries to keep her silver at home. As a result, silver smuggling has become almost respectable, with small boats speeding millions of ounces out of the country each year.



shrunk, and commissions, too, because smiths have cut back silver purchases. "In normal times we sell about 40,000 ounces of silver a month," says a teller. "Now we're selling a tenth of that, and one day we didn't sell a single ounce."

Back at the silver shop I say good-bye to the owner and wonder why he doesn't simply sell out. Didn't he say his inventory was worth 40 percent more now than a year ago?

"I've had offers. But what can I buy today with half a million pesos that I couldn't buy last year for much less?" He sweeps his arm around the shop, and his reflection ripples along an arc of bracelets, teapots, and goblets. "I'll keep this," he says stubbornly.

MEXICO has led the world in silver production for most of this century. In 1979 Mexican miners dug almost 50 million ounces of silver out of their earth; that was more than 14 percent of global production, and only the Soviet Union offered Mexico any competition.

I've stopped in Mexico City to see a man who knows such things, a director of the mining consortium that supplies Mexico with more than two-thirds of its silver. The consortium will boost its annual production by 50 percent in the next five years, he tells me—if the price of silver stays up.

At what level? Must it be at $35, or $40, or $50 per ounce? The mining man's amused. "Such prices—ridiculous! So much silver comes as the by-product of mining for other metals that we can dig it out of the ground profitably when it's selling for far, far less."

And when it's not, will people still buy silver? "I can speak of world supply and industrial demand, but I can't predict people. And I can't say silver won't hit $50 again—even twice that—if people get nervous about war, or if some Texan thinks he has the world by the tail."

He means Nelson Bunker Hunt, Texas oilman, Dallas billionaire—epic acquirer of silver (following page). Angry voices denounced him early last year as silver's price soared. He, his brother Herbert, and other relatives had bought silver and silver futures to a total of as much as 200 million ounces—more than 6,200 tons. To many a connection seemed inescapable.

"I think people give me too much credit; have a seat." Tall and endowed with generous girth, in a rumpled suit, Bunker—so he calls himself—waves me into his office at the Hunt Energy Corporation in Dallas. It seems the time for my silver dice from Taxco. His first toss, Bunker rolls a lucky seven.

"A friend tells me a man should bet every day, he may be walking around lucky. Well, I haven't been very lucky lately." Not since March 1980, when the price of silver skidded to $10.80 an ounce.

The decline had begun in January, as exchanges drastically increased the down payments needed to buy silver futures and limited the number that could be bought or held. Rising interest rates made it costlier to buy the actual metal with borrowed money. Slowing industrial demand and a glut of family silver at refineries further depressed the price. As it sank, Bunker and Herbert had to pay their brokers margin money to secure their silver futures—they were long. On March 25 the brokers demanded a hundred million dollars, at once. The Hunts couldn't pay, so two days later the brokers sold most of their futures to avoid ruin. The stock market briefly plunged, traders panicked, and Bunker's silver wealth turned to dross.

He that loveth silver shall not be satisfied with silver.

—ECCLESIASTES 5:10

Thirteen banks loaned more than one billion dollars to cover Bunker and Herbert's silver-buying debts. Daily interest is almost $500,000; they may not deal in futures, and Bunker has mortgaged himself lock, stock, and oil barrel.

Bunker says he didn't drive up the price of silver. He rattles the dice. "I bought 90 percent of my silver for less than $12 per ounce. Insiders at the exchanges forced the price up and then down, while changing the trading rules for personal profit."

This serious charge is Bunker's reply to rumors that he persuaded wealthy Arabs to buy silver to help him corner the world supply. I've heard an insider and a director of a major Arab bank in Paris discuss the rumor. The banker, close to Middle East businessmen who have dealt with Bunker, says his conservative Arab depositors could see that silver offered their petrodollars refuge from

war and inflation. The insider helps govern COMEX; he asserts that even if Bunker didn't intend to corner the silver market, his buying nearly had that effect. Both men believe that the Hunts still own 63 million ounces of silver stored in U. S. and London vaults, and 50 million more in Swiss banks. Bunker claims half that amount.

On another day, on his mortgaged Circle T ranch, Bunker tells me he was a wise investor who saw the gap between silver demand and supply, knew the price had to rise, and bought silver as a hedge against inflation. Wise indeed: Despite everything, Bunker has broken even on paper and retains his mortgaged property. We watch some of it thunder around a training track in a blur of chestnut and green. A $200,000 horse flashes by, one of Bunker's 600 Thoroughbreds. And the green? Racing silks the color of money—Bunker's choice. He smiles. "I figured it could only be lucky."

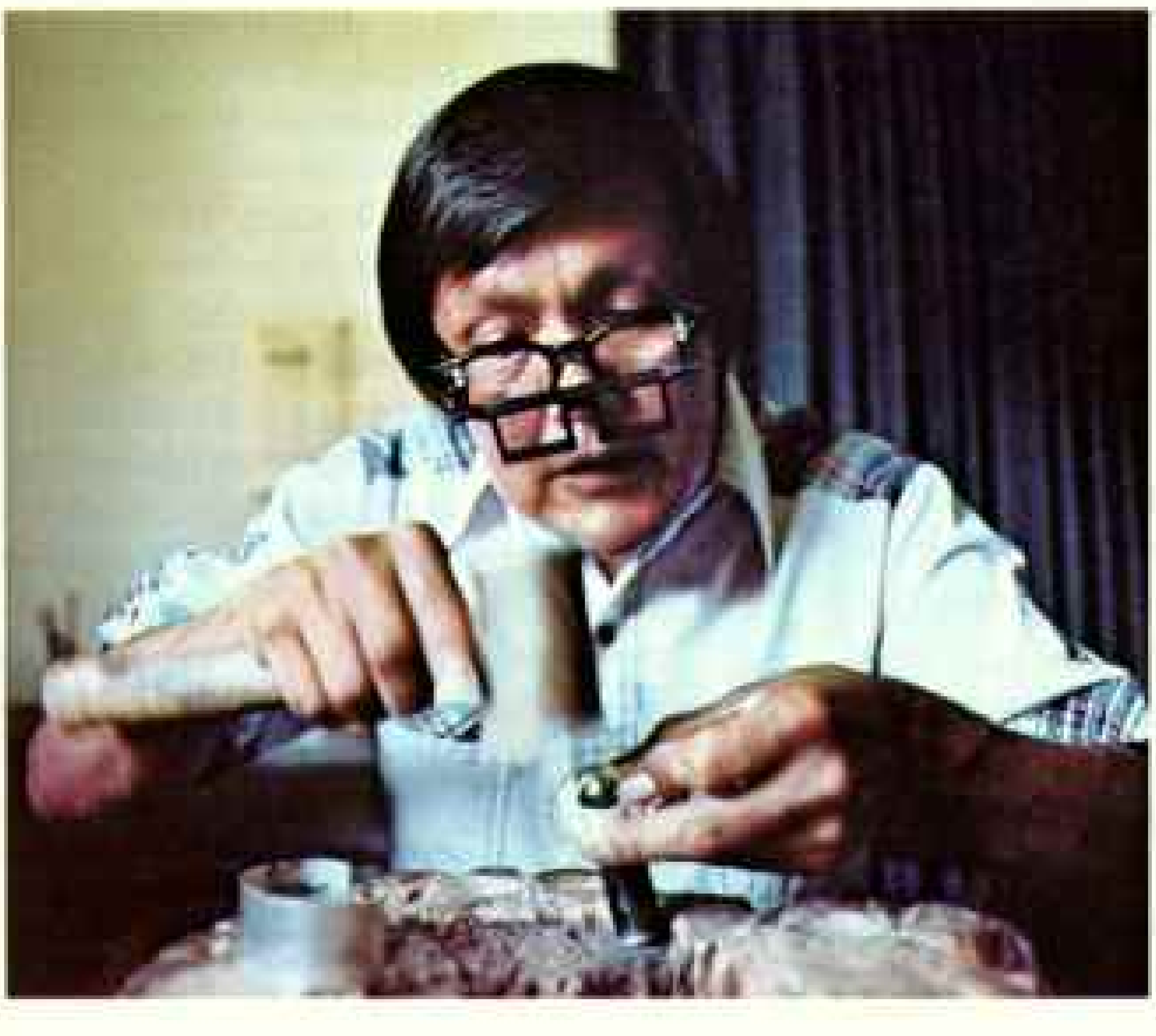
THE BIGGEST SILVER THING I have ever seen stands, royally rotund, in a pink stucco Xanadu, the City Palace of the Maharaja of Jaipur, in India. Close by gleams its twin: more than 10,000 ounces of pure silver fashioned into a water jug five feet tall and as big around as a young Indian elephant (pages 284-5).

So big-bellied are these pots, that even on tiptoe, with neck craned, I can't see to their bottoms. The maharaja's pious grandfather voyaged to England in 1902 with 1,800 gallons of water from the Holy River Ganges in each silver barrel. Thus he spared himself profaner drink during his visit.

India's silver is the residue of empires. The Portuguese, French, and the English funneled tons of silver bullion, coins, and gifts into the subcontinent—the price of spices, silks, tea, and peace with powerful Indian nabobs. One turn-of-the-century maharaja received from the British a table-top silver train. Electric-powered, it shuttled cigars, liqueurs, and sweets among the guests at his banquet board (page 312).

India heavily taxes such princely relics, but peasants hoard silver freely, aided by official decrees pegging Indian silver below the world price. Rather than pensions or insurance, cheap silver is the common reserve against hard times and old age.

***"I'm still bullish on silver,"** says the man who shook the world silver market. Rolling a pair of silver dice in his Dallas office (**facing page**), Nelson Bunker Hunt conveys the gambling instinct that in 1973 attracted him and his oil-rich family to the New York Commodity Exchange (**above**) and other silver markets in Chicago, London, and Zurich. By January 1980 the Hunts controlled an estimated 200 million ounces—more than that owned by the U. S. government. Prices swelled from a 1973 average of $2.56 an ounce to more than $50. As the exchanges moved to restore stability, prices fell rapidly. On March 27, 1980—known as Silver Thursday in financial circles—the price skidded to $10.80, forcing the Hunts to borrow more than a billion dollars to repay loans. Nonetheless, the Hunt family still owns perhaps the world's largest stock of private silver.*

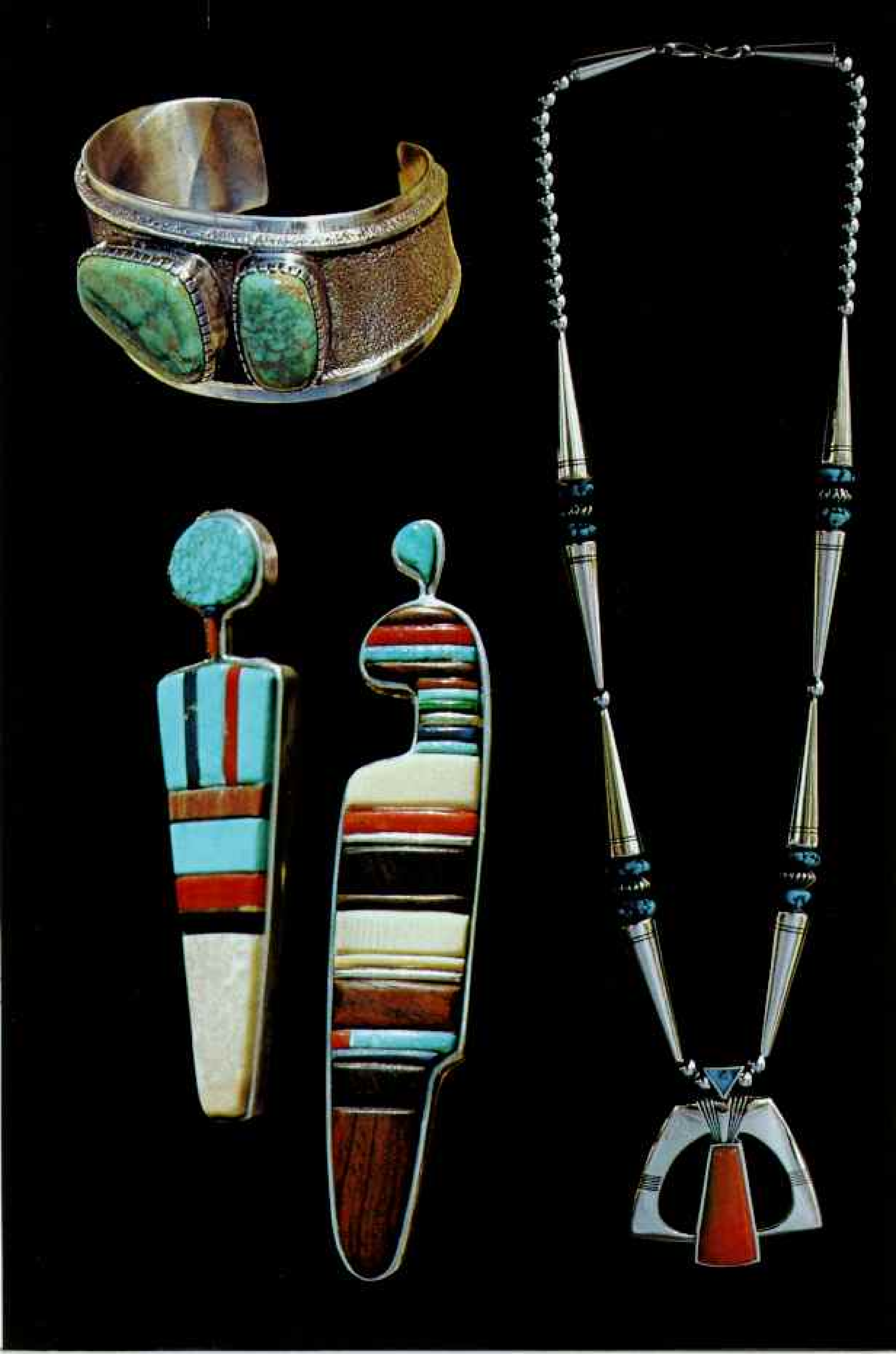


Happy medium *for Indian jewelers of the U. S. Southwest, silver matches splendidly with stone under their special touch. Grand master Charles Loloma (***top, left***) enjoys an international reputation, with some of his pieces bringing thousands of dollars. Two pendants, inlaid with turquoise, coral, ivory, and wood (***right,*** *at lower left), reflect a continual use of innovative concepts. They also mirror in color and form the Hopi mesa country.*

*Larry Golsh, here in his studio at Scottsdale, Arizona (***left, middle***), is considered by many the heir apparent to Loloma's preeminence. A Pala Mission Indian known for his unusual placement of stones, Golsh has won countless prizes for creations such as the silver and turquoise bracelet (***right,*** *at top).*

*Closest to the roots of this craft are Navajo artists like Harvey Begay (***left, bottom***). He was taught by his father, who had learned from a nephew of Slender Maker of Silver—the first notable Indian silver craftsman in the U. S. Southwest. Presumably the skill was acquired from Mexico with its centuries-old silver-working tradition.*

*"I try to maintain as much Navajo spirit as I can in my design," says Begay, who crafted the silver, turquoise, and coral necklace (***right,*** *at right).*



It is also an Indian woman's best friend. By tradition, an Indian man has no claim to his wife's wearable wealth, and an unhappy woman may walk away from a bad husband with silver belts on her hips and silver rupees strung around her throat.

In Bombay I wander down a bustling street called Zaveri—"jewelers." Silver is abundant here, dangling in tiny stalls for every passerby to see: slim hoops for wrists, fat silver chokers, and ear pendants so heavy they'd stretch a woman's earlobes halfway to her chin. At one stall a barefoot dowager niggles with a jeweler over a dark spot on a silver ring. A rag, a swipe, it's gone—only tarnish. "*Salaam, baba*—Peace, sir," she says, ambling away with a glint in her eye and the ring on a toe.

A while later I'm lounging on pillows and Persian carpets in the office of a bullion merchant. At my elbow is a small stack of silver ingots. Contemplating them, the merchant tells me that interest in Indian silver is somewhat depressed right now; heavy storms in the Arabian Sea have reduced local demand for it.

He says "local demand" delicately. Smugglers, he means. With Indian silver sometimes priced as much as one-third below the world rate, it pays to defy the official export ban and take some for a little airing on the Arabian Sea. If the weather's good, those

Silver service *in a class by itself, this electric train once circled the Maharaja of Gwalior's banquet table, bearing nuts, cigars, and liqueurs to delighted guests. As society finds ever more practical work for this noble metal, one is led to wonder: How long will silver stay on the world's table to enhance food and drink?*

other fellows will be out there, too, in Arab dhows, slender, swift wooden ships from Dubai on the Persian Gulf. How their skillful, anonymous crews crave silver! Maybe it's the sea air, so bracing. . . .

In 1980 better than 25 million ounces of silver left India in this and similar ways clandestine, illegal, and profitable. Most went to Dubai, then to English, Swiss, and West German refineries to be purified; thereafter the track fades. Quite a lot of metal for a country without a single silver mine, but it's barely a ripple in the pool of four to five billion ounces that remains behind on Indian wrists and ankles, in coins and saris, and on temple doors and maharajas' palanquins.

With such vast wealth, I ask the merchant, isn't it foolish for India to ban exports of silver bullion? Couldn't some of that precious metal earn foreign exchange to buy fertilizers, food, or oil? Yes, he says, but to his mind one simple truth outweighs all other considerations. "It has taken us centuries to accumulate our silver, and we shouldn't squander it. After all, silver is the poor man's gold."

DON JORDAN won't challenge that, since it pretty well applies to him. Not that he's poor; he's comfortable enough in his trailer at Wild Horse Reservoir, in northeastern Nevada. Flick a lure out front, and you can hook a two-pound trout. Aim your eye some degrees above the water, and you're sighting a valley tufted with sweet-smelling sage. A bit more elevation and the Independence Range looms into view, all rock, snow, and creamy clouds. There's nothing poor about that.

But Don wants security, so like a surgeon he's carefully slicing a yard at a time into the breast of nearby Rosebud Mountain. His scalpel is a bulldozer; the point of incision, the Diamond Jim Mine. Not far down the valley a big corporation is chewing up earth by the acre for gold. Don's making do with the poor man's substitute.

"I don't aim to get rich," Don tells me one morning as we grind up the side of Rosebud in his pickup. "I'd like a little independence though." When the price of silver took off in 1979, he and two partners leased the mineral rights on Rosebud, corralled a used bulldozer, and began digging.

Silver fever has struck before, here in Nevada. In 1859, in a gulch on the western side of the state, gold miners stumbled on the Comstock Lode, the first and richest silver-mining camp in the United States. Eventually the huge bonanza yielded more than 15,000 tons of silver extracted by tens of thousands of eager, excited men. From Nevada they fanned out into Utah, Colorado, Idaho, and Montana stampeding from strike to strike, discoveries that for about three decades made the U. S. the premier silver producer of the world. Then, one by one, the biggest lodes played out, until finally the silver fever broke. It had caused a prodigious convulsion of men and metal.

> *By and by I was smitten with the silver fever. . . . Plainly this was the road to fortune.*
>
> —MARK TWAIN, "ROUGHING IT"

By comparison, Don's fever is low grade. Yet it's high enough to move mountains, as I can see by the state of the Diamond Jim. Plainly it's been worked before: Don's bulldozer has exposed an abandoned tunnel and has twisted old ore-car tracks into a pretzel.

"Most of the veins here run catawampus to the world," says Don, "so I have to doze them out—then it's pick and shovel."

His ore is rich—a ton yields 50 ounces of silver—and he can mine four tons on a good day. Counting his share, the U. S. produced 38 million ounces in 1979, ranking it fourth in the world—after Mexico, the U.S.S.R., and Peru, and just ahead of Canada. Idaho's Coeur d'Alene district supplied 40 percent of U. S. production, from some 30 mines—the Sunshine, the Bunker Hill, the Lucky Friday. . . . They're part of the densest concentration of silver mines in the world.

IT'S CHILL UP HERE on Rosebud; winter is coming, and this has been an itinerant silver seeker's final stop. The first snow of the season dusted the Diamond Jim two nights before, and dresses the torn earth like gauze. Don doesn't mine when the ground freezes, and as we turn to go back down the mountain, he points out a vein of lead-silver ore. The vein is three feet thick and sparkling. "I like some incentive when I start up in the spring," he says, "so I'm leaving that for purty." □

COTY

Manhattan – Images of

Fires of evening *are mirrored in the glass-and-steel cliffs of midtown Manhattan, oldest of New York City's five boroughs (preceding pages). Cockpit of finance, citadel of corporate power, trend setter in arts and fashion, and pacemaker of media and advertising, Manhattan glitters in its role of the unsurpassably cosmopolitan cosmopolis.*

Yet a Manhattanite's city has other sides: quiet places and crowds, good streets and bad, celebration, desperation, work. A cigar-smoking cabbie (above) and two Wall Streeters using reflectors to ensure even tans (following pages) add fragments to a mosaic composed of the private lives of one and a half million residents, molded into a whole by the shared energy that beats constantly in this hemisphere's mightiest city.

By JOHN J. PUTMAN

NATIONAL GEOGRAPHIC SENIOR WRITER

Photographs by JAY MAISEL

MANY YEARS AGO, when I was a boy in the Deep South, the family often used to sit out in the yard in the evening. The adults sat on canvas lawn chairs and talked; the children lay on the grass, listened, and watched the stars come out. Once each evening a single airplane passed over, its pale lights flickering.

Now and then relatives would come back from far-off places for a visit. I can remember meeting them at the railroad station: the silent platform, a distant throbbing, the sudden and splendid appearance of the locomotive. With a whoosh of steam, the great train would be beside us, relatives descending.

Those who came back from "up North," from New York City, I remember, were always changed: They spoke differently, dressed differently, even their faces were somehow changed. And the things they had seen! The stories they could tell! And then they were gone again, on the same silver rails northward. Little wonder that in a child's mind there arose the image of not just one unglimpsed but near-mythic city, Jerusalem, the city of God, but also the image of a second, New York, the city of human possibilities.

When recently I was able to spend time in that great city myself, I was forewarned that I had come too late. "Shudda been here in the '40s," one man said. "Ain't the same."

I wondered.

"HI YA, FATHER."

"Hi, Eddie."

"Hi ya, Father."

"How ya doing, Rita?"

I was walking down West 42nd Street with Father Robert Rappleyea, pastor of Holy Cross Church. The parish reaches from Broadway and Times Square to the Hudson River, and from 36th to 46th Streets. The church is 113 years old. It has seen the coming of the great immigrant tides, the flourishing of breweries, granaries, slaughterhouses, the bustle of rail yards and docks—all now vanished. It has seen the area decline, the streets turn mean.

I had read about this part of Manhattan, and wondered what was happening now. "For a time," Father Rappleyea said, "it seemed it could all go under. In the past four years things have been turning around." He pointed out the problems he and others had been combating: Peep shows, bars, adult bookstores, prostitution, drug dealers' hangouts, hard characters, abandoned buildings, tourist hotels converted into residences for discharged mental patients. "Some," he sighed, "are nightmares."

But the signs of renewal were clear. A block of old buildings, once part of a tenderloin district, had been converted into small off-Broadway theaters and a restaurant. A second block was being similarly revitalized. The city, the state, the federal government, foundations, banks, and nonprofit corporations had joined hands to rejuvenate 42nd Street. Their plans included a revived Times Square with a new 292-million-dollar hotel, a great pedestrian plaza, even a trolley line linking the Hudson with the United Nations on the East River.

There were other signs: On the small side streets old buildings and houses, laced with fire escapes, were being bought and restored by young people who wanted to live in the heart of the city.

And there was Manhattan Plaza, two 45-story apartment towers between Ninth and Tenth Avenues. The complex had been built to house upwardly mobile, two-income

the City

The "ins" and the "outs" *of success weave through a labyrinth of neighborhoods that lead up or down. Home for countless immigrants since the 1700s, seat of Jewish New York near the turn of the century, the Lower East Side bears a largely black and Hispanic cast today. Here a fire escape serves double duty as escape hatch from crowded tenement rooms. Ticket to a bit of sky and air, combination front yard, backyard, sun-room, and patio, the iron balcony still provides for residents on the bottom rung as it has for the many who came before and moved on up. One foreign arrival that will stay, an ailanthus tree grows up from the street below. This import from the Orient manages to root in brick-strewn soil and flourish in the grimy air of the inner city. That has always been the newcomer's choice: Adapt and thrive, leave, or die.*

***In a city of strangers,** faces pass half-glimpsed, remembered only by the subliminal eye. Tides of commuters cross a cat's cradle of bridges and tunnels from Manhattan's sister boroughs and New Jersey, swelling daytime population by more than 3,000,000. And anywhere within New York's vast reach, when they say "The City," they mean Manhattan.*

families, but by the time it was completed, rising costs had driven rents out of reach of the intended market. A Manhattan-type solution was found. The towers became federally subsidized housing, with 70 percent of the units set aside for performing artists with limited incomes. "A great asset," Father Rappleyea said. "You have 3,500 people, shops, cafés, a swim club. You have people coming, going at all times—most young, with the future in mind."

There was another reason for the comeback. We stopped by the Poseidon Bakery on Ninth Avenue. The store was redolent of Greek pastries baked in the back. Lili Fable, her husband, and their three sons lived over the store.

"People tend to forget," Lili said, "that this has traditionally been a family neighborhood. Things began to deteriorate about 12 years ago; five years ago was the worst. It was the prostitution.

"Then people began to become part of block associations, began to call the police, began to realize they had to get involved. We had many rallies: schools, business people, the Broadway theater people. We had a huge stage built right on Times Square.

"The city began to be aware that there was a community here that cared. They set up a police substation on Times Square and assigned more police to the street at night. Things are 80 percent better."

Families like the Fables worked in other ways to improve the neighborhood. When they finally got a small park on 46th Street, an outside gang took it over. The neighborhood boys drove them out. "There must have been 300 kids racing from block to block," Lili said. "There were police cars and ambulances. Now during the day, if there's enough of our kids coming, its OK. In the late afternoon, we lose it to outsiders."

The struggle was far from over, but Lili gave no thought to leaving the city. "It's the greatest place in all the world—and the boys, they don't talk about moving to the country any more."

When I last saw Father Rappleyea, some months later, he said, "If you have a moment, stop by and see the church." I did. Inside were the familiar statues, burning candles, a handful of petitioners. But there was something new: The interior glistened and smelled of fresh paint. Holy Cross, like the old neighborhood, was freshening up.

I LIVED FOR A TIME in an old hotel at Fifth Avenue and 55th Street. All day long there was the crump of blasting as workmen gouged into the Manhattan schist to lay foundations for new skyscrapers.

Buildings were sprouting in midtown like mushrooms after a rain: twelve under construction, two more planned, sixteen under consideration. They included six hotels, a residential tower over the Museum of Modern Art, a corporate headquarters for AT&T, an office building for IBM. So dense was planned construction between 39th and

60th Streets that some Manhattanites organized to resist it, saying the towers would cut off the last of the sunlight.

Nevertheless, the towers symbolize both the city's economic gains in the past four years and the shape of the future. The gains were largely confined to Manhattan. They lay in the areas of finance, banking, national and international corporations, and all the businesses that serve them, in tourism, and in movement back to the center of the city by middle-class and high-income people.

Manhattan, it seemed, was shaping itself even more into a society of the knowledgeable, the talented, the affluent.

Among the developers building the skyscrapers is Donald Trump, 34, president of the Trump Organization. Donald's father had built the business and the first fortune with apartment complexes in the boroughs; Donald had moved to midtown.

"It's incredible," he said. "Five years ago New York was in trouble; today it's the hottest city in the world. Every block somebody's fixing, restoring, building something. Look at the West Side—it's a boomtown! Young people are coming back to the city, and new shops and restaurants are following right along."

Donald's company was restoring the exterior of Grand Central Terminal; stripping the old Commodore Hotel down to its frame and rebuilding it as a hundred-million-dollar Grand Hyatt Hotel; promoting the sale to the state of a 750,000-square-foot site on 34th Street for a 375-million-dollar convention center.

But his proudest achievement was on Fifth Avenue. He had paid ten million dollars for the old Bonwit Teller building there. In its place will rise Trump Tower, a 150-million-dollar, 68-story goliath. "I'm a young guy," Donald told me, "but I'll never be able to get another site like this, the best in all the world. Right next to Tiffany's."

The building's lower floors would be devoted to shops and offices; the upper floors to apartments. Base price: $500,000.

Who would live there? Those with a taste for Luciano Pavarotti at the Metropolitan Opera, for Mikhail Baryshnikov of the American Ballet Theatre; for museums like the Metropolitan, the Guggenheim, the Whitney; for art galleries and auction houses; for shops like Tiffany's; for the yeast that comes from mixing young Greenwich Village film-makers with Columbia University scholars, and those on the way up with those on the way down. In short, for what only a great city can provide.

Manhattan's economic gains had been bolstered by an influx of foreign money; in the process, it was becoming more and more an international city. Foreigners were buying apartments for personal use, real estate for investment, old-line companies for profits. Gimbels, Saks Fifth Avenue, the *New York Post*, even the great toy store F.A.O. Schwarz now sail under foreign flags. One morning I discovered my hotel had slipped into Swiss hands.

The flow of overseas money could be measured by the number of branches and agencies of foreign banks: Five years ago there were 96; today 170, with combined assets of 138 billion dollars.

Foreign companies have also been busy establishing offices here. The Japanese alone have 480 corporations in the city. Specialty businesses have arisen to cater to their executives, among them sushi restaurants and another Ginza favorite, the piano bar.

THE JAPANESE PIANO BAR was just off Park Avenue. A long cabinet held patrons' bottles, almost all expensive Scotch. My Japanese friend and I were seated by the mamma-san and joined

Hot Nuts
EXPR

A pinball ride *beneath the streets carries New Yorkers about their daily business. Graffiti cover the cars, but spray-paint self-expression is a piddling worry; overcrowding, delays, equipment failure, and crime bedevil the system. Funds exist for only a small portion of the estimated 14 billion dollars' worth of needed repairs.*

by two hostesses. One girl was from Japan; she wore the traditional kimono and white face powder. The other was from Oregon, a hopeful actress.

While we talked, Japanese businessmen took turns at the microphone beside the piano. They sang old Japanese songs, recalling their faraway homeland: "When the wind blows, the leaves turn silver. . . ." When one finished, all of them applauded, and another took his place. The piano bar, the songs, the effort to sing them properly seemed to restore each man, reconnecting him with his heritage.

As we left, my Japanese friend and I passed a small plaza. On each of its concrete benches lay a sleeping form, bundled against the chill night. Farther along we saw flattened boxes leaning against the side door of a church. A hand reached out and adjusted a piece of cardboard. If there is a touch of Tokyo in Manhattan, there is also a hint of Bombay, the sleeping forms in the streets.

THE CITY HAS CHANGED, of course; the numbers collected by economists and the census tell you that. From 1950 to 1969, New York remained stable in jobs and population, the unrivaled metropolis of the nation. In '69 came the break. National trends caught up with the city: the shift to the suburbs and the Sunbelt, gains in communications and transportation that made a central location less important, the decline of central cities.

In the past dozen years New York lost 500,000 jobs, mainly in manufacturing, and 825,000 people. Financial crisis followed. The present city administration does not expect to regain that lost population or most of those jobs. It has cut its suit for a smaller city.

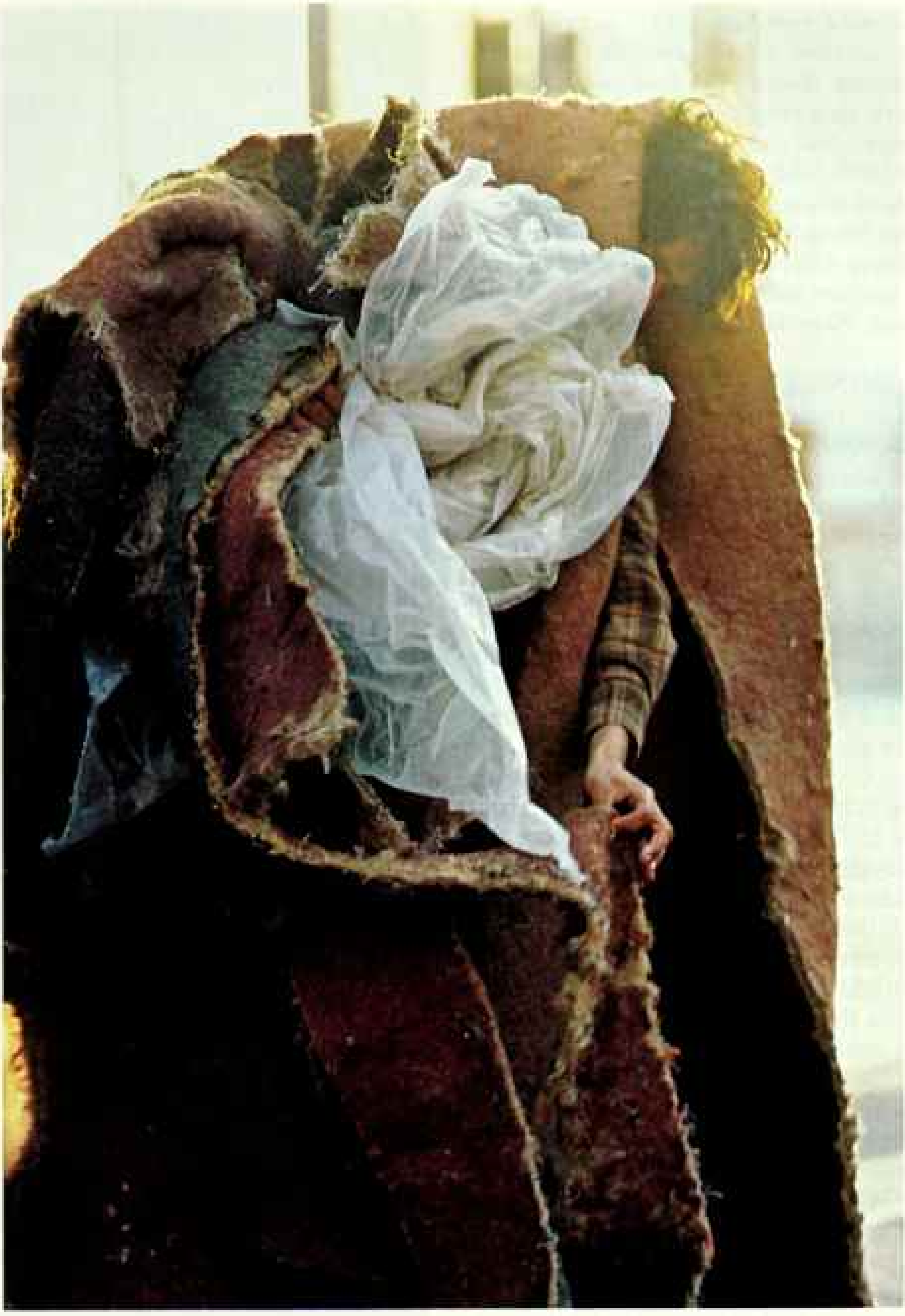
The city work force has been chopped by 60,000;

(Continued on page 330)

ONE WAY
ONE WAY
W 50 St

Stage setting *for Manhattan's biggest productions, Fifth Avenue fills to the walls for Pope John Paul II's visit to St. Patrick's Cathedral, right, on his trip to the U. S. in 1979. Divider of East Side from West, coveted address of publishers, famous stores, and landmarks such as Rockefeller Center and the Empire State Building, the avenue is no stranger to throngs. Annual parades celebrating Irish, Greek, Puerto Rican, Jewish, German, Italian, and Polish heritages troop up the nation's swankiest thoroughfare. Weekday lunch hours release a human sea. Natives swim through with ease, for in the crowd's jostling anonymity, the New Yorker returns to his natural element.*

Street art *composed of last summer's beer cans and Popsicle sticks takes shape in heat-softened asphalt on unswept streets (left). Living castoffs roam the streets in uncounted thousands, walking wounded in the battle of life. One such derelict (below) awakens to a cold morning with a carpet-and-gauze house on his back.*



Wealth and genius *spice the city's creative brew. Copper magnate Solomon R. Guggenheim didn't live to see the namesake modern art museum he commissioned Frank Lloyd Wright to design. A single spiral ramp leads viewers gently downhill from the top to the rotunda, here displaying a temporary exhibit of modern sculpture made from animal fat.*

(Continued from page 325) services have been curtailed, schools and libraries judged redundant closed. For two years the city budget, now carefully audited, has been in balance. And this year, for the first time since 1975, the city sold some long-term bonds on its own—without using the special system set up with state and federal help.

"There will be problems down the road," one banker told me, "but we've turned around. We're back from the precipice."

AMONG THE INDUSTRIES affected by these changes are the proud designer shops and dress manufacturers of Manhattan's Seventh Avenue. They still dominate the nation's styles and sales, but regional markets and imports now challenge them, and they have lost a third of their labor force. They constantly search for new hands.

I boarded the freight elevator at 41 Elizabeth Street in Chinatown and rode up to Eddie Leung's shop on the fourth floor. Eddie was in his office, a small man with a high voice, a garment contractor for 22 years. When Eddie had started out, there were 15 shops in Chinatown; now there were 475, employing 15,000 people.

Eddie explained: "China has begun to let people out; many come here, a new source of labor. So manufacturers uptown may bankroll bright young men here who can set up and run shops."

We walked out into the sewing room. "All immigrants," Eddie said above the hammering of the machines. "Most are from south China, Canton. Maybe a girl here says she wants to bring her family over. I promise jobs. When they come, the girl and I teach them together. They send a lot of money back to the homeland."

The increased immigration has brought problems as well as payrolls to Chinatown,

Sentry duty *on a drowsy afternoon: A radio squawks call codes, but not for this policeman. For the moment, no news is good news. Manhattan reported 196,439 felonies last year, while the citywide police force has shrunk by a fourth since 1975—to about 23,000—as the city budget tightened. Protectors, arbiters, bullies, targets—"New York's Finest" cope. And the beat goes on.*

others told me. Youth gangs, protection rackets, shootings, drugs, charges of sweatshops. Some Chinese are moving away to avoid these. Still, Chinatown grows, spreading into Little Italy, which is declining as its younger people move out.

All over the city, ethnic patterns are shifting as people come and go. City Hall plots it all on a great map, a dazzling kaleidoscope of reds, blues, greens, purples, chartreuses, oranges, browns, blacks, grays.

I asked the man in charge of the map about immigration today. "Seventy-three thousand legal immigrants into the city each year, perhaps as many more illegally. They come these days mainly from the Dominican Republic, Italy, China, Jamaica, Ecuador, Colombia, Cuba, the U.S.S.R., Trinidad and Tobago, Greece, India, the United Kingdom, Guyana, Korea, Haiti, and the Philippines. As they tend to live together, they also tend to seek the same jobs: Koreans are strong in fresh-fruit and vegetable markets; Greeks run the luncheonettes."

Kaleidoscope or tapestry, this ethnic mix flavors and enriches the city, and the newcomers provide willing hands for jobs others may spurn.

SLOWLY, DAY BY DAY, Manhattan began to yield some secrets. The horse-drawn carriage swung past the Mall, the one great formal space in Central Park, designed long ago for promenades. "This stand of elms," Betsy Barlow said, "and a stand in East Hampton are among the finest left in America. See the overreaching, arching limbs, like a cathedral." Betsy scanned the trees for "flagging," the yellowing of leaves that signals Dutch elm disease.

Betsy is administrator of the park and spends time looking for private, state, and federal funds to maintain its natural amenities; the city does not have enough money. Private funds were found to combat the Dutch elm disease, state funds to resod the battered Sheep Meadow.

The pounding of millions of feet alone did damage. A concert was scheduled that evening; 200,000 would attend. There would be wear and tear, but not as much as the great ethnic parades inflict on the park.

For one festival, I had learned, people used to come into the park the night before, dig holes, roast pigs. On the day of the festival itself, things became so frenetic that by 3 p.m. police concentrated only on heading off violence or injury, and made little attempt to control gambling, drinking, drugs.

The carriage clattered on: past the Bethesda Terrace and down by the model-boat basin, where we bought ice-cream cones. Then to the boathouse by the lake. Birdwatchers keep a log there of sightings in the nearby Ramble. Betsy, herself a birdwatcher, wanted to see what had been spotted that week. She read aloud: "Yellow warbler. Northern water thrush. Baltimore oriole—two young; one took its first flight."

In Central Park, as throughout Manhattan, I was learning, you can find what you want: quietude or frenzy.

Last year 71 feature films were photographed in New York City. Little wonder: Manhattan is the greatest stage in the world. Musicians, jugglers, mimes, peddlers, actors, gamblers abound—the last, three-card monte men who carry cardboard boxes to serve as tables. They set up anywhere; everybody knows it's a sucker's game, yet many of them play.

It is a city of images glimpsed: the spiderweb of Brooklyn Bridge cables, aglow in the setting sun; the black beards and hats of the Hasidic Jews on 47th Street, diamond capital of the nation; burly meat-packers on the Lower West Side taking a break in blood-smeared smocks; yellow cabs fighting the traffic up Eighth Avenue, like salmon struggling upriver to spawn.

I spent an evening with four chamber musicians in a nook at the Hallmark Cards store on Fifth Avenue. They were out of work for the summer and needed money. A small crowd collected; people came and went. "Any Vivaldi?" one woman asked, dropping a quarter into their box. "Turn that ____ off!" demanded a young rogue.

A police car passed, red roof light flashing; an elegant couple on roller skates paused, skated on. Around the corner a man selected another Hallmark nook, lay down on the sidewalk, and went to sleep. "It's like Dickens," said Chris, one of the musicians. "I like Dickens. Maybe that's why I like New York." So do I, I thought, so do I.

Few days lacked a surprise. I bought a newspaper at a sidewalk kiosk. "Got your morning *Times*, eh," observed a well-dressed woman nearby. "Well, stick it in your ear!" I smiled and scurried on, never to learn the source of her feelings.

It's an outspoken town. One Sunday morning I was walking with Mayor Edward Koch in Greenwich Village, his neighborhood, discussing his achievements so far. His Honor was saying that his administration had begun to reverse the ill wind that had shaken the city, that the middle class now had a friend at City Hall, that he tried to act as a normal person and not as a sophisticate, and that he wanted to be mayor for three terms—"it will take that long to clean up this place."

A garbage truck passed; the worker on the back yelled, "Hi ya, Mayor!"

"Hi ya," the mayor shot back. "How'm I doing?"

"You're doing great, keep it up," the worker shouted. The truck rattled on.

TIME and again the theme of change reappeared. Roseland ballroom on West 52nd Street; Wednesday night. The $12 ticket entitles you to a free buffet and the ceaseless music of two big bands. I made my way past display cases holding the dancing shoes of the great and once great—Joan Crawford, Fred Astaire, Paul Hartman—and found a table.

Charlotte was a widow from Flushing. She raised her finger to chin level. "When I get up to here with the house, I come. Everybody in New York knows Roseland. It's an institution. Wonderful, circumspect, and you meet all types. I try to dance only two dances with any one man."

Abby was retired and lived in an apartment house in the West 80s. "My room used to be a maid's room, but the super enlarged it by making a little more space in the hall for me. It's small, but it's a bargain, and I got safety—two doormen in the lobby all the time." Abby too was a regular.

The bands played "Star Dust," "Begin the Beguine," "Spanish Eyes" as a tango. As we moved across the dance floor, beneath the

A building dies *a second death on a crumbling street in a slum. Metal window covers show that it already ranked among the abandoned before it burned. Gaunt clusters of such skeletons stare across rubbled lots in Harlem, in the Lower East Side, or wherever Manhattan's magic has failed. For the homeless, many provide shelter. For fire fighters, too many provide danger, and sometimes disaster.*

glittering chandeliers and streamers, it seemed in time as if we were all on some great cruise ship slipping away from Manhattan, away from lonely rooms.

Charlotte and Abby departed separately, Cinderella-like, before 11; then Roseland transformed itself into a disco, catering to a younger crowd, moving with the times.

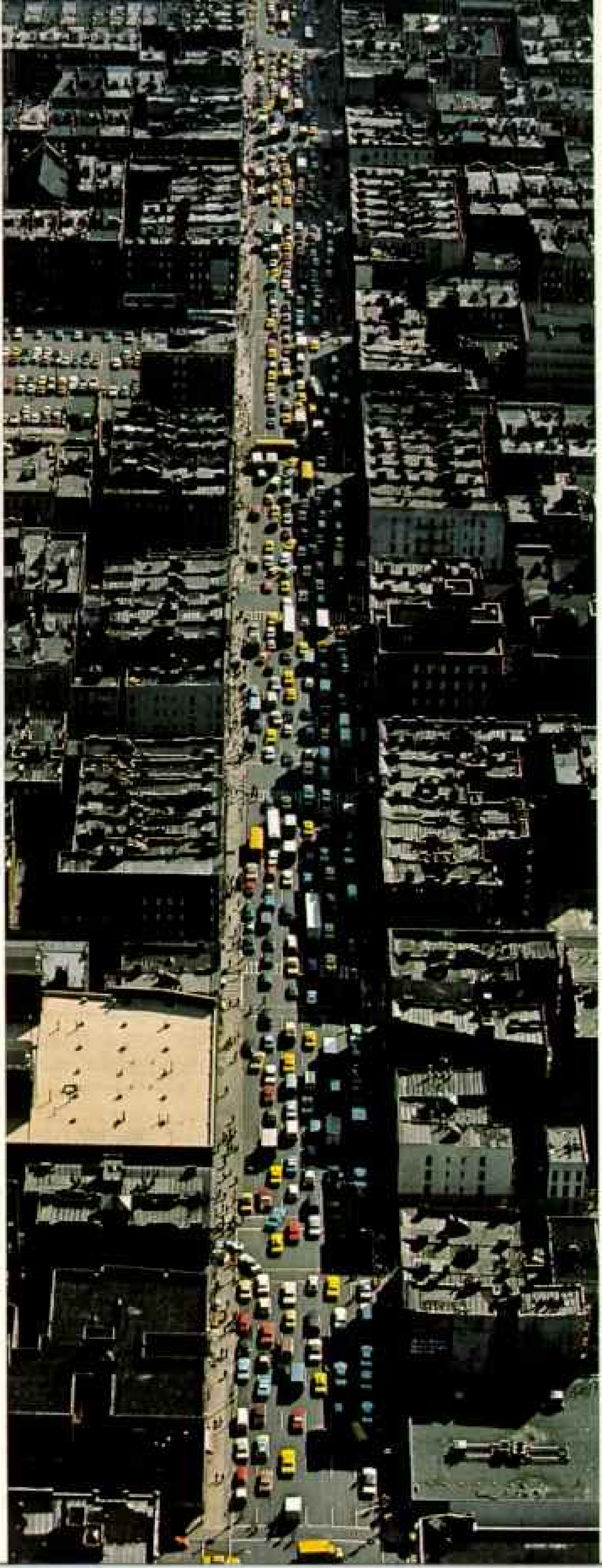
THE POLICE OFFICER was tall and Irish, and his face showed he'd come up the hard way. "Yeah, I knew your father-in-law," he told my companion. "Had a jewelry shop, didn't he, up on 106th? I was walking a beat then. Things were different then. If someone was harassing a merchant, we'd go sit in the back of the store with a beer and wait for the guy to come around again. When he did, we'd take him out and do a number on him. He wouldn't come back. It was efficient; no court." The officer thumped the papers on his desk. The station house was air-conditioned, fortlike; the streets outside humid, alien.

One day, talking with a Broadway mogul, I mentioned that the theater now seemed to lack an O'Neill, an Odets. "Look," he said matter-of-factly, "nothing is what it was; nobody is what he was; not me, not you. They wrote in a certain time about certain problems and are remembered for their contributions.

"The theater today is dealing with different kinds of values and problems in a world that is very different. So we have a Pinter, a Neil Simon, an Albee. Today more people are going to the Broadway theater and spending more money than at any time in its history. In that way, the theater is better off. Times change, you adapt, and the bottom line is always in economic terms."

I spent 24 hours with Ladder Company Three down on 13th Street. In the morning we inspected buildings; in the late afternoon

Twin monarchs *of the skyline, World Trade Center towers (left) lift the palatial suites of international firms in the ceaseless maneuvering for the high ground of command. Brief careers as the world's tallest buildings ended in 1973, when Chicago's Sears Tower topped their 1,350 feet. But Manhattan's reign as kingpin of commerce has never been challenged, even though the 1970s saw the overall New York City population drop by more than 10 percent. And overspending waltzed City Hall to the brink of financial disaster in mid-decade. A transit strike in 1980 clogged arterial avenues (right), but New Yorkers walked, biked, car-pooled, hitchhiked, and rode it out as they have always ridden out crises—with perverse pride in the sacrifices made for greatness.*



Humbug *has been known to take place even in the Christmas season, when it's sometimes hard to tell the real Santa. Fakers have collected for their own personal Christmas funds in the past. After all, this is the town, legend has it, where the Brooklyn Bridge has been sold countless times. But not to New Yorkers, of course.*

the alarms began. We rushed to a great department store; no fire, an alarm malfunction. The assembled firemen put their oxygen tanks, axes, and hoses back on the trucks with relief; two had died in such a building the week before.

Through the night we leaped from our beds and roared through empty streets—a woman reported a tenement on fire (it proved to be a charcoal grill on a fire escape); a woman reported smelling smoke in her apartment (a neighbor had attacked roaches with an insect bomb); another report of smoke (nothing found).

In time the dark buildings, with their sleeping populations, took on a sinister look: A fireman could die in any of them. With morning we rushed to Union Square to extinguish a trash fire near a subway entrance. And now we sat, tired, coffee in hand, in the station house. I asked a couple of the men what changes they had noticed in the city in recent years. Two shrugged their shoulders. One replied: "It's a year older."

MORNINGS: Sometimes a yellow-brown haze, sometimes a metallic gray haze. Sometimes a sharpness of light and shadow that takes your breath, and you can smell the sea and see clear down the island. On such a day I headed down to Wall Street. I sought not change but abidingness.

I was reassured when I met Bob Enslein, a member of the New York Stock Exchange, in the Stock Exchange Luncheon Club. There were wood-paneled walls, mounted moose and bison heads, a tobacco counter, a small room where members checked their street shoes and slipped into more comfortable shoes for the long hours of trading. We went down into the pit.

The day was typical: An opening "bulge," a midday lull, a closing bulge; 45 million shares traded. Between buys and sells, Bob talked. "A few years ago we considered a new building. This floor was a reflection of the 1920s. We needed tons of electronic gear to computerize and provide instant communication for the emerging national market system. A new building proved too costly; we decided to rebuild the inside of this one, without stopping trading."

Thirty-nine million dollars later, the floor has been rebuilt, its new trading posts festooned with blinking electronic boxes. Thus the venerable New York Stock Exchange building, symbol of American capitalism for nearly a century, endures—thanks to the careful measuring of a dollar.

"THE PROBLEM with New York City," a deputy mayor told me, "is that in many ways it has become two cities: Manhattan south of 96th Street, which is doing great, and all the rest." I headed uptown.

On 103rd Street, between Third and Lexington Avenues, a stool sits on the sidewalk. On the stool is a large goldfish bowl, filled with water and covered by a piece of cardboard with a slot cut in it. The bottom of the bowl holds a saucer. If you can drop a coin through the slot so that it drops into the saucer, you win money. Though surrounded by coins, the saucer remains empty.

In a way, the fishbowl symbolizes East Harlem, Spanish Harlem, the heart of the Puerto Rican population in Manhattan. Few other parts of Manhattan have greater unemployment or social distress.*

Father Javier Irurtia pulled a bottle of brandy from the cupboard in the rectory of Holy Agony Church and filled two glasses. The brandy, like the priest, was from Spain. "This is a ghetto from which people want only to escape. The moment a man gets a promotion, he and his family leave. Many think always of retirement, of returning to Puerto Rico. Even people in their 40s."

So, as in the South Bronx across the Harlem River, people were moving out, leaving blocks pocked by abandoned and burned-out buildings, littered lots, broken dreams.

Some fought back. I met Maria on 103rd Street, by the vacant lots she wanted to turn into a playground. She had grown up across the street; she remembered when the lots held a supermarket, houses, a synagogue. She had earned dimes turning out the lights for the last. Now she was a social worker. The kids she supervised, paid by several agencies, scraped away at the rubble.

She and the kids had written to the owners of the lots, asking that titles be transferred to the city; to foundations, asking for money for playground equipment; and to politicians, asking for support. Now they awaited the replies.

Maria was angry: Despair was too often her neighbor. "We're not animals," she said. "We breathe, we think, we have five senses just like everybody else. We have people here who need jobs, and you look around and you see all the work that needs to be done, but nothing happens."

TENEMENT WINDOWS indicate life or abandonment on 103rd Street. Bricks and sheet metal close the windows of abandoned buildings, like pennies on a dead man's eyes. In the windows of occupied buildings you will glimpse a wooden birdcage, a flowerpot, pillows propped in

---

*Frank Hercules's story and LeRoy Woodson, Jr.'s photographs showed an insiders' view of Harlem—the nation's best known black community—in the February 1977 NATIONAL GEOGRAPHIC.

Fantasy rides high *each Thanksgiving, when helium-filled cartoon characters float in Macy's parade (left). Real-life characters flock to Central Park on any pleasant weekend. Roller skates are in; so are roller-skating fashions (below). So are radio headsets—electronic spheres of privacy in the midst of the crowd.*

Morning light *casts a hard eye on a storefront in the Bowery, where a brother of the loose order of skid row sizes up the day ahead. Winners and losers alike lay claim to The City, for it is almost true, as Manhattanites say, that anything can be found here. A native New Yorker, photographer Jay Maisel qualifies the boast: "Anything except peace and quiet. Those are things you have to make yourself."*

the sun, an old man staring, a child reaching through the metal grill.

I entered the tenement at 156 with Anna Salazar. "I've finally gotten people to use a key, to keep this outside door locked for their own protection. Now you can walk in and up the stairs without being afraid of anyone being behind you."

We went up five flights, and out on the roof. "You can see the destruction," Anna said. The buildings on both sides had been burned out; holes gaped in the roofs. When a building is abandoned, she said, sometimes people go in them and set fires—to cook, to keep warm, perhaps to burn.

"I've pulled this building out of abandonment twice," Anna said. "I've lived here almost 35 years. Thirty-five years ago it was beautiful. Like little private homes."

I asked Anna when she had taken over the building last. "About a year and a half ago. The landlord wasn't paying his taxes and he wasn't paying his utilities. They were going to turn off electricity for the common areas. The landlord owed them $17,000. That got me all fired up.

"So I organized this building. I held back my rent to show the other people they shouldn't be frightened.

"We went to court," Anna continued, "and we signed a petition. Article 7-A of the state's real property act. As a matter of fact, you can take over and act as the landlord. These old buildings, especially, you have to keep up with them."

Anna had more plans.

In her apartment she showed me an architect's drawing. A local community group had applied for federal assistance to rehabilitate 15 buildings. The 117 apartments defined in the architect's plan would again be like little private homes.

"I just keep plugging along," she said. "But how long can I do it?"

ON ONE OF MY LAST NIGHTS in Manhattan, I went to Avery Fisher Hall in Lincoln Center. Leonard Bernstein was returning to the New York Philharmonic Orchestra as guest conductor. The concert ended with a profoundly moving rendering of a Mahler symphony. The audience rose to its feet. A woman in my row shouted: "Atta way, Lenny, sock it to 'em!"

Sock it to whom, I wondered. Life, perhaps? Never mind; that combativeness, that willingness to engage is as much a part of Manhattan as the great music, the great buildings, perhaps its essence.

I departed the city by train, passing under the Hudson, surfacing in the Jersey flats. Looking back, I could see the towers of Manhattan poking above the bluffs along the river. It was an image very much like the one I had fashioned so long ago. The larger city, I knew now, had changed: It had lost jobs, people, financial resources; for many, the human possibilities had narrowed. Yet in one sense New York had not changed. With Manhattan as its heart, it remains the greatest of cities, capable of inspiring wonder. Here as in ancient Rome, a poet could truly write: "Nothing human is alien to me."

I remembered talking with an investment banker in an office above Rockefeller Center. He had grown up in Paris, lived now on the Upper East Side, traveled often on business to London and Paris.

"Manhattan," he had said, "is the only place in the world to live. The only place that's really civilized in the sense of the 1980s. Maybe not in the 19th-century sense. But whatever is happening in the latter part of the 20th century—in terms of the intellect and the arts, in science, in the sense of what's good and bad in the world—is here."

Whatever is happening—the good and the bad. Amen. I had not come too late. The train rocked on southward. □

R OF...
nsolidated
R & CONE CORP
T BRAND CONES
WAFERS
& SUGAR CONES
HOUSE
L CLOSEOUTS
VA, STAINLESS
PRICES
SCALES
STERNO
BROOMS
PIZZA & DONUT
BOXES
BLACK
BOARDS
BULBS
PARAGON
NOW IN STOCK KIDDE
WHIPPETS
N2O CHARGERS
FOOD PRODUCTS
MUSTARD
SWEET 'N' LOW
SANKA
TEA BAGS
HOT CHOCOLATE
RELISH
BAR 'B' QUE
Special ROLL TOWELS
30 ROLLS 14.75 A CASE
PAPER BAGS SUGAR WA
WEST BEND
ELECTRIC
coffee makers
GRIDDLES
WOKS
FRY PANS
AUTOMATIC
HEADQUARTERS FOR "FEAST"
SUPPLIES
PAPERPLATES
NAPKINS - STRAWS
PLASTIC TUMBLERS
FOOD TRAYS
SUMMER'S HERE
CUPS for ICES
COLD CUPS
Surplus
POTS
FRY PANS
WOKS
STRAINERS
AJAX BLEACH
BRILLO PINE
HAND & DISH SOAP
OVEN CLEANER
FLOOR WAX
AMMONIA
E-2 SUDS
SHERRI

Like swirling desert winds, dancers from Al Buraymi oasis swing their hair

OMAN: GUARDIAN

at a festival in Muscat marking a decade of oil-financed progress in Oman.

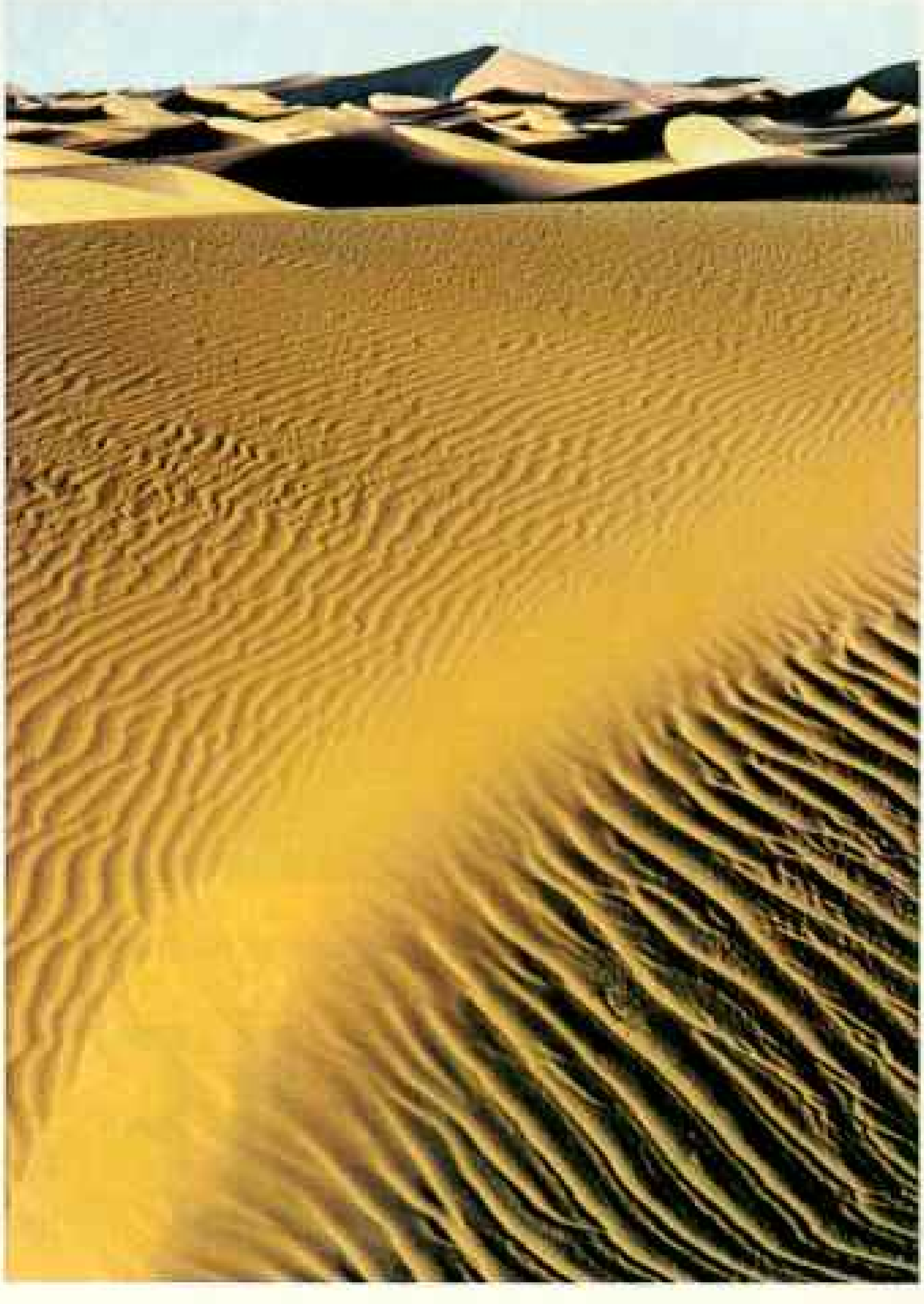
OF THE GULF

By THOMAS J. ABERCROMBIE
NATIONAL GEOGRAPHIC SENIOR WRITER

Photographs by the author
and LYNN ABERCROMBIE

LYNN ABERCROMBIE (ABOVE AND RIGHT)

Spring-fed terraces *of onions and garlic* (***facing page***) *climb the canyon walls of rugged Al Jabal al Akhdar, or "the green mountain," in the country's northern heartland. Oman is a land of harsh contrasts. The stark Hajar range* (***above***), *rimmed by scattered groves of date palms, walnuts, and mangoes with patches of alfalfa and wheat, sweeps from deserts in the northwest to fishing villages in the east. Though narrow, the fertile Batinah coast on the Gulf of Oman grows 50 percent of the crops that set Oman apart from most Persian Gulf states as a potential exporter of food. The dunes of the vast Empty Quarter* (***right***) *skirt gravel plains that stretch 80 miles south into Dhofar province, whose rolling grasslands resemble East Africa more than Arabia.*



LYNN ABERCROMBIE (ABOVE)

Between a rock and a hard place, *the town of Kumzar—wedged into a crack in the Musandam Peninsula—has filled the cemetery beside its mosque, where men depart after Friday noon prayer* (**right**). *The dead are now buried beneath floors of houses or along narrow streets.*

At a Koranic school in Kumzar, a boy in a crocheted cap (**above**) *studies the Arabic alphabet. Omanis embraced Islam during the lifetime of the Prophet Muhammad, but split from his successors in the eighth century to adopt the Ibadhi sect. Most people of the interior still follow its tenets, while most Muslims on the coast profess Sunni Islam.*

OMAN: GUARDIAN OF THE GULF

DRONING OUT of its narrow, rock-bound lair, the Omani patrol boat *Bravo Two* shadowed the desolate cliffs of Ras Sharitah, northernmost knuckle of eastern Arabia's stony mainland, and slashed into the sparkling cobalt waters of the Strait of Hormuz.

"Course three five zero," Navy Lt. Salim Abdullah Rashid barked to the helmsman beside us on the bridge. The bow eased over toward the distant ships. Through my binoculars I scanned the horizon past the speck of a lighthouse to count three . . . no, four giant tankers following the main channel that hooks through Omani waters on its way out of the Persian Gulf—or the Arabian Gulf, as it's more often called in the countries along its southwestern shores.

"Before the war between Iran and Iraq we monitored an average 78 ships a day," Lieutenant Rashid said. "These days, traffic is about two-thirds that."

Our tiny warship is one of two such missile boats in the Sultan of Oman's navy. The rest of its flotilla consists of only four other gunboats, two support ships, some landing craft, and a wooden dhow—a modest fleet to guard the crucial strait some refer to as the "Western world's jugular vein."

Back at the small Oman Navy post on Goat Island, I peered into a glowing radar screen with the British contract officer in charge of the base.

"More than half of the oil exported to the United States, Western Europe, and Japan sails across this little screen—something in the neighborhood of 750,000 barrels an hour," the commander said.

"No, sinking a supertanker wouldn't block the strait," he explained. "It's deep and 28 miles wide. But those big ships are sitting ducks for terrorists. Even the threat to attack or mine the strait would spark ruddy havoc, quadrupling a shipper's insurance rates and slowing down traffic to a trickle."

For the moment it was quiet enough, peaceful as a dove's nest. Still, there was a certain tension.

"Since the American hostages were seized, Iranian pilots have buzzed us nearly every day," another British officer said. "Cheeky lads." Pointing to a military map, he added, "See this mark? That's where the Soviet ship anchors just outside Oman's territorial waters. Sometimes it's a rusty old minesweeper, sometimes the latest Kresta II-class cruiser."

Few places in the world are so strategic, yet so thinly defended, as this Gibraltar of the East. Oman's 20,000-man military, trained and led by British officers, is rated one of the best in the Middle East, but it is one of the smallest. Across the strait, once powerful Iran has been neutralized by revolution and war. Alarm grows in the West as the Russians seem to close their jaws on the gulf, from submarine pens next door in Democratic Yemen (Aden) and new air bases in Afghanistan.

American contractors had already arrived to install "facilities" on Oman's Masira Island, intended for contingency use by U. S. forces. But for such a vital ally, Oman is remarkably little known to Americans. Few Western travelers reach its shores; there is no such thing as a tourist visa.

Nevertheless, on a recent three-month journey I found that, while dark troubles swirl all around it, the strategic sultanate still basks in the eye of the hurricane.

Bracketing Arabia's eastern littoral, Oman is about as big (82,000 square miles) and almost as populous (890,000) as Utah. Its interior of jagged mountains, gravel plateaus, and shifting dunes gives way to long sloping beaches and rocky coves. Compared to most of Arabia, fertile Oman receives a greater share of "Allah's bounty": water.

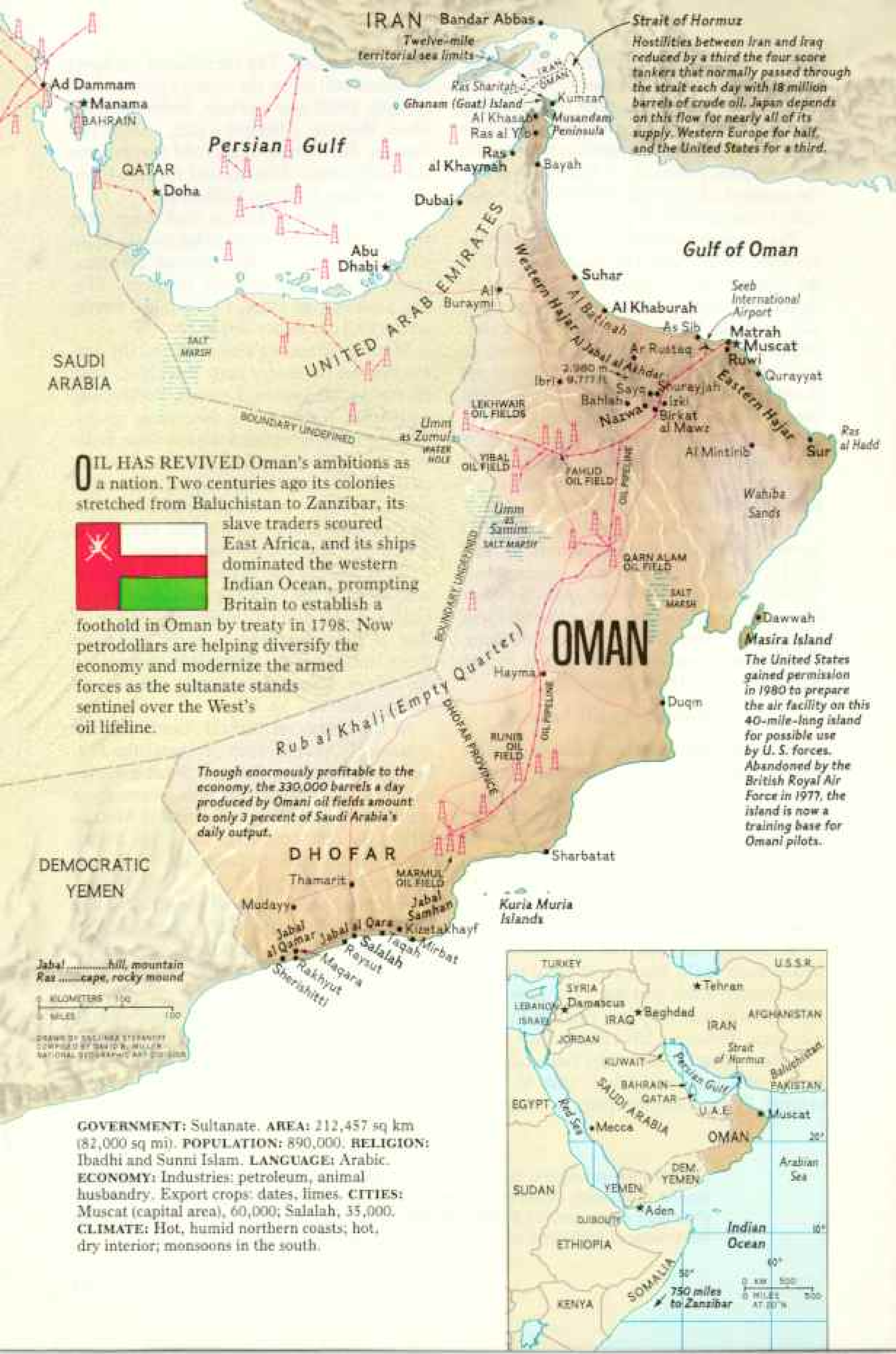
The inland massif of Al Jabal al Akhdar—"the green mountain"—thrusts as high as 10,000 feet to squeeze rain from winter clouds. Its spring-fed folds hide villages

***King-size portrait** of Sultan Qaboos bin Said bin Taimur towers over workmen hoisting it onto the side of a Muscat hotel. Qaboos deposed his highly conservative father in 1970, fearing that a rebellion in Dhofar supported by Soviet-backed Democratic Yemen was succeeding. He still warns of Soviet expansionism in the region.*

LYNN ABERCROMBIE

A fiery palm *hangs over Matrah's new deepwater port as National Day fireworks celebrate Oman's heritage and the sultan's development programs. Since 1970 some 370 schools, 14 hospitals, and 1,100 miles of roads have been built where few existed before. New mosques, wells, houses, airports, and power plants have also been paid for with oil revenues that may reach four billion dollars this year.*

OIL HAS REVIVED Oman's ambitions as a nation. Two centuries ago its colonies stretched from Baluchistan to Zanzibar, its slave traders scoured East Africa, and its ships dominated the western Indian Ocean, prompting Britain to establish a foothold in Oman by treaty in 1798. Now petrodollars are helping diversify the economy and modernize the armed forces as the sultanate stands sentinel over the West's oil lifeline.



Strait of Hormuz

Hostilities between Iran and Iraq reduced by a third the four score tankers that normally passed through the strait each day with 18 million barrels of crude oil. Japan depends on this flow for nearly all of its supply, Western Europe for half, and the United States for a third.

Masira Island

The United States gained permission in 1980 to prepare the air facility on this 40-mile-long island for possible use by U. S. forces. Abandoned by the British Royal Air Force in 1977, the island is now a training base for Omani pilots.

Though enormously profitable to the economy, the 330,000 barrels a day produced by Omani oil fields amount to only 3 percent of Saudi Arabia's daily output.

Jabal ....*hill, mountain*
Ras ......*cape, rocky mound*

DRAWN BY SALLINEE STEFANOFF
COMPILED BY DAVID B. MILLER
NATIONAL GEOGRAPHIC ART DIVISION

IRAN
Bandar Abbas
Twelve-mile territorial sea limits
IRAN
OMAN
Ras Sharitah
Ghanam (Goat) Island
Kumzar
Al Khasab
Musandam Peninsula
Ras al Yib
Ras al Khaymah
Bayah
Ad Dammam
Manama
BAHRAIN
Persian Gulf
QATAR
Doha
Dubai
Abu Dhabi
Gulf of Oman
Suhar
Al Batinah
Western Hajar
UNITED ARAB EMIRATES
Al Buraymi
Al Khaburah
Seeb International Airport
As Sib
Matrah
Muscat
Ruwi
Ar Rustaq
Al Jabal al Akhdar
2,980 m 9,777 ft.
Ibri
Sayq
Shurayjah
Quriyyat
Bahlah
Izki
Nazwa
Birkat al Mawz
Eastern Hajar
Ras al Hadd
Sur
Al Mintirib
SALT MARSH
SAUDI ARABIA
BOUNDARY UNDEFINED
LEKHWAIR OIL FIELDS
Umm as Zumul WATER HOLE
YIBAL OIL FIELD
FAHUD OIL FIELD
Wahiba Sands
Umm as Samim SALT MARSH
QARN ALAM OIL FIELD
SALT MARSH
Dawwah
Masira Island
OMAN
Rub al Khali (Empty Quarter)
Hayma
Duqm
DHOFAR PROVINCE
RUNIS OIL FIELD
DHOFAR
Sharbatat
DEMOCRATIC YEMEN
Thamarit
MARMUL OIL FIELD
Jabal Samhan
Kuria Muria Islands
Mudayy
Jabal al Qamar
Jabal al Qara
Kuntakhayf
Salalah
Taqah
Mirbat
Raysut
Maqara
Rakhyut
Sherishitti
0 KILOMETERS 150
0 MILES 100
TURKEY
U.S.S.R.
SYRIA
Tehran
LEBANON
ISRAEL
Damascus
IRAQ
Baghdad
IRAN
AFGHANISTAN
JORDAN
Strait of Hormuz
KUWAIT
Persian Gulf
Baluchistan
BAHRAIN
PAKISTAN
QATAR
EGYPT
U.A.E.
Muscat
Red Sea
Mecca
SAUDI ARABIA
OMAN
20°
Arabian Sea
DEM. YEMEN
SUDAN
YEMEN
Aden
DJIBOUTI
Indian Ocean
10°
ETHIOPIA
60°
SOMALIA
50°
750 miles to Zanzibar
0 KM 500
0 MILES 300
AT 20° N
KENYA

GOVERNMENT: Sultanate. **AREA:** 212,457 sq km (82,000 sq mi). **POPULATION:** 890,000. **RELIGION:** Ibadhi and Sunni Islam. **LANGUAGE:** Arabic. **ECONOMY:** Industries: petroleum, animal husbandry. Export crops: dates, limes. **CITIES:** Muscat (capital area), 60,000; Salalah, 35,000. **CLIMATE:** Hot, humid northern coasts; hot, dry interior; monsoons in the south.

where peach, pomegranate, and walnut trees branch among terraces of onions and alfalfa. Date palms green the 170-mile-long Batinah coast northwest of Muscat, where farmers tap intricate irrigation systems. In the southern province of Dhofar, recently the scene of a bitter guerrilla war, monsoon rain cloaks the hills in grassland.

The country reached its nadir under the despotic Sultan Said bin Taimur, father of the present ruler. Omanis by the tens of thousands drifted away to seek education and jobs in the neighboring oil states. Oman's own small wells were starting to pay, but the old sultan's medieval methods channeled little wealth into development the country sorely needed. His only son and heir, Qaboos, back from England's elite Sandhurst military academy, was kept under virtual house arrest for seven years at the palace in Salalah, capital of Dhofar.

In the mid-1960s bands of dissidents formed in Dhofar's rugged mountains, and by 1970 Salalah itself was surrounded. Young Qaboos decided to act. After a palace shoot-out he deposed his father and sent him to exile in London. Declaring himself sultan, he pledged to put down the rebels and to hoist Oman into the 20th century.

Country Prospers Under Super Q

A decade later a drive through Muscat and its suburbs proves that Sultan Qaboos —Super Q, as British expatriates affectionately call him—has fulfilled his promise.

I started under the Bab al Saghir, the small pedestrian gate in Muscat's southern wall, where turbaned old men still gather, as they have for centuries, to exchange the news and soak up the sun's first rays.

"A dozen years ago the city gates were bolted each night from eight until dawn," one wizened elder told me. "If you walked the streets at night, by law you had to carry a lantern. Today we have streetlights."

I glanced up at the twin fairy-tale fortresses of Mirani and Jalali, built by 16th-century Portuguese occupiers to command Muscat's harbor. The crenellated parapets of Mirani still house the sultan's guard; until recently Jalali was a prison. Behind the Ali Musa Mosque, I flagged a taxi, a shiny red Datsun. We took the busy road that follows the wall around Muscat and funneled into the four-lane highway to Matrah.

"Before Sultan Qaboos took over, this was the only paved road in Oman—six miles long," says driver Muhammad Ibrahim, spouting enthusiasm—and statistics. "Today asphalt highways, 1,100 miles' worth, connect all our major towns."

Matrah, Muscat's sister city on the sea, has become the major port. Freighters from Hamburg, Singapore, London, Rotterdam, and Kobe crowded her deepwater quays. Diesel-powered wooden dhows from Pakistan and the Persian Gulf states rode at anchor off the fishermen's wharf. Nearby I watched seiners mending their nets on the beach beside hand-hewn skiffs, each hung with a new Yamaha outboard motor.

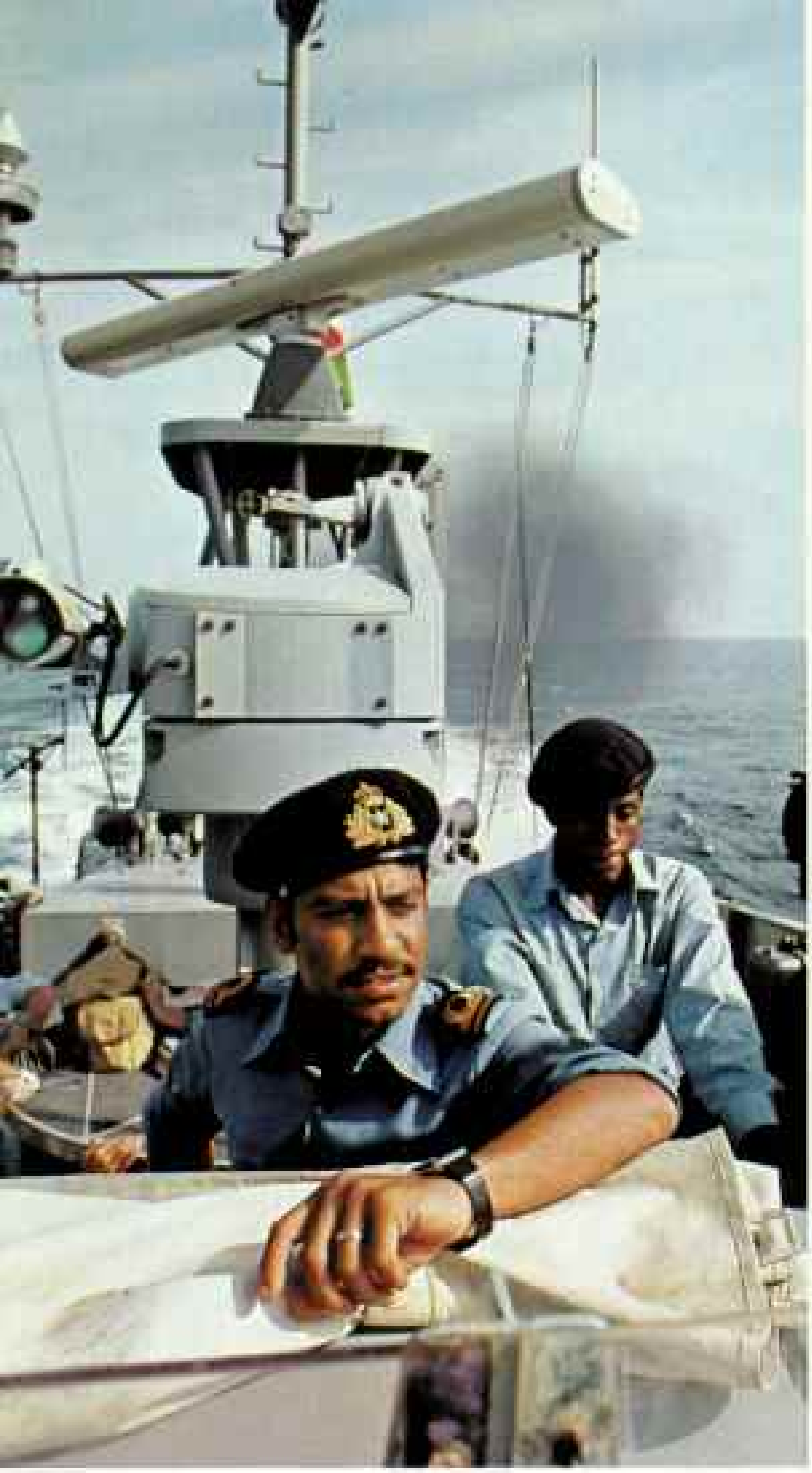
From Matrah the expressway curves inland through the high-rise suburb of Ruwi. Until recently the old whitewashed fort of Bait al Falaj guarded a sandy stretch of thorn trees; now it is difficult to spot among the offices, apartments, hotels, banks, and movie theaters.

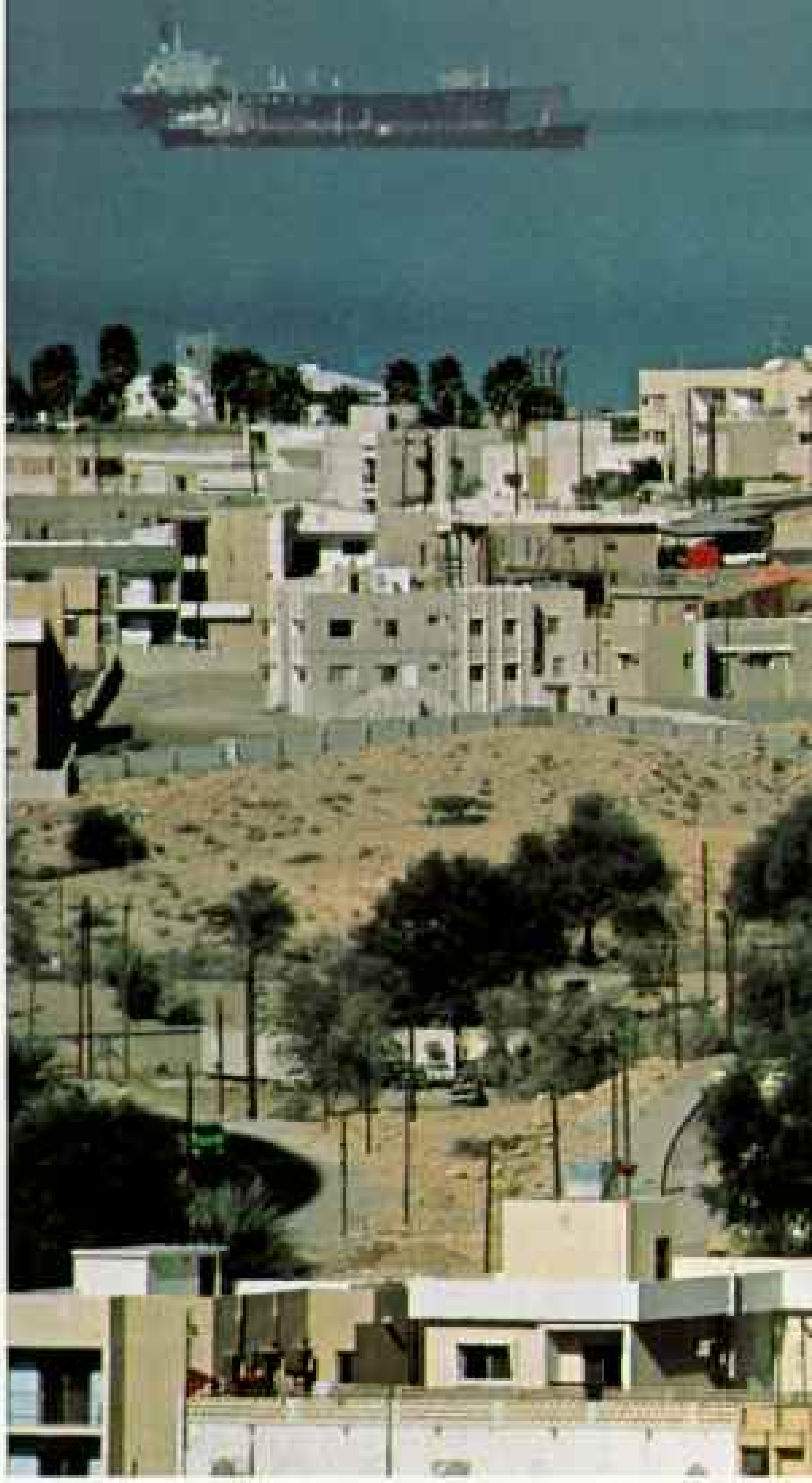
At the Qurayyat turnoff stands another symbol of Oman's rapid progress, the 218-bed Al Nahda Hospital, specializing in eye, ear, nose, and throat problems. Formerly, a small American mission hospital in Matrah served the entire country. Today the Ministry of Health runs 14 hospitals, 70 clinics, and 26 mobile units.

Progress can be a mixed blessing, as any motorist finds in the traffic clogging Wattayah circle. Before 1970 there were only a few dozen private cars and trucks in the country; today, some 80,000.

I was struck as much by the nature of the traffic as by the density. A wealthy sheikh darted by in a black Mercedes-Benz, and a cabinet minister flanked by a pair of wailing motorcycles. But most of it was workaday

Startled by strangers, *two Bedouin women of the central desert clutch full-face masks, rarely seen elsewhere in Oman, as they wait for a doctor to arrive by plane at the small dispensary in Sharbatat. Efforts to bring medical care to outlying areas have reduced high rates of infant mortality, malaria, and trachoma.*





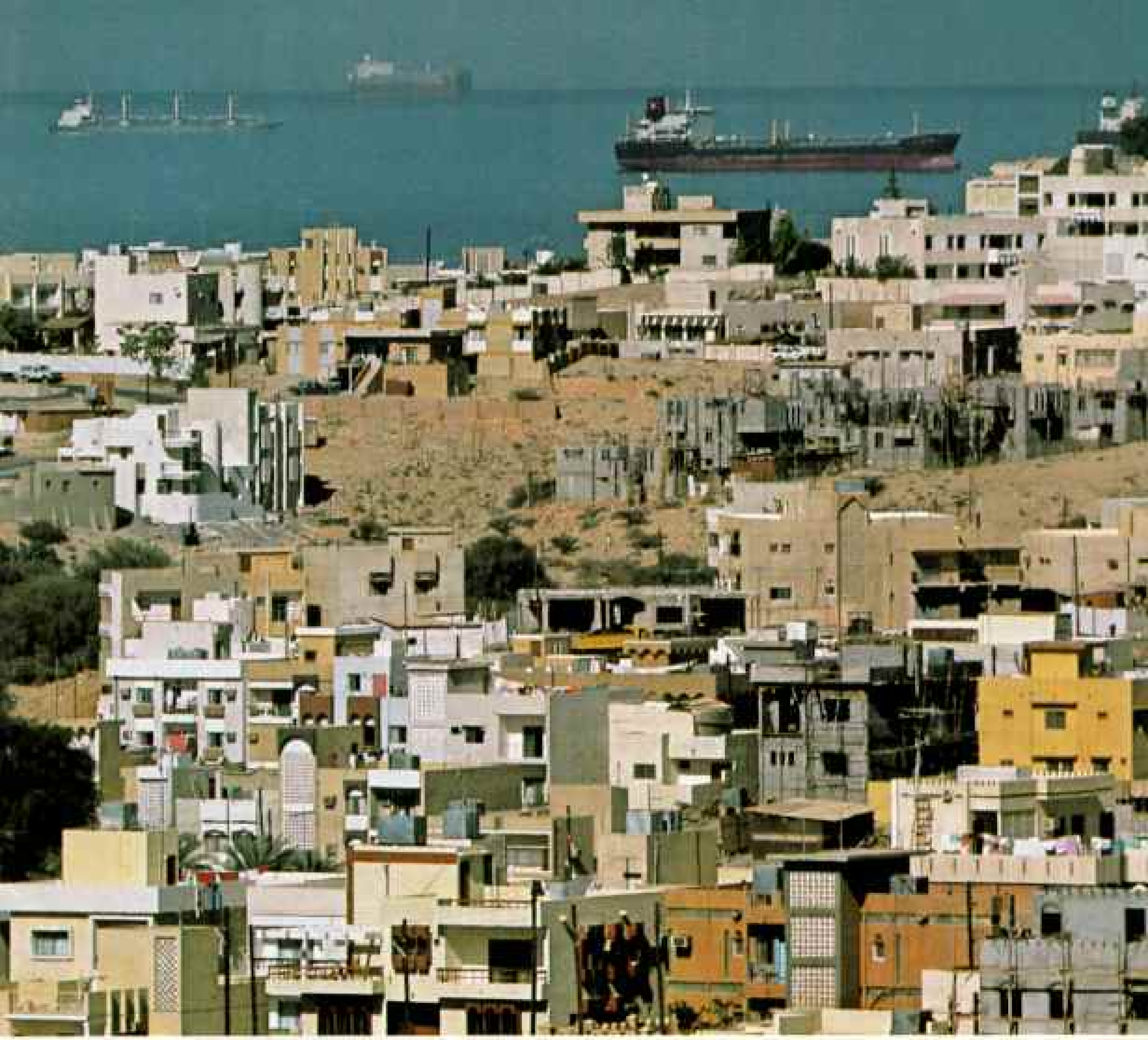
Keeping close watch *on traffic in the strategic Strait of Hormuz, Lt. Salim Abdullah Rashid* ***(above)*** *guides one of Oman's two British-made, missile-equipped naval*

traffic: 20-ton dumpers, flatbeds loaded with cement and steel, rumbling graders, Land-Rovers and pickups, busloads of Pakistani workers, a giant crane. Oman is, above all, a nation on the build.

The National Day celebrating Sultan Qaboos's first dramatic decade—and his 40th birthday—turned into a four-day extravaganza, climaxed by a military pageant. Its cast of 3,000 included an 800-piece band, lancers, a camel corps, paratroopers, and motorcycle police, backed by helicopters, artillery, American-built tanks, and musical fountains. The result: a thunderous blend resembling *Götterdämmerung*, Disneyland, and World War II.

Later I called on Sultan Qaboos at the royal palace in nearby As Sib. He greeted me in his study, stepping out from behind a mahogany desk stacked with memos and royal decrees. Sweetening the air was the subtle fragrance of frankincense.

The sultan wore traditional Omani dress, a black robe over a full-length white *dishdasha* cinched by a gleaming silver dagger, or *khanjar*. His flashing dark eyes were framed by a smartly trimmed beard, grayed at the cheek, and a powder blue turban. The ramrod martial image I had watched on the parade ground gave way now to the quiet voice and manner of the private man. Yet as we explored the subject of Oman, the



patrol boats. As many as 40 tankers (**above**) *have anchored near Muscat to avoid extra time and higher insurance premiums in the war-menaced Persian Gulf.*

talk kept veering back to matters military.

"We don't want to involve ourselves in the awesome conflict between the superpowers," His Majesty said, shaking his head. "Oman must look to its own defense, and we are capable of doing so. But we must expand the armed forces, especially our navy. We need minesweepers, better radar, antisubmarine planes. For this we count on backing from Europe and the United States.

"Is this not fair?" His Majesty asked. "Is not the strait as vital to the West as to us?

"We see the Soviet Union as a very real threat to the region," he continued. "We learned that firsthand, fighting the Communists in Dhofar. In the end, with help from our British and Iranian allies, we drove them from our soil."

Would His Majesty favor opening this friendly and beautiful country to tourists?

"We are not ready to entertain foreign guests yet," the sultan said. "I have seen what mass tourism can do—in Spain, for instance. We do not want to jeopardize our cultural identity."

The crucible of Omani culture remains its isolated mountain spine. Here, in rock folds where peaks rise sharply from the desert, self-sufficient oases were already flourishing when the first Arab immigrants pressed into Oman from southern Arabia nearly 2,000 years ago. For centuries conflict raged between desert nomads and Persianized villagers who had organized intensive agriculture around irrigation systems.

Among the earliest of Muhammad's converts, the Omanis had embraced Islam by the middle of the seventh century but, fiercely independent, they refused to pay homage—or taxes—to the caliphs in Damascus and Baghdad. They soon adopted the tenets of the small Ibadhi sect of Islam. Strict yet fiercely egalitarian, the Ibadhis promoted unity between villagers and nomads and established law and order, electing their leader, the imam, from among their own learned elders.

Over the past 200 years Oman's political center of gravity gradually shifted to Muscat and the seacoast, under the sultans of the still reigning Al Bu Said Dynasty. But in the interior the imams refused to submit. As recently as 1954, Imam Ghalib bin Ali rebelled and declared central Oman independent.

The sultan's forces attacked overland from Muscat to reduce Nazwa and Ar Rustaq. Imam Ghalib abdicated, marking an end to the imamate. The main body of rebels fled to the natural fortress of Al Jabal al Akhdar, high above Nazwa. From remote villages they continued to harass the sultan. Finally, British jet bombers and airborne troops put down the insurgents in 1959.

Feet Yield to Automobiles

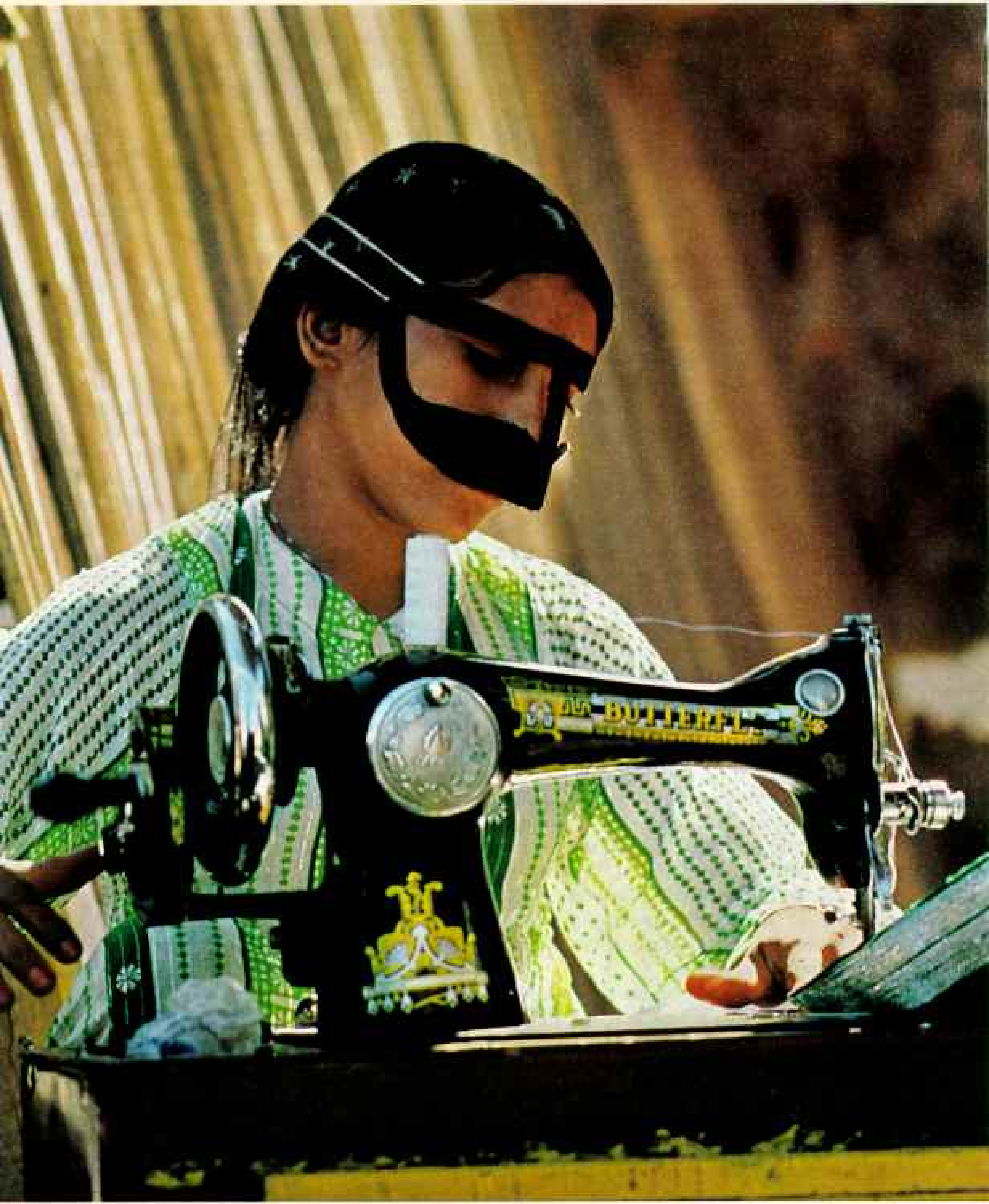
Armed with a pass from the Ministry of Defense, I drove up from Birkat al Mawz to the 6,500-foot-high Sayq plateau. A study in vertigo, the steep, winding track thrust me against the seat back, up narrow ravines, and across bald mountain flanks. The 20-mile trip took two hours.

From the Oman Army training camp at Sayq, I continued on foot with Cpl. Suleman Nasir, an enthusiastic young native of the plateau. "Our villages had never seen a motorcar until the road opened two years ago," Suleman smiled. "Feet are still the main form of transport up here."

Suddenly we stood on a bleak, windswept precipice, and I could see tiny hamlets dwarfed by the immense canyon that cleaved the plateau and plunged to the desert floor a mile below. From each cluster of houses trailed emerald terraces.

We started down steps cut into the rock

Oases of color *in a land of bleak horizons, Omani women prefer clothes as bright as any in Arabia. A seamstress in Kumzar,*



LYNN ABERCROMBIE

veiled in a brief mask typical of the region, sews a silver-threaded cuff onto trousers to be worn beneath an embroidered dress. At home Omani women play traditional roles, though many now hold jobs in the government or private businesses.

and just minutes from the moonscape of the plateau strolled through a paradise of pools and waterfalls, sweet-smelling fields and vineyards. Under fruit orchards our feet kicked up the first leaves of autumn. Along the canal near Shurayjah, villagers watered terraces of garlic, onions, and *yas*, a medicinal herb exported by donkey to lowland markets. Women in bright mountain costume pounded wash in the gurgling stream.

With houses piled almost atop each other on the crowded knoll, the streets of Shurayjah were more like tunnels. Here and there a bare spot held a neat square of rubble.

"Houses of the rebel leaders," Suleman explained. "After the war the army helped rebuild the damaged mosques, homes, and canals. But these ruins were left as warnings to any future rebels."

Battlements Guard a Stormy Past

Reminders of countless rebellions and foreign invasions, medieval forts and watchtowers spike nearly every Omani town. Many were built by the imams after they drove out the Portuguese in 1650. (At the end of that century Omanis pushed Portugal from its East African stronghold in Mombasa; massive Fort Jesus fell to the Arabs after a siege lasting nearly three years.)

Of the great fortifications of that era in Oman, perhaps the most impressive is the great circular fortress in Nazwa, Oman's cultural capital, guarding the southern flank of Jabal Akhdar. I found it in near-perfect condition (pages 362-3). Until a few years ago the fort served as Nazwa's principal defense. Today helicopters and howitzers at the army camp south of town have eclipsed its military role.

If Nazwa's fort had become a mere relic, the noisy marketplace beside it still held a firm grip on the past. I wandered through the covered suq to savor the tang of spices and incense and bargain for local crafts: pottery from nearby Bahlah, Bedouin basketry and rugs, wooden chests from Sur, bolts of cotton from the handlooms of Nazwa. In the glittering silver suq I encountered a wandering arms merchant struggling with a load of old Martini-Henry rifles, broadswords, and silver khanjars. I had long coveted one of these weapons, so I set to haggling.

"My last price?" the stubborn vendor blurted. "Same as my first price: 270 rials [$780]." The splendid dagger, tucked into a silver scabbard on a belt of wide brocade, completes the costume of any properly dressed Omani gentleman. Short supply made it a sellers' market. The cheapest khanjar I would ever find was well over $300; very fine specimens, fitted with handles of rhino horn, ten times that!

Nearby, in the shade of a great gnarled tamarisk, an auction drew a knot of farmers to bid for what, this lean year, was also a precious commodity: water. These men farmed date groves along the Daras *falaj*, or canal, largest of Nazwa's eight irrigation systems, and one of only two still flowing.

"It has been three years since we had rain," lamented farmer Musa Ali al Abry. "These days even the mighty Daras is only a trickle, so I must buy additional water."

Quickly the auctioneer sold available shares of water, shaking his head from side to side in rhythm with the bids, collecting wads of bills and entering transactions in the falaj book he carried.

"Normally these three-hour shares cost but a few coppers. Just now I paid 26 rials," Musa said. That translated to $76. "I spent more on water this year than I will ever get back from my dates and limes. But what can I do? Without water the trees will not live."

No farmer takes water for granted. Commonly in Oman's deserts the word for rain is *hayat*—life. Oases like Nazwa depend on irrigation arteries, the falajs, for their lifeblood. The gravel slopes around Oman's mountains are laced with subterranean aqueducts that have flowed since antiquity. They likely date to fifth-century B.C. Persian colonists; some even credit them to Sulayman bin Dawud: King Solomon.

The source of the Daras falaj lies under

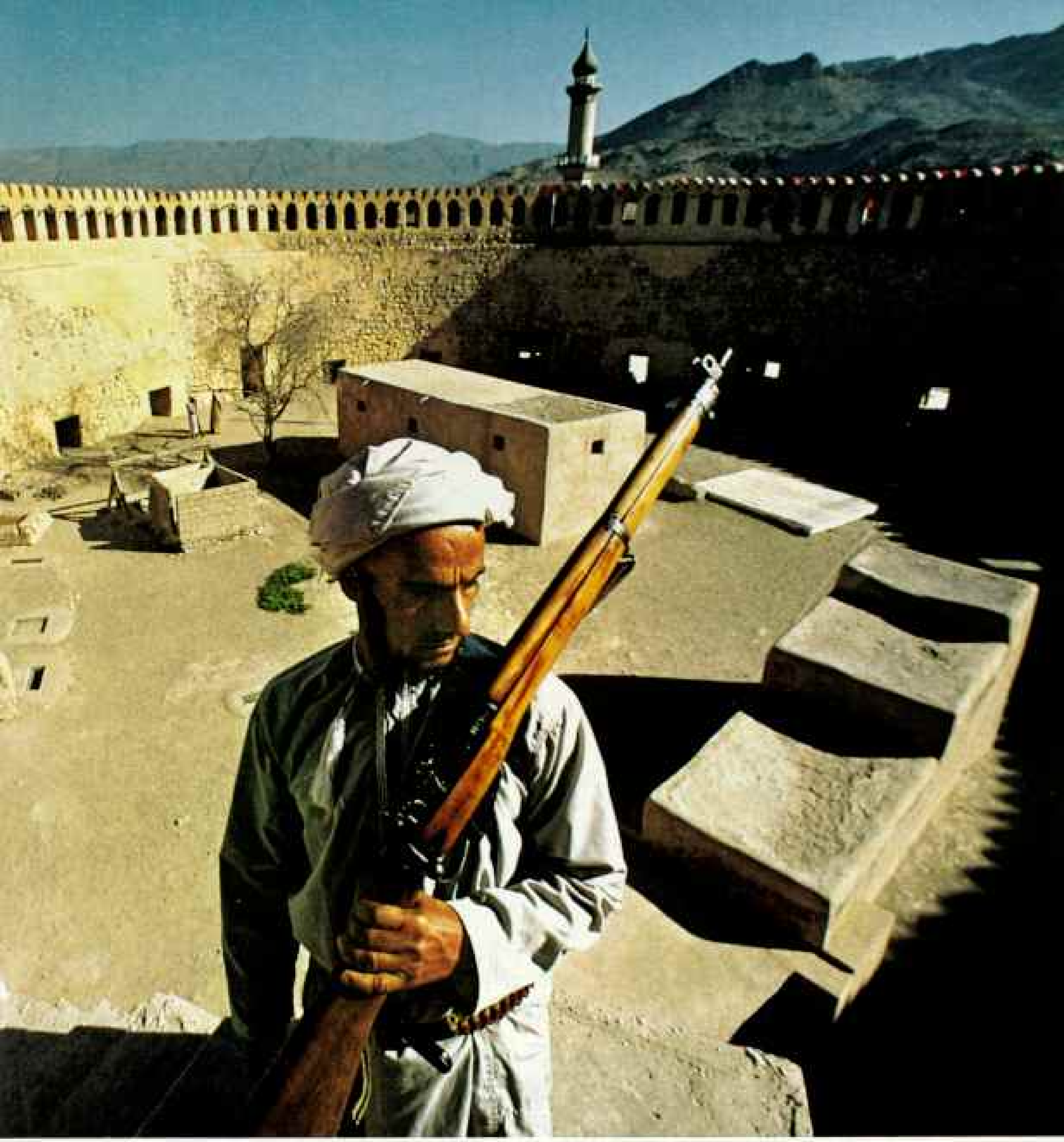
Despite hefty catches *of king mackerel, tuna, and other fish from coastal waters, more than half of Oman's fishermen have taken other jobs since 1970, many in the construction and oil industries. To aid fishermen like this boatman at Sur, the government has built icehouses and helped pay for new boats and equipment.*

***Still vigilant** six years after crushing the Marxist-led Dhofar revolt with Iranian, British, and Jordanian help, the sultan's army now trains troops like this camouflaged soldier (**below**) in the Dhofar hills. Evoking older battles, a retainer of Nazwa's governor (**right**) surveys the former capital from the 80-foot-high wall of its formidable 17th-century fortress.*

higher ground nine miles away. Dug by hand, the mother well bores down some 300 feet. Tapped every 50 yards or so by vertical maintenance shafts, the channel beneath the desert finally reaches ground level at Nazwa's northern edge. In late afternoon I followed its serpentine waters through the lush gardens and shaded groves.

"Nearly half of Nazwa's 12,000 people depend on the Daras waters," said Muhammad Khamis Mesud, the overseer, or *arif*, of the Daras system (page 367). "Farmers must buy water rights separately from their land. Most own permanent water portions now timed on an eight-day cycle. Water for drinking—piped off upstream—and for washing is free to all."

Today the flow of oil, not water, measures Oman's prosperity. Still, with a current production of 330,000 barrels a day, it is hardly in the same league as the OPEC countries of the region. Iran and Iraq each produce ten



times that; Saudi Arabia, 30. Forced to husband revenues and plan carefully, Oman's developers have wrought less waste, less conspicuous consumption, less havoc to their traditional culture. Blessed with prosperity to build, but not enough to corrupt, Oman is more a beehive than a boom.

The first oil prospectors arrived in 1924, but not until 1967 did Petroleum Development Oman finally begin commercial production, at Fahud.

"Oman started later than other Middle East producers, fortunately, I think. We were able to learn a lot from their experience," Hans M. Brinkhorst had told me in Muscat. He is PDO's managing director on loan from Royal Dutch Shell, largest private shareholder in the company. The Omani government holds a 60 percent interest.

"And, waiting in the ground, the crude increased in value," Mr. Brinkhorst said. "Only after oil prices jumped fivefold in

1973 was it profitable to exploit our more remote oil fields.

"Oman has enough natural gas for domestic use for perhaps 150 years," he continued. "Already gas generates electricity and distills fresh water from the sea for Muscat and the capital area. We're building a new pipeline 150 miles up the coast to Suhar. When the copper mines open there in 1982, gas will fire their smelter."

New Wells in the Desert

From Muscat I aimed my Land-Rover toward Oman's oil fields in the central desert. This furnace of blinding gravel flats, stony outcrops, and rivers of sand long separated Oman proper from its southern province of Dhofar. Only tenacious Bedouin tribes—the Duru, the Harasi, the Yal Wahiba—scrape a meager living from this limbo, stalking faint trails from one bitter water hole to the next, grazing their own camels and raiding neighbors' herds since man first measured time. But in barely a generation the Bedouin lost his sway. Today the desert tracks converge on wells of a different sort.

After days in the bone-dry wilderness I found Marmul, PDO's new production center for its 78 southern wells, a mirage come true. With a population of 500, the modern oasis offered clean sheets, cold beer, movies, a swimming pool, even a garage to mend my ailing Land-Rover. Industrial-relations officer Muhammed Shuely showed me around. Amid the small talk at the Oasis Club I found English, Dutch, and Hindi predominating.

"Expatriates still fill most technical jobs," Mr. Shuely said. Like many educated Omanis, he was something of an expatriate himself. His family owned extensive properties in Zanzibar, and he learned his English at a British school in Tanganyika. After eight years with Getty Oil in Kuwait, Shuely joined PDO in 1972.

"Hundreds of Bedouin also work for PDO, as guards, roughnecks, drivers," Mr. Shuely said. "Many are taking our training courses in engineering, computers, and management."

Change touches even the most stubborn Bedouin. Take Sheikh Salem Musallim of the Al Akak tribe. I overnighted at his tents south of Mudayy, not far from the South Yemen border. A Japanese transistor radio had awakened me blaring news from distant Muscat; now we sat on Japanese rush mats as his wife brought us hot tea from a Japanese thermos.

"Many good things these days are *Yabani* [Japanese]," Sheikh Salem admitted. As he talked, he filled a leather bowl with milk from the spigots of a she-camel hobbled outside the tent. The foal had recently been slaughtered, but its skin, hung on a nearby shrub, kept the mare flowing.

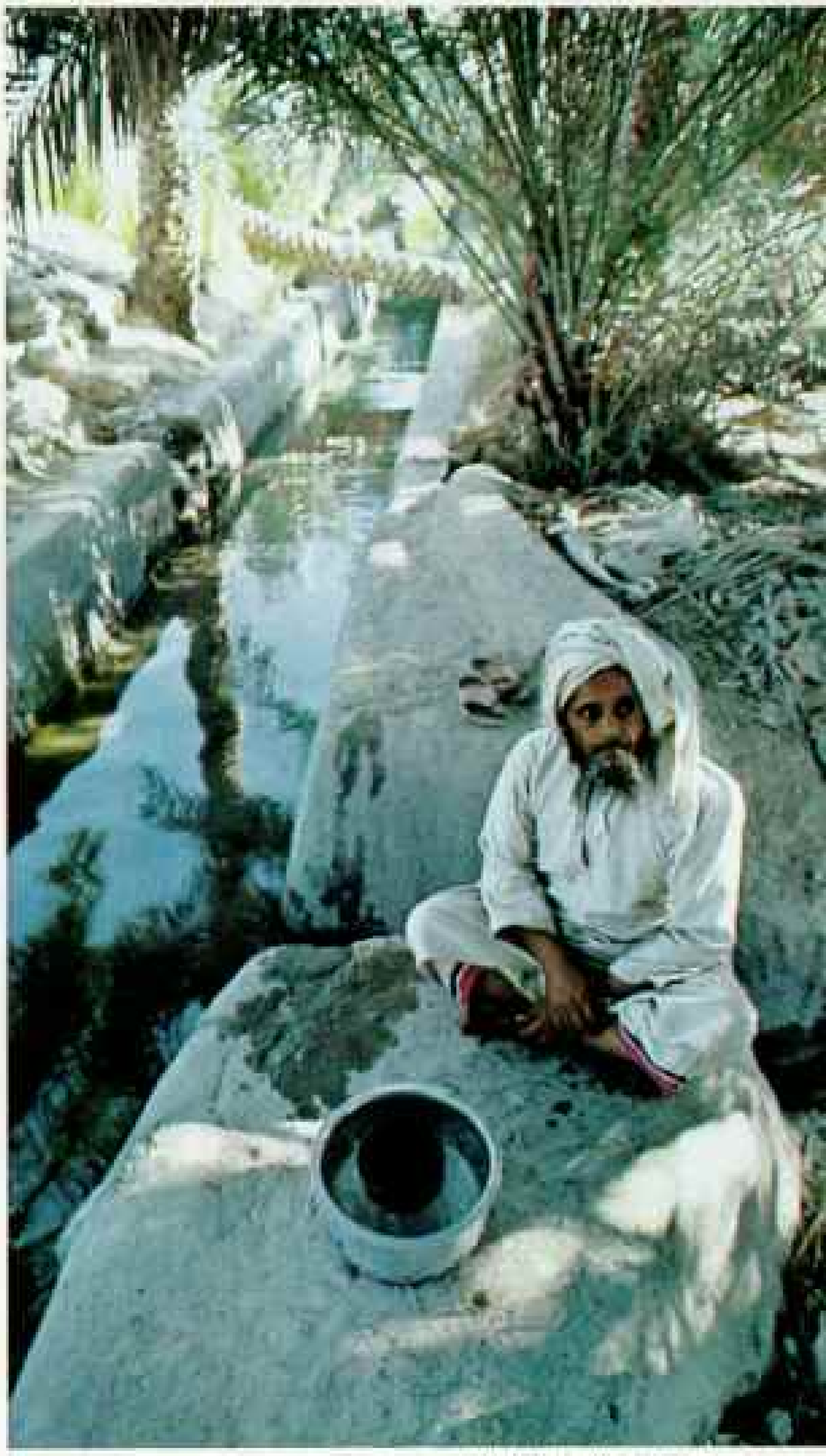
"But my cousin Ahmad went too far," Sheikh Salem said. "He bought a Yabani pickup, Tooyoota. These are too expensive to feed. And they cannot march the trails that a camel must." He passed me the foaming bowl. "And let him try milking his Tooyoota!"

Innovations like the "iron camel" and the mechanical pump, by bringing water, grazing, and animals together efficiently, continue to alter Bedouin life. Yet few would give up their precious herds.

A Bedouin stripped of his camel is more ravaged than an American without his car. He has some 160 words for camel, depending on age, sex, color, bloodline. Beast of burden, desert companion, source of pride, measure of wealth, hero of poetry and legends, the camel is deeply embedded in the Bedouin psyche. It provides milk and, for the occasional feast, meat. From its wool, women weave blankets and rugs; its hide is turned into sandals, cradles, buckets.

Cows as well as camels roam with the Jeballis, mountain nomads in the southern province of Dhofar. A cultural island surrounded by vast deserts and the sea, the 160-mile-long crescent range formed by Jabals Qara, Qamar, and Samhan stands apart from the rest of Oman. Southwest monsoons

***The sea is the only highway** to Kumzar, where passengers from Al Khasab disembark. Seafarers since the dawn of history, Omani traders were hauling copper to Sumeria by 2200 B.C. An Omani sailed to China about A.D. 750. And in the tenth century, Suhar, the legendary home of Sindbad, was among Islam's major ports.*



LYNN ABERCROMBIE (LEFT)

Women usually pull *when Shihuh men plow on the dusty mountaintops of the Musandam Peninsula. But Ahmad bin Hassan* **(left)** *explained that his wife was old and nearly blind, and so he shared the work with his son. Living in huts of mud or stone, the Shihuh scratch out wheat or barley crops with the most basic tools.*

More sophisticated farmers of the interior rely on centuries-old canals and underground aqueducts. Muhammad Khamis Mesud **(above)** *supervises water distribution at Nazwa to shareholders of water rights. Canal flow was once measured by how long it took water from the large bowl in the foreground to fill the perforated smaller bowl inside it. Officials now use a digital watch.*

from June to September bring rain and mists that carpet the hills with green, the only such lush pastureland in all Arabia.

Firmly annexed by the Omani sultans only a century ago, Dhofar soon became their favorite summer retreat. Sultan Said bin Taimur, father of the present sultan, moved his permanent residence from Muscat to Salalah, Dhofar's capital on the sea.

Communist Uprising Put Down

Chafing under the old sultan's oppressive rule, the hill tribes touched off a rebellion and in 1968 formed the Popular Front for the Liberation of the Occupied Arabian Gulf (PFLOAG). Backed by Communist guns and ideology from the neighboring People's Democratic Republic of Yemen (Aden), the rebels slowly gained control of the rugged hill country and much of the narrow coastal plain as well.

"By 1970 Salalah was under siege. It looked like another Dien Bien Phu," said the British major commanding the Mobile Firqat Forces. A crack militia regiment, the Firqat troops are mostly young Jeballis, former rebels granted amnesty after Sultan Qaboos deposed his father.

"The hill country, unmapped, densely wooded, favored the guerrillas. It was heavy slogging," the major said. "With modern air strikes and bloody brave soldiering the revolutionaries were finally beaten back and across the Yemen border in 1975."

With a Jeballi friend, Muhammad Said al Amry, I climbed down a steep, thickly overgrown ridge at Sherishitti, scene of some of the war's bitterest fighting. We stopped at the entrance to a cave, strewn with barbed wire, spent machine-gun belts, and Chinese ammunition boxes. Muhammad warned me against entering. The bunker, a former rebel command post, had never been cleared of booby traps.

"Many of our troops, and Iranian soldiers sent by the shah to help us, died taking this ridge. Here they set up the Damavand Line, which cut the rebels off from their supply bases in Yemen," Muhammad said.

"In the end, the Communists became their own worst enemies," Muhammad added. "The fighting made moving the herds dangerous; no one could get to market. Rebel bands often robbed us of what little food

No match for their goats, *girls from the village of Sayq edge across a cliff in pursuit of surefooted runaways* **(above)**. *Never conquered by the Portuguese, who occupied the coast from 1507 to 1650, the people of the mountain valleys* **(facing page)** *retained a spirit of independence. A rebellion of mountain tribes was put down by the sultan and British troops in 1959.*

we had. Worse, forcing Marxist ideology on everyone, the Communists outlawed Islam. People were executed for saying prayers."

During the war Muhammad had fled to Salalah and joined Dhofar's Civil Aid Department, charged with bringing modern development to war-torn mountain villages. We clambered back to 4,000 feet, to a hilltop meadow to see a well recently drilled by civil-aid engineers. It was shared now by a thirsty menagerie of goats, cows, and camels. The barefoot driver of the camels wore only an indigo loincloth and a *mahfif*, a braided leather cord, wrapped around his crop of long, frizzy hair.

"*A lonn hek, a heer bek,*" the old man crooned in the local Jeballi language. "Come my beauties, drink your fill."

Cows Get a Taste of the Sea

We followed the scramble of small black-and-white Jeballi cattle, herded by a pair of young girls, into nearby Maqara. Here the traditional round stone huts domed with earthen roofs had been abandoned for new wood-and-sheet-iron bungalows. After the evening milking, we helped Suhayl Twari feed his herd dried sardines that he had hauled up the steep track from Rakhyut. I was surprised cows would eat fish.

"They always need extra food when the dry season thins the grazing up here," Suhayl explained.

"Yes, things are changing now—for the better," he said. "Soon a new road will bring us closer to the coast, hours instead of days. Besides the new well, the government has also built us a school and a small clinic."

Next morning we hiked back to the road through limestone outcrops carved by wind and rain into curious abstracts that reminded me of dinosaur bones. I decided that Jabal al Qamar, literally "mountain of the moon," was aptly named. The way was overgrown with stunted, otherworldly trees. Muhammad knew them all: the *atira*, half tree, half cactus, with grotesque square branches; the *hiyuk*, whose papery bark is used for medicine; the Dhofari "oak," the *meetan*, source of strong roof beams. And the *bedha* plant; its tuberous roots, baked in camel dung, taste like roast chestnuts, I was told. Fortunately, they were out of season.

Best known of Dhofar's exotic flora are

"**After the incense,** *there should be no more sitting," an Omani proverb advises well-mannered guests like this elder at Al Mintirib* **(above)**. *The gathering of frankincense from the scrubby trees of Dhofar is no longer the major industry it was in biblical days. Yet the passing of a fragrant burner at the end of a meal is still a favorite custom all over Oman.*

Fine cotton fabric from this weaver's loom in Nazwa **(facing page)** *may be made into loincloths worn by Omani men beneath their traditional white dishdashas and curved khanjars, or daggers.*

the frankincense trees *(Boswellia sacra)* that grow wild along the dry gravel beds. Considered a gift fit for a king, frankincense was offered by Sheba's queen to Solomon, and by the Magi to the infant Jesus.

"Dhofar has just the right combination of white limestone soils, high humidity, and high winter temperatures for these rare plants," explained Muhammad Suhayl of the Ministry of Information office in Salalah. "My tribe, the Al Kathir, still has the monopoly on the crop. I used to harvest it when I was a boy."

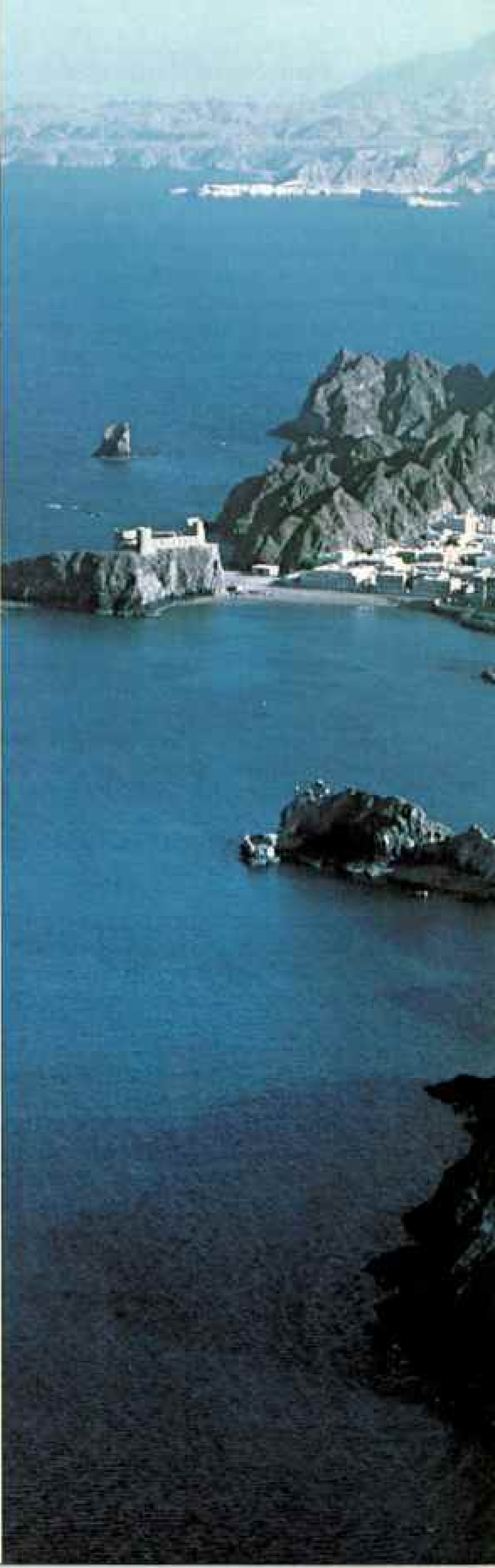
We walked through a stand of frankincense in nearby Wadi Adawnib. Branching out at ground level, few trees reached more than 12 feet. Muhammad scored the bark of one with his knife and drops of sap oozed out. "A tree can be tapped about once a week each spring," he said. "The dried resin is collected later—about a pound each time from each tree."

Today newer, cheaper fragrances from India flood the world market. Most frankincense is used by Oman and its Arabian neighbors, for whom burning scent is traditional when entertaining guests.

In Salalah's modern marketplace I found old women still selling frankincense together with the locally made censers of painted pottery. I walked away with several gifts fit for a king for three dollars each—packaged in plastic bags.

You Can't Get There From Here

With the fires out in Dhofar, Oman now turns more attention to its northern exclave, the Musandam Peninsula. Isolated from the main part of Oman by the United Arab Emirates, the strategic toe of land—barely 25 by 50 miles—is reachable only by sea or military plane. Few outsiders have landed along these scorched, pockmarked shores blocked by sheer cliffs and lashed by treacherous currents and eddies. No road yet



Marching to the sea, *barren volcanic ridges surround Muscat, forcing an expanding population to spill over into neighboring valleys. Two Portuguese-built forts, one the headquarters of the Royal Guard, the other a former prison, have guarded its harbor since the 16th century.*

penetrates the craggy wilderness where the primitive Shihuh tribes live just this side of the Stone Age.

From Al Khasab, the provincial capital on the coast, it is a grueling two-day climb on winding trails, too steep and narrow even for camels or donkeys, to the tiny village of Ras al Yib, 4,000 feet above the sea. But aboard an Oman Air Force helicopter—American built, British flown—it took only six breathtaking minutes. Landing me with cameras, duffel bag, and a handful of smoke signals, the pilot promised to pick me up next day and clattered off.

LYNN ABERCROMBIE (FACING PAGE)

***The vanishing life** of the nomad finds a ready symbol in a camel-skull scarecrow* **(above)** *erected by Bedouin who have abandoned their wandering to raise alfalfa on the edge of the Wahiba Sands.*

The features of a young herdswoman from a Dhofar mountain tribe **(right)** *reflect her people's descent from Hamitic rather than Semitic stock. Speaking a non-Arabic tongue, her tribe grazes cattle on the monsoon-nourished hills rather than goats or camels as in the rest of Arabia.*

At the edge of an eagle's nest of a village set on a precipitous ridge, I was greeted warily by an old man in dusty turban, patched shirt, and loincloth, clutching a long-handled *gerz*, the light mountain ax carried by the Shihuhs. We exchanged salaams. His name, he told me in rustic Arabic, was Ahmad bin Hassan. His son joined us, shouldering a small wooden plow. A brief sprinkle yesterday had finally moistened the soil, a signal to plant.

Women Pull Their Weight—and More

We trudged uphill to a small plot fenced by stones and thorns against the goats. Back and forth the old man pulled while his son guided the crude plow (pages 366-7). It took the morning to furrow half an acre and broadcast the precious barley seed.

"Normally women pull the plows," Ahmad explained, "but my wife is now old and nearly blind. She can barely tend the house.

"More than 60 people used to live in this village, but now we are only three families," the old man said as he installed me for the night in one of the empty stone hovels. It was dug deep into the hillside, and its roof covered over with dirt and stones—more a cave than a house. In the corner stood a small fireplace; two enormous pottery urns set in the earthen floor held the water supply, caught during the rare rains in a *birkat*, a crude gully reservoir. Such mountain villages have no wells.

"Most of our young men have gone down to Khasab or the Emirates to work," Ahmad said. "There is money to be made there. But this is my land, and I am too old to change. My family has more than an acre in grain, 20 goats for milk, three date palms, a fig—all we need in this life.

"Allah kareem," he added, turning to leave for the night. "God is generous."

Much of the Musandam Peninsula is still terra incognita. Even on my up-to-date British and American maps the important town of Kumzar, closest settlement to the strategic Strait of Hormuz, was misplaced by miles and faced the Gulf of Oman.

Wedged at the end of a barren inlet guarded by rocky islets, the village of Kumzar lies

all but unnoticed by passing supertankers. In its narrow cleft, sunlight penetrates only from nine to three. Here, centuries back, pirates lurked, but Kumzar now follows peaceful ways.

"Most of the year we fish," said Captain Abdullah from the tiller of his diesel-powered dhow. Kumzar slid slowly into view as we rounded its crumbling watchtower, our cold box filled with tuna, red snapper, mackerel, and shark. "We sell the catch to 'buy-boats' out of Ras al Khaymah, 50 miles down the gulf."

The dhow anchored, and I ferried to the beach on a long, narrow *batil*, a fast, Kumzar-built boat rowed by half a dozen men. Its long prow and graceful lines reminded me of a Venetian gondola.

On shore, village elder Abdullah bin Hassan welcomed me with coffee and dates, then led me on a brief tour of the tightly packed town. Along lanes barely a yard wide, children still found room to romp. We passed a woman hanging wash to dry, while another hand-cranked a sewing machine. In places, graves that angled toward distant Mecca narrowed passage to less than a foot. Kumzar's cemeteries overflowed long ago, and many of the dead lie buried under the floor of their homes within a few feet perhaps of where they were born.

"Overcrowding is our curse. Every square meter between the cliffs is built up," Sheikh Abdullah said.

In a small courtyard girls, swaying back and forth over battered, yellowed textbooks, recited Arabic lessons. The teacher wore a long calico gown and, true to Kumzari fashion, a stark, masklike veil.

"The government plans to build a modern school here," my host said. "Problem is, where to put it?"

We paused at Kumzar's only shop, stocked with basics: tea, cloth, motor oil, kettles, milk powder, fishhooks, twine. Over the counter, banter was lively, but I understood barely a word. The Kumzari mix Arabic and Persian with a grammar all their own. I could follow Sheikh Abdullah as he explained in Arabic: "Kumzar is, of course, closer to Iran than it is to Oman proper. Before the troubles in Iran we traded regularly with Bandar Abbas, on the other side of the strait. Nowadays it is forbidden."

Into the 20th Century

Returning to Khasab, I spoke with Bob Buchanan, a University of Arizona graduate in water-resources management now working for the Omani government's Musandam Development Committee.

"In the hills everything needed to sustain life is in short supply," Bob said. "MDC's first priority is fresh water, precious even along the coast.

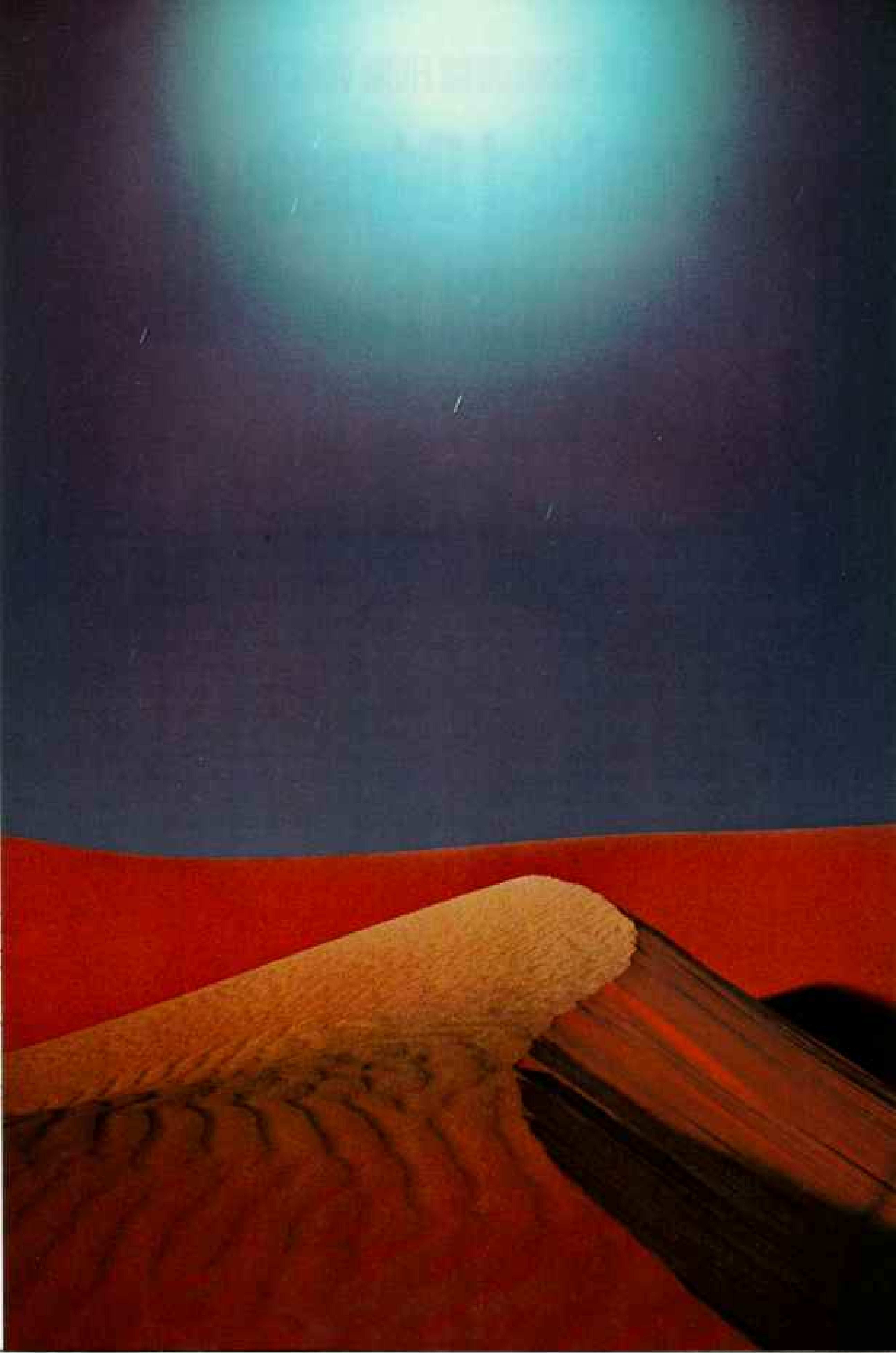
"We are making a detailed survey of water resources all over the peninsula," he continued. "We have projects ranging from repairing small mountain reservoirs to maintaining desalination plants. Our three small tankers, converted landing craft, now haul water to 66 coastal villages.

"We have electric generators running in four main settlements and a larger unit here in Khasab," Buchanan said. "Meanwhile the Ministry of Defense is pushing a road through from Bayah in the south. In two years we hope to have a land link with the outside world."

Khasab, obviously, was girding for a change. A cold store and ice plant were being built to encourage local fishermen. The new boarding schools were filling with eager boys and girls flown in from the more isolated villages. U. S. engineers had recently been through to survey modernization of its gravel runway. Just before I left Khasab, a new earth-satellite station was aimed skyward to beam in TV programs and phone calls from Muscat and beyond.

Remote Musandam, like the rest of the country, was gaining on the 20th century, I reflected. Given Oman's growing role in the security of the Western world, it seemed not a moment too soon. □

***When Oman's oil runs out** sometime after the year 2000, and natural-gas flares no longer cast an eerie midnight glow on the dunes near the Lekhwair oil fields, the government hopes that farming, fishing, and mining industries will be strong enough to carry on Oman's remarkable progress.*



THE WANDERERS FROM VUNG TAU

Troubled Odyssey of Vietnamese Fishermen

By HARVEY ARDEN

NATIONAL GEOGRAPHIC SENIOR STAFF

Photographs by STEVE WALL

THE STORY keeps changing even as I write, eluding my grasp like a handful of smoke. But let me tell you what I've learned, to this point anyway, about the extraordinary group of survivors I call the wanderers from Vung Tau—a people with the special knack of always riding the last wave out to freedom.

Composing but a single thread in the vast unraveling tapestry of humanity to flow out of Southeast Asia in the past six years, this close-knit group of Vietnamese fishermen and their families—numbering perhaps 1,300 persons in all—have made family togetherness the instrument of their survival.

Originally from North Vietnam, this particular group fled to South Vietnam after the 1954 Communist takeover, settled for a time around the resort and fishing town of Vung Tau, then fled again with the fall of South Vietnam in 1975—this time halfway around the planet (map, page 380).

Now they are recongregating in Biloxi, Mississippi, as one of several groups of Vietnamese fishermen scattered along the Gulf coast from Florida to Texas. But all their troubles are not behind them.

As one of the wanderers from Vung Tau expresses it: "All our lives we have been at war, have known nothing but war. First it was in Vietnam. Now it is here in America—*a war for our people to be accepted.*"

The poignant symbol of their exodus takes shape in a dockyard among the shrimp exchanges and cat-food factories of Biloxi's Back Bay waterfront. Disentangling itself from milky fog drifting in off the Gulf of Mexico, the roughed-out wooden hull of a half-finished fishing boat emerges like an apparition. In the curve of its deck and its sweeping lines there's a striking amalgam of Oriental and American boat design.

Up on the deck silhouetted workmen move about. The clamor of saws, hammers, axes, and an electric drill rings out on the raw January air in shrill counterpoint to the singsong chatter of workmen's voices.

Crossing a dockyard graveled with crushed oyster and barnacle shells, I board the seeming phantom vessel via a makeshift ladder. With Ba Van Nguyen, co-owner and

---

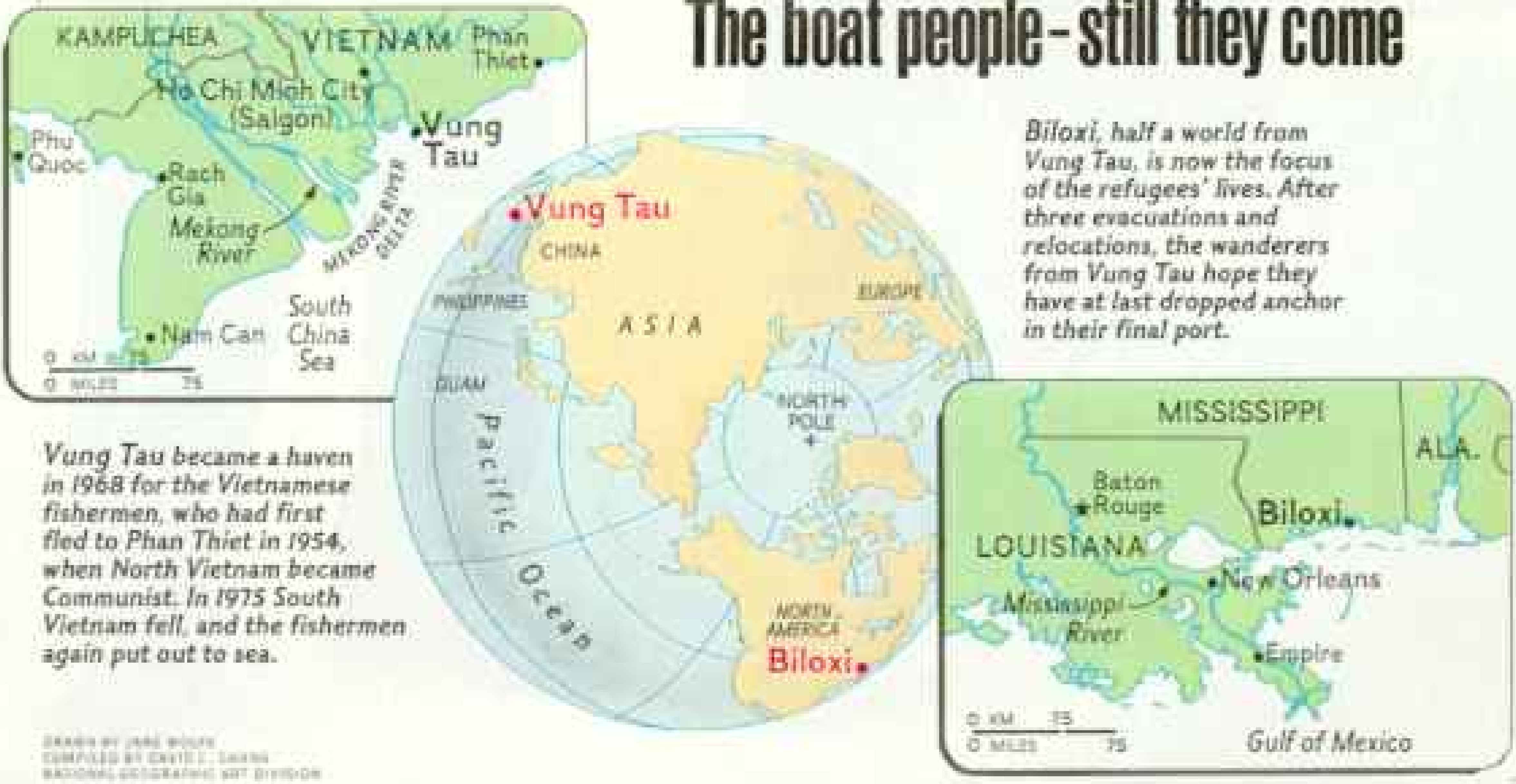
EDITOR'S NOTE: Because of the possibility of reprisals against their relatives still living in Vietnam, and in light of some recent attacks in Vietnamese communities on the Gulf coast, the names of certain individuals mentioned in this article have been changed or omitted, at their request.

***Mail call in Mississippi** keeps refugee Chac Van Nguyen in close touch with his far-flung relatives. Having fled the 1975 Communist takeover of South Vietnam, he and his fellow fishermen now pool their resources to reunite their extended families in a new land that is, by turns, friendly, hostile, and bewildering.*

With all the horrors *the Indo-Chinese refugees have suffered, and suffer still, the fishermen from Vung Tau were fortunate in one respect—they were able to escape in their own boats.*

While their old boats saved them, the first boats they bought in the United States led to trouble. A small Vietnamese shrimper **(above)** *passes larger American counterparts in Empire, Louisiana. But the tranquillity is deceptive, for local antagonism forced most Vietnamese fishermen to leave Empire. The Vung Tau contingent then took their hopes to nearby Biloxi, Mississippi, where some hew to their old life as fishermen, while others*

The boat people–still they come


KAMPUCHEA
VIETNAM
Phan Thiet
Ho Chi Minh City (Saigon)
Vung Tau
Phu Quoc
Rach Gia
Mekong River
MEKONG RIVER DELTA
Nam Can
South China Sea
0 KM 75
0 MILES 75
Vung Tau
CHINA
PHILIPPINES
EUROPE
ASIA
GUAM
Pacific Ocean
NORTH POLE
NORTH AMERICA
Biloxi
MISSISSIPPI
ALA.
Baton Rouge
Biloxi
LOUISIANA
New Orleans
Mississippi River
Empire
0 KM 75
0 MILES 75
Gulf of Mexico

Biloxi, half a world from Vung Tau, is now the focus of the refugees' lives. After three evacuations and relocations, the wanderers from Vung Tau hope they have at last dropped anchor in their final port.

Vung Tau became a haven in 1968 for the Vietnamese fishermen, who had first fled to Phan Thiet in 1954, when North Vietnam became Communist. In 1975 South Vietnam fell, and the fishermen again put out to sea.

DRAWN BY [illegible]
COMPILED BY [illegible]
NATIONAL GEOGRAPHIC ART DIVISION

captain of this vessel-in-the-making, I unroll a map of Southeast Asia.

Ba's eyes light up with recognition. He jabs a trembling finger to a point on the map just to the southeast of the city once called Saigon on the coast of the country once called South Vietnam.

"There!" he exclaims. "Vung Tau!"

BA PEERS into the map as if seeing right through the colored ink and paper to a lost world of white sand beaches, forest-covered coastal mountains, thatch-and-bamboo villages, and blue-green seas that teem with fish, shrimp, and lobster ready for the taking.

He is moved, but can't understand why a stranger would want to know his personal history. Because Ba speaks only rudimentary English, my translator, Hung Van Nguyen, a young Vietnamese fisherman nicknamed "Sonny," helps to paraphrase:

We were always fishermen, back to the beginning of memory, long before we came to Vung Tau. We lived in the far north, near Haiphong. That was the happy time. We fished the seas and the seas fed us. Then came the Communists. . . .

Ba recalls their 1954 takeover of North Vietnam that ended French rule.

Our people didn't like the French, but we liked the Communists even less. They wanted to make us work like slaves. When the French left, we went out to the open sea where the big American ships were waiting for us. But we had to let our own fine boat drift away on the waves forever. That was the saddest time—the women cried. That was boat number one. . . .

American ships took the fleeing fishermen to South Vietnam, resettling them in coastal towns, mainly around Phan Thiet.

There we built boat number two. Then, in 1968, the Communists bring the war to Phan Thiet, so we sail farther south, this time to Vung Tau. There we live and fish until 1975, when the Communists take over the whole country. Once more we went out to sea, and the American ships were waiting. Boat number two floated away on the waves, yes, but we saved our freedom.

Most of the families were taken to Guam, then, finally, to the United States, to be scattered across the land.

take any odd job available. A fortunate few have prospered; now there is even a jointly owned Vietnamese-American shipyard and shrimp-buying facility.

But tens of thousands of Vietnamese escapees remain mired in refugee camps scattered across Southeast Asia. Some will be resettled in the United States, but most will wait months, some even years, before a host country can be found.

In May 1981 alone, 14,300 Vietnamese escaped their country by boat, an upsurge that may be due in part to relaxed government vigilance, since many Vietnamese troops are tied down on the border with China and in Kampuchea (Cambodia) and Laos.

Vietnamese refugees newly arrived in the U. S. receive aid from individuals and from private and government agencies. They tend to be quickly self-supporting, and within five years their employment rate is the same as the average for all Americans. Indo-Chinese refugees (some 491,000, 70 percent of them Vietnamese) tend to settle where their families or compatriots are established; California has by far the largest number.

Catch weighed and counted, *a Vietnamese crew relaxes as Sinh Van Nguyen talks shop with Biloxi shrimp buyer Larry Jones. Some buyers won't deal with the Vietnamese, and some local fishermen don't want them "poaching in our waters." Others*

respect them for their hard work and self-sufficiency. Some friction was understandable, since Vietnamese began to work waters already overfished and, at first, fouled nets of local shrimpers through ignorance of fishing regulations and customs.

Some families go to Minnesota, some to Pennsylvania, some to Oklahoma. The Americans don't understand that we want to keep our families together in one big family. And we don't like the cold weather. Many of us come to Louisiana, where it is warmer and we can fish for a living again.

But local Louisiana fishermen proved less than welcoming.

They say there's not enough shrimp and fish for all. They won't let us dock, won't buy our shrimp. They shoot our boats, make threats, chase us. But where can we go?

Then we find that, nearby, in Biloxi, people don't seem to mind so much if we come. We work hard, save our money, so we can start buying small fishing boats. We even start building new ones. . . .

Ba smiles, rapping the solid cypress planking of his new vessel. "This," he says, "this is boat number three!"

Throughout their generation-long exodus the wanderers from Vung Tau have always kept what they call the big family together.

The big family—their notion of it is different from our own. We Westerners, too, have our nuclear family unit and our larger extended family. But among the Vietnamese people, the extended family is paramount, providing the context for the nuclear family. Each small family unit pools its savings with the larger family, thus enabling family leaders to finance major projects—the buying of a home, the sending of a child to college, the building of a boat.

RICHARD GOLLOTT had no intention of getting involved in anything as epic as an exodus. He merely wanted to hire some extra oyster shuckers.

"That was early 1977," he remembers, sitting at his desk in the small office of Cap'n Gollott Seafood on Biloxi's Back Bay. "It was a bad time. We had two trailerloads of oysters and no one to shuck 'em. People just don't want to shuck oysters any more. The work's too messy, and it's just plain backbreaking to sit there on a little stool all day making the same motions hour after hour.

"Anyway, I heard about these Vietnamese refugees who'd been settling around New Orleans. We drove a van over there, picked up a dozen or so, and brought 'em back here to work during the day. I never saw people so eager to work! They wouldn't work for wages—wanted to be paid by the amount of work they did. They learned real quick, and pretty soon lots of 'em were making six or seven dollars an hour. What's more, they were honest—you could always

ANGEL & MICHELLE

PITALO HARDWARE & BOAT SUPPLY · Marine & Industrial

With only mental blueprints *and yardsticks, a fisherman and a helper measure the spiling of the hull planking of a new boat (***above***). Every available member of the extended family volunteers for months of work, mainly with hand tools and chain saws, to finish a boat (***below***) for the start of the shrimp season.*

leave tools lying around and they would stay right there.

"But it was expensive driving to and from the New Orleans area every day. So we got two Vietnamese families to come and live here. Pretty soon others followed. Before you knew it, we had a whole community of Vietnamese refugees growing right here in Biloxi."

ENTER FATHER THANG, the fisherman priest who has played the role of a Moses to his people. Shortly after the first fishermen's families started gathering in Biloxi, this diminutive Vietnamese clergyman, a refugee himself, turned up at the Biloxi office of Roman Catholic Bishop Joseph Lawson Howze. He wanted to minister to the new Vietnamese community, he said. The bishop directed him to Monsignor Gregory Johnson of St. Michael's Church on the waterfront.

"These fishermen are Catholics, you know," Monsignor Johnson explains. "They are a very, very devout people, and Father Thang, or Father James as we call him, has become their shepherd here just as he was back in Vietnam.

"He fled from North to South Vietnam in 1954, then studied for the priesthood in Saigon while working as a taxi driver. After he was ordained in 1956, he went to Vung Tau and founded a church in the fishing village of Phuoc Tinh nearby. There he gathered his flock and kept them together.

"He's doing the same here, under what we call a spiritual apostolate—taking care of baptisms, marriages, services, Holy Communion, all their spiritual needs. He's also working to bring together families that have been separated, arranging to bring them down here to Biloxi."

A choir of indescribably sweet and angelic voices lured me into St. Michael's on a Saturday morning. Within, Father Thang officiated at a wedding of two young Vietnamese, both from Vung Tau.

The black-garbed priest raised his hands in blessing over the youthful couple—the lovely bride, Nhung Thi Nguyen, in exquisite white gown, and the groom, Lam Thuy Nguyen, in a natty yellow tuxedo.

The sun beamed through the church's stained-glass windows, which depict the Apostles holding out a large net. It seemed particularly appropriate: the Apostles and Father Thang—all fishers of men.

I caught Father Thang after the ceremony, congratulating him for his work in bringing together the once scattered fishermen's families from the town of Vung Tau.

He shrugged. "I only do what I must do. The people come here, so I come here. I come here, so the people come here. It's all the same. We stay together.

"But, please, you must forgive me," he said, "I am needed. . . ." And off he went on another errand of the spirit, shepherding his wandering people.

BUT THERE ARE TROUBLES. The wanderers from Vung Tau want to do more than shuck oysters. They want to resume their lives as fishermen. Even before they came to Biloxi, the families around New Orleans—those that could scrape up the money—began buying whatever small fishing boats were available, many rusted and leaking. For a time whole families lived aboard these decrepit vessels.

A few started docking in Empire, Louisiana, an hour's drive from New Orleans.

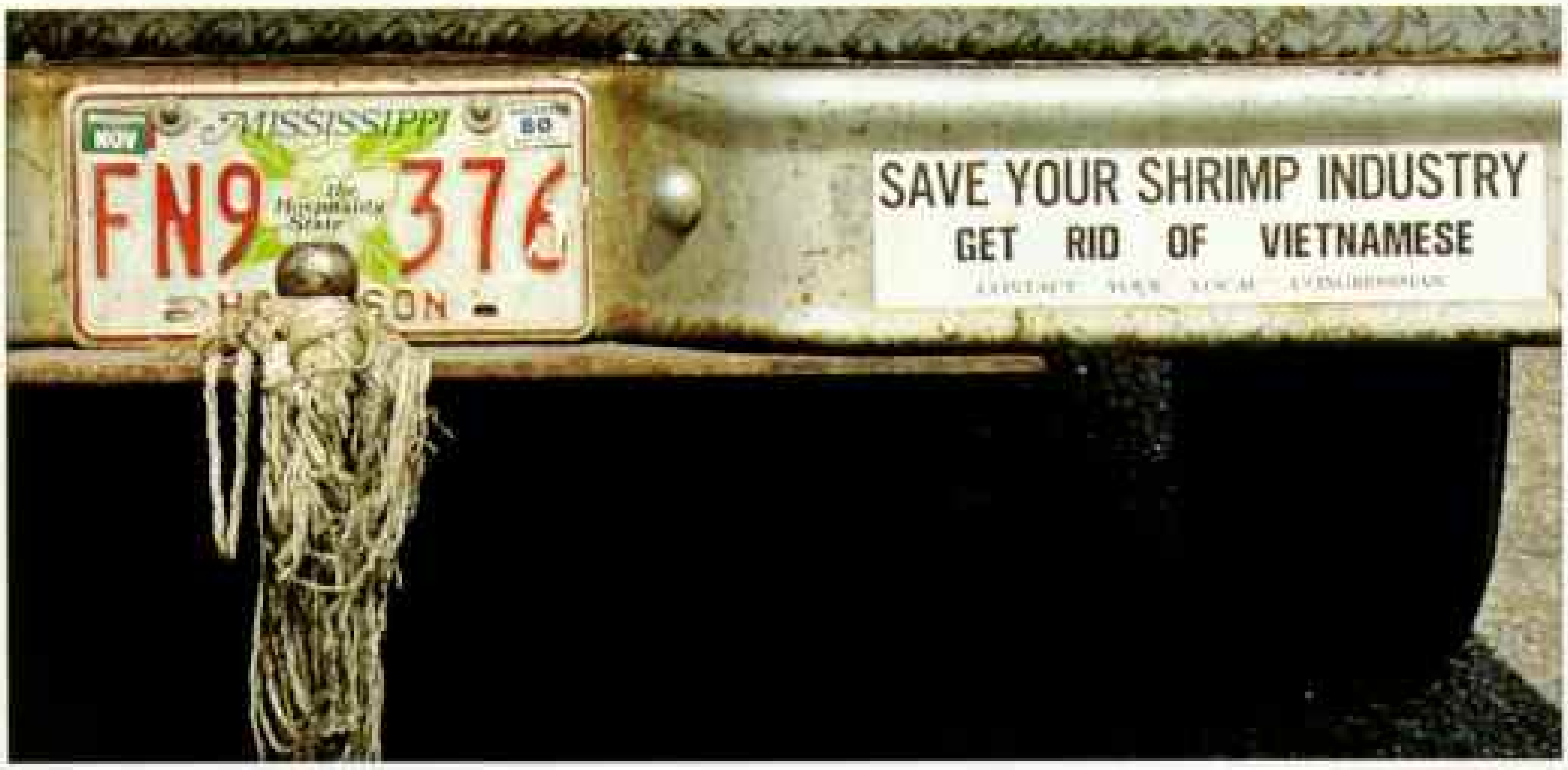
"I've fished here all my life," a fisherman in Empire told me. "Mostly I keep to a certain territory. Then, all of a sudden, these Vietnamese start puttin' in here—35 or 40 boats at first, then more and still more. My catch went down a third this past year. I don't want them poachin' on me. We got a hard enough time makin' ends meet as it is."

The wanderers from Vung Tau quickly got the message that they were unwelcome. Signs appeared: No Vietnamese Wanted. Docking privileges for Vietnamese were sharply restricted. They found it hard to sell their catch to local shrimp and seafood buyers. There were even incidents of physical harassment and threats of worse—though no one was hurt. Not in Empire, anyway.

But over in Seadrift, Texas—450 miles away—the mounting violence exacted its toll. An American fisherman was shot and killed by a Vietnamese member of a group of fishermen similar to the one from Vung Tau. The case went to court. Verdict: justifiable homicide in self-defense, prompted by intolerable harassment. But this hardly mollified sentiments on either side.

Shrimping the beds *off the Mississippi coast* (**above**)*, some Vietnamese use old boats they have modified with larger cabins to add bunk and cooking space.*

A license-plate slogan and a bumper sticker transmit contradictory messages (**below**) *from the rear of a pickup. While trouble only simmers in Biloxi, it has boiled over in nearby Texas, where shootings have occurred and the Ku Klux Klan has accused Vietnamese fishermen of "Communist infiltration."*


NOV
MISSISSIPPI
80
FN9 376
The Hospitality State
SAVE YOUR SHRIMP INDUSTRY
GET RID OF VIETNAMESE

It's all work *and little play for Biloxi's struggling new Vietnamese community.*

Seventeen-year-old Thuy Le (**left**) *gets instructions from her new boss, James Moore, at a local fast-food restaurant. Some of her pay will be turned over to her parents, who will pool savings with other members of the extended family for joint expenses.*

Crowding around a worktable at a shrimp unloading dock in Biloxi (**below**), *Vietnamese girls and women prepare newly caught Gulf shrimp for shipment.*

Out on the Gulf, retired U. S. Army Sgt. Bill Seaborn pilots his trawler (**far right**) *as his wife, Hia, a Vietnamese war bride 13 years ago, culls trash fish from the catch with the help of refugee Le Van Loi.*

TURNED AWAY from Empire, the wanderers from Vung Tau hoped to reassemble the scattered fragments of their lives in Biloxi.

"They nearly got turned away from here too," the owner of a shrimp unloading dock told me. "There were threats, some sabotage of their boats and nets, the usual thing. But it was only a few people who got riled up.

"Shrimping's been real bad these past few years. Too many fishermen already. And then we had heavy rains in April 1980 that ruined the spawning. Some locals blamed the Vietnamese for the drop in catch, but, heck, how can you blame them for *that?*

"Truth is, if we had a real abundance of shrimp, the big outside trawlers would come over here and scoop 'em up anyway. If you ask me, the Viets don't make much difference. They're catching a lot of shrimp no one else would try for. They don't mind staying out longer hours, working the poor beds.

"Lots of places around here wouldn't buy from 'em, but me and a few others. We figured, why not? This is America, isn't it? These are hardworking, honest people. Good fishermen and good businessmen. Absolutely trustworthy.

"I've often tried to act as mediator when they have troubles with other people here in Biloxi. The language can be a real problem. The Vietnamese often find Gulf fishing rules and customs confusing.

"For instance, they like to shrimp from north to south like they did in Vietnam, while around here the boats traditionally move from east to west. Unless everyone moves the same way, trawl lines and nets get crossed and tangled. And they didn't understand at first about light signals, docking procedures, all the fishermen's rules of the road. This caused friction with the locals

and still does. But they're getting the hang of it fast. Some folks still don't like 'em, but we're learning to live and let live."

I STOPPED in Thua's grocery store on East First Street. Vietnamese pop music blared from a cassette player. Oriental groceries and sundries crowded the tightly spaced shelves. Near the counter a woman crouched before a large cardboard box filled with merchandise.

"She sends it to the family left in Vietnam," Thua told me. Among the neatly packed contents: yards of fabric, toothpaste, aspirin and other medicines, monosodium glutamate, perfume, cosmetics, bicycle inner tubes, miscellaneous new clothing, including a pair of jeans.

"Most goes for the black market," Thua said. "Today in Vietnam a family can live for weeks with the money they get for one pair of blue jeans. And if you get a bicycle through, the family can live for many months. The Vietnamese government taxes it heavily, of course. And much gets stolen—sometimes by Soviet soldiers, we hear. But still, some gets through."

An elderly fisherman showed me faded photos of family members he is still trying to get out of Vietnam. He pulled out a list of names that he has submitted to the U. S. Catholic Conference Office of Migration and Refugee Services. It included his wife, two sons, three daughters, sons-in-law, grandchildren—a dozen in all.

"They are my life," he said simply. "I fill out many forms, but no one tells me when they will come. I keep waiting year after year after year. Perhaps the next time the telephone rings. . . ."

Home is where the tradition is, *with the old ways cherished. There, life is little changed for the family of Chac Van Nguyen* **(below)**, *eating shrimp and rice with herbs and vegetables they grow in a small garden plot. Devout Catholics,*

Under an agreement negotiated by the United Nations in 1979, the Vietnamese government has agreed to the orderly release of thousands of citizens, many with relatives already in the United States. But there's no telling who will be among them.

There are other methods of escape.

"Getting out a particular family member can take as much as $3,000 worth of gold," Thua told me. "We send the money through an agent in Paris. He gets it to Vietnam. Then the government lets them go—but only after taking everything they own."

These, of course, are the "boat people." The original wave of wanderers from Vung Tau missed this particular horror: They had boats of their own, took along their savings, and escaped the routine brutalization by pirates that afflicted those who fled later.

"We had 350 people in one boat," recalls a fisherman who arrived in Biloxi in late 1980. "It takes only two and a half days to get to Malaysia, but pirates board our boat five times. They take our money, our clothes. They attack the women. They throw our water and rice into the sea. Twice they ram our boat and try to sink us.

"But then two big fish come up and keep us afloat until we reach Malaysia. . . ."

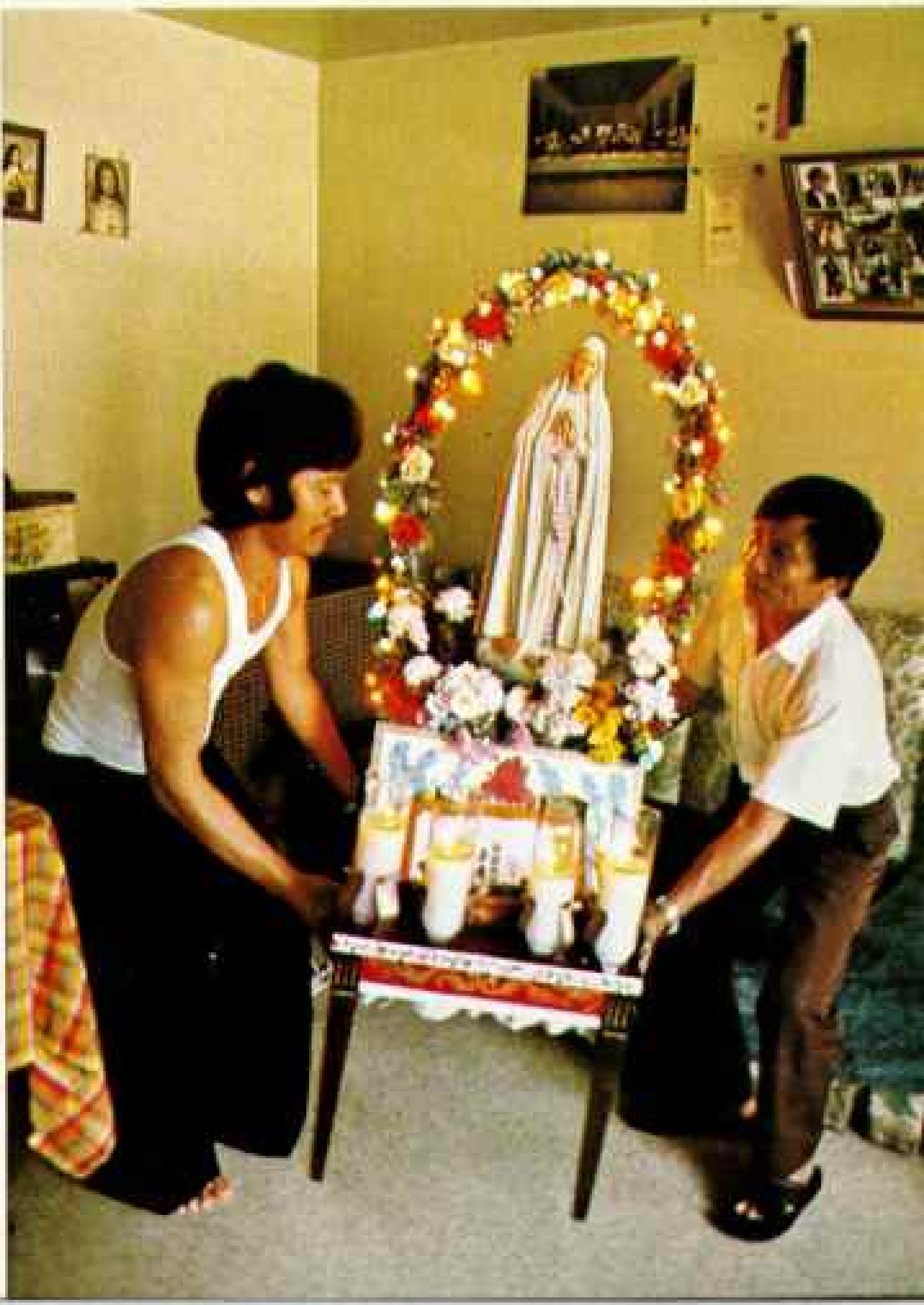
Delirium? Folklore in the making?

Several times I heard similar stories of big fish, or whales, miraculously rescuing boat people at sea. Whales, I discovered, are sacred to these fishermen.

"One time I was going to shoot a whale that came up near our boat," my guide Sonny once told me. "My daddy, he scream and stop me. Never shoot a whale, he told me. They bring good fortune to fishermen."

Outside of Vung Tau, it happens, the

*the Vung Tau fishermen share the use of a portable shrine of the Virgin Mary (**right**), which they reverently carry from home to home. Family members join in frequent communal prayer for reunification with relatives still in Vietnam.*



The soft sway of a Vietnamese hammock and the cool breeze of an American

air conditioner give double comfort to three-year-old Mary Thi Vo.

bleached skeleton of a whale guards the town's entrance. Who's to say where symbolism ends and the miraculous begins?

"WHEN YOU REALIZE what these children have seen with those lovely eyes of theirs!" exclaimed Susan Hunt, principal of Biloxi's Gorenflo Elementary School, as we toured her classrooms for several hours one weekday morning.

"They're doing very well here. They excel in math and art, and most of them pick right up on English. They can speak it much better than their parents. At home they are the ones to answer the phone, read the mail, talk to visitors. But it does cause some problems within the family. Among the Vietnamese, children are traditionally seen, not heard. But here they know much more about what's going on than their elders. It makes the parents feel inferior, and the children even start talking back—which used to be unheard of.

"But aren't they beautiful?" Susan asked, as we sat down at a cafeteria table to share lunch with a group of Vietnamese children. One little girl's sparkling eyes attracted mine. She looked perhaps eight, but Susan told me she was actually 14—old enough to remember the war, the boats, the pirates.

"Once in a while a few of the other children, they pick on us," the girl told me. "They laugh at us and throw things. They call us names—Vietcong, gooks. They try to beat us up." Her eyes gleamed with dark defiance. "But we don't run away," she said. "*We don't scare. . . .*"

I ATTENDED A NIGHT CLASS in English as a Second Language at a local high school in Biloxi. Sponsored by the state of Mississippi and funded by the federal government, the classes are organized by program coordinator Jane O'Brien for Catholic Social and Community Services of Biloxi. Jane sat beside me as a score of young Vietnamese grappled with the maddening complexities of the English language.

"It's a very difficult language for them," Jane explained. "Cambodians, for instance, have an easier time learning English than the Vietnamese. English has so many sounds that don't exist in Vietnamese, and vice versa. Even when it seems to them that they're saying it right, it can be hard for an American to understand them.

"We teach classes entirely in English here. And what we teach you might call survival English—how to read signs, understand grocery advertisements, get on a bus. It makes no point trying to teach grammar and parsing sentences to someone who can't read a Fire Escape sign."

She pointed out something else. "Do you notice," she asked, "how the younger children walk compared with the older ones? Like Americans, with free-swinging steps instead of the smaller, tighter steps the older ones learned in Vietnam. And they don't squat down on their haunches the way the older ones do. They're becoming more and more Americanized."

A MONTH LATER, while writing this story back in Washington, D. C., I see on TV that a group of Ku Klux Klan members in Texas have burned a mock Vietnamese fishing boat in effigy, just before the start of the spring shrimping season. The image of the Klansmen with their torches and white hoods burns into my mind like a branding iron. What must the wanderers from Vung Tau be thinking as they watch the evening news in Biloxi? But, then, terror is nothing new to them. They've rarely lived without it.

I think of the little Vietnamese girl in Gorenflo Elementary School. Her words ring in my inner ear: "*We don't scare. . . .*"

I remember, too, Ba Van Nguyen's boat number three out there on the Biloxi waterfront, emerging ghostlike from the fog, its lines as graceful as a gull in flight.

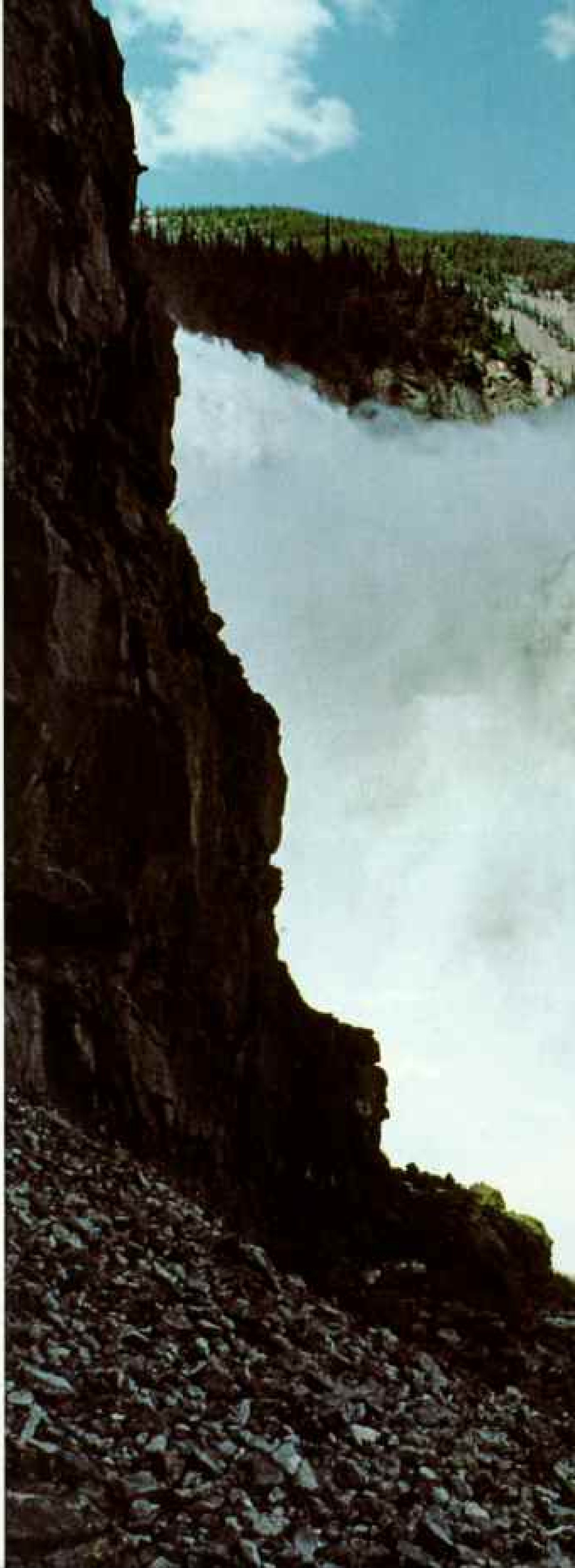
And I wonder . . . I wish I didn't but I do . . . has the exodus of the wanderers from Vung Tau ended yet? □

***Swinging between two worlds,** young Christopher gets a push from his father, Hung Van Nguyen, known as Sonny, and sails toward his American mother, Veronica, in the yard of their Biloxi home. "My daddy, he still doesn't accept Veronica," says Sonny, "but he say Christopher going to be one heck of a fisherman!"*

By DOUGLAS H. CHADWICK
Photographs by
MATT BRADLEY

Nahanni
CANADA'S WILDERNESS PARK

Forces of nature consort to create masterworks along the gallery of the South Nahanni, the Nahadeh or Powerful River of Indian lore, now lifeline of a national park in the Northwest Territories.



Roaring cataract *at the heart of the park, 294-foot Virginia Falls splits against a limestone steeple. Once considered for hydroelectric development, the falls remains the only unharnessed Canadian chute of its height—more than one and a half times Niagara's.*

MICHAEL DOESE

IN THE VILLAGE Charles Yohin, 82, was speaking in the language of the Slave tribe of Athapaskan Indians. John Vital, another gray-headed Slave man, translated, adding stories of his own. This is what they told me:

Early some autumns in what is now the southwestern corner of Canada's Northwest Territories, a few hunting bands of Slaves would start long, separate journeys overland toward the high headwaters of Nahadeh, or Powerful River.

Each band was simply the members of from one to three families. Dogs carried the families' food and possessions in packs until daylong cold tightened up the creeks and snows smoothed over broken ground. Then sleds were built, and the dogs pulled those as the hunting bands followed game through the mountains.

The people camped from caribou to mountain sheep to moose, camping best where the moose were fat, placing a part of each slain moose just so in a tree, to say, in effect: See, our life because of yours.

With luck, by breakup time as Powerful River flushed the ice from its channels, there would be seven, maybe eight moose hides to sew together with tendons and stretch across a tapered frame of poplar and willow. Soon as many as 15 people, with all their belongings and all their dogs, would crowd aboard this pitch-sealed craft and push off into the current. And Nahadeh, running fast, very cold, and very big, as it always runs, would carry them back toward the lowlands, completing the cycle.

This is what the people floated past and what I came to explore, for three weeks in winter and again for two months during the summer of 1980, within a landscape little changed since the skin-boat days:

Hot springs, some bubbling out of tufa mounds—ornately terraced deposits of calcium and other minerals. Glaciers. The three most spectacularly carved river canyons in Canada, which together form one of the deepest canyon systems on the earth's surface. Reedy marshes. A miniature sandstone desertscape, bizarrely sculpted by whirling winds. Whirlpool rapids. Moss-still forest glades. Tundra plateaus. A waterfall spilling more than one and a half times the height of Niagara. Cliff faces shattered by frost into towering hoodoos. And a limestone landform known as karst, with essentially bottomless sinkhole lakes, abruptly plunging canyons, and miles of still largely unexplored caves.

Now understand the name as those Slaves did: *Nah*, power, as in primal magic, as in medicine power; *deh*, river. Nahadeh, a river to connect nature with the spirit of man in potent ways.

Nahadeh, better known today as the South Nahanni River, originates close to the Yukon Territory and flows southeastward out of the Ragged Range of the Selwyn Mountains (map, pages 402-403). No sooner is it past the Selwyns than it meets the massive Mackenzie Mountains. Meets them and, surging along a course more ancient than the period of mountain uplift, cuts straight across them, severing the spines of successive ranges. Finally, some 390 river miles from its beginnings, the South Nahanni empties into the Liard River, the main tributary to the lakewide, Arctic-bound Mackenzie River.

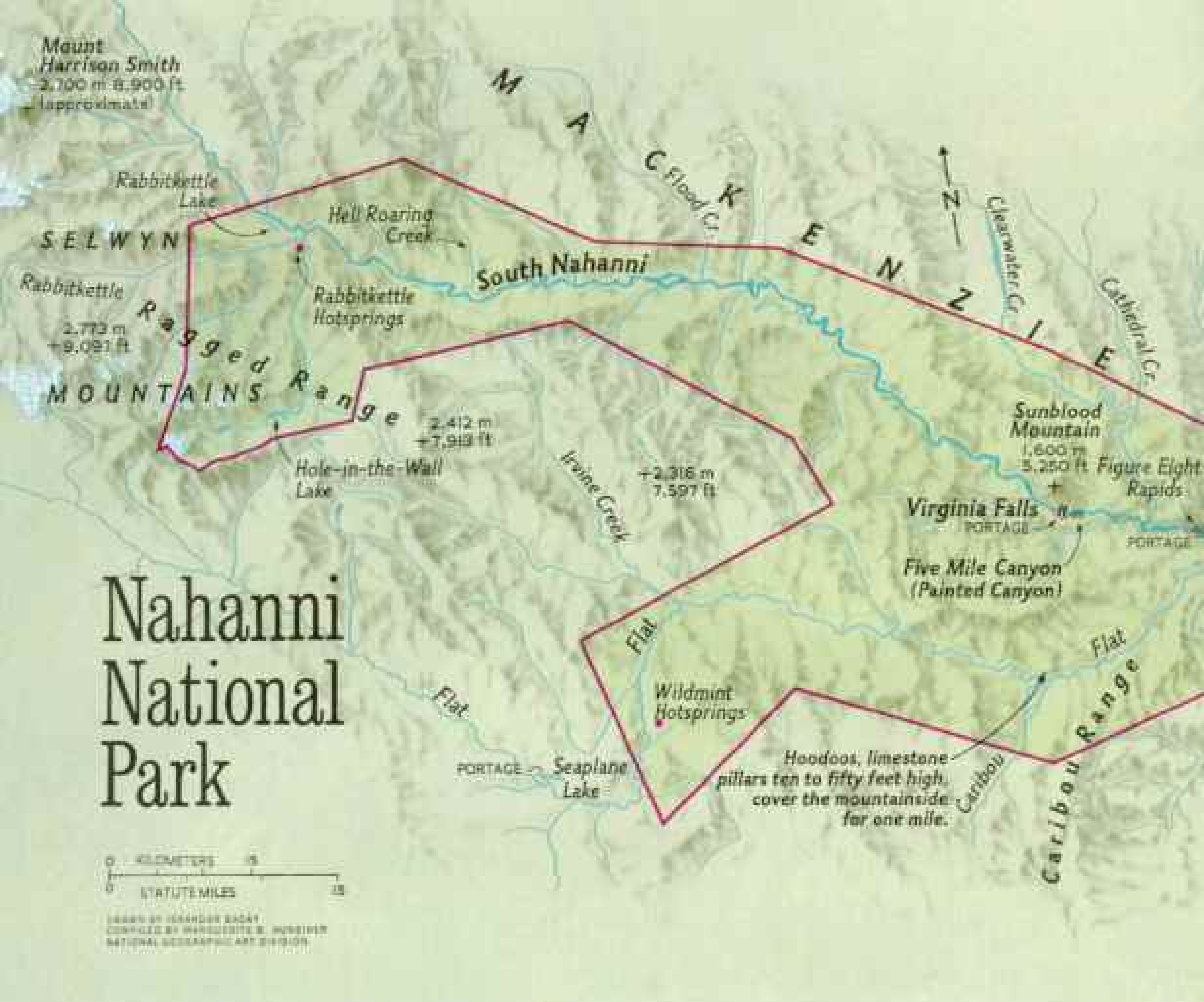
In 1972 the federal government set aside a reserve for Parks Canada in the heart of this geologically extravagant watershed. Its official borders were finally outlined just five years ago, in 1976, to enclose the lower two-thirds (some 240 river miles) of the South Nahanni and the lower half (about 70 river miles) of its primary tributary, the Flat River. The result: 1,840-square-mile Nahanni National Park, the goal of my two recent trips to the Northwest Territories.

Located ten air miles outside the downstream boundary of the preserve, Nahanni Park field headquarters overlooks the confluence of the South Nahanni and the Liard from the base of cliff-sided Nahanni Butte. When our chartered skiplane landed here

At Hole-in-the-Wall Lake, *author Douglas Chadwick struggles with supper. "Fire nearly impossible to start," Chadwick's journal notes, "and food is cold before it's halfway eaten. But what a pure and limitless wilderness we are in." In 1979 UNESCO proclaimed the park the first world heritage site for all mankind.*

Slowly awakening to spring, *the South Nahanni winds 4,000 feet below limestone bluffs and banded dolomite walls of the 16-mile First Canyon. The park's*

chasms—Canada's deepest—were cleft when ranges of the Mackenzie Mountains, thrusting skyward, came under the knife of this ancient and relentless river.



Nahanni National Park

Mount Harrison Smith
2,700 m 8,900 ft (approximate)
Rabbitkettle Lake
SELWYN
Rabbitkettle
2,773 m 9,097 ft
Ragged Range
MOUNTAINS
Hell Roaring Creek
Rabbitkettle Hotsprings
South Nahanni
2,412 m 7,913 ft
Hole-in-the-Wall Lake
MACKENZIE
Flood Cr.
N
Clearwater Cr.
Cathedral Cr.
Irvine Creek
2,316 m 7,597 ft
Sunblood Mountain
1,600 m 5,250 ft
Figure Eight Rapids
Virginia Falls
PORTAGE
PORTAGE
Five Mile Canyon (Painted Canyon)
Flat
Flat
Flat
Wildmint Hotsprings
PORTAGE
Seaplane Lake
Hoodoos, limestone pillars ten to fifty feet high, cover the mountainside for one mile.
Caribou
Caribou Range
0 KILOMETERS 15
0 STATUTE MILES 15
DRAWN BY ISKANDAR BADAY
COMPILED BY MARGUERITE B. HUNSIKER
NATIONAL GEOGRAPHIC ART DIVISION

in early March, photographer Matt Bradley and I were welcomed by parka-clad Lou Comin, the park's chief warden.

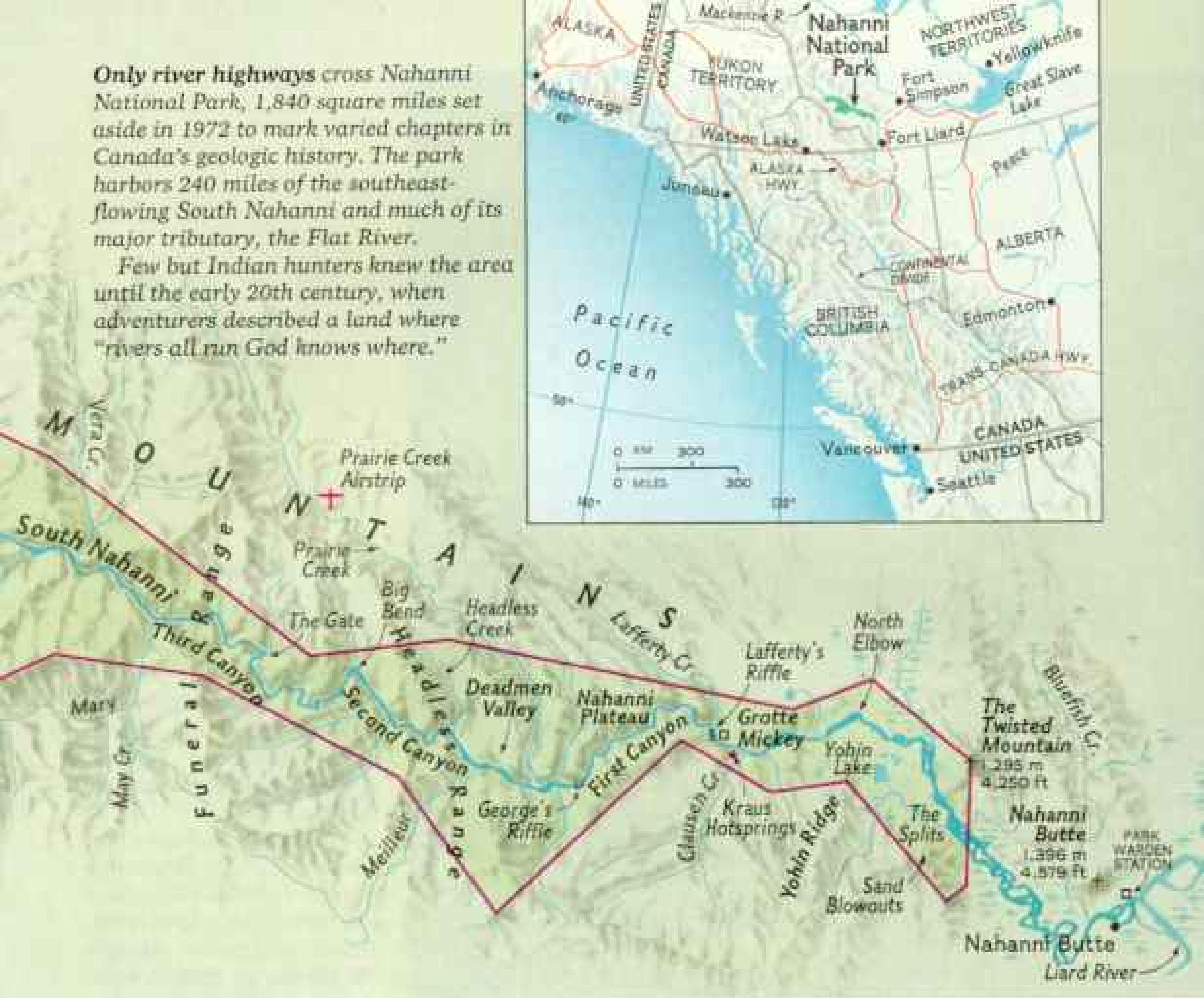
Across the river stood the small native settlement of Nahanni Butte, population about 80, where the local Slave Indians spend much of their time these days, having come to depend less and less upon the bush for living. A few make use of hunting and fishing rights they retain within the preserve. And others are developing a different sort of relationship with the park.

"For major construction projects we hire all the native workers we can get," Lou Comin told us as we entered park headquarters for a cup of coffee. "Our regular maintenance crew is made up of three part-time employees; two of them are from the village. And I hope we'll have at least one native warden when new positions open up."

After a thorough orientation from Lou, Matt and I flew on to begin our explorations near the western border of the park, high in the glacier-shouldered portion of the Ragged Range known as Les Aiguilles—"the needles." Our destination was Hole-in-the-Wall Lake, and the first thing we did after being left alone on its shore was to hole up even further.

Because it was cold, too cold to snow. Instead, a mist of ice crystals was condensing out of the stillness between the surrounding spires. The afternoon high was minus 10 degrees Fahrenheit, and the temperature tobogganed downward from there. Night came with a light wind, and we hovered around our campfire flame like moths.

Our tent was pitched 200 air miles west of Fort Simpson, Northwest Territories, where Nahanni Park maintains an office. To the southwest, 135 miles away, lay Watson Lake, Yukon Territory, the other town where visitors charter planes to take them to the park.


Mackenzie R.
Nahanni National Park
NORTHWEST TERRITORIES
Yellowknife
ALASKA
UNITED STATES
CANADA
YUKON TERRITORY
Anchorage
Fort Simpson
Great Slave Lake
Watson Lake
Fort Liard
ALASKA HWY.
Peace
Juneau
ALBERTA
CONTINENTAL DIVIDE
BRITISH COLUMBIA
Edmonton
Pacific Ocean
TRANS-CANADA HWY.
CANADA
UNITED STATES
Vancouver
Seattle
0 KM 300
0 MILES 300
MOUNTAINS
Vera C.
Prairie Creek Airstrip
South Nahanni
Funeral Range
Prairie Creek
Big Bend
Headless Creek
The Gate
Third Canyon
Headless Range
Lafferty C.
Lafferty's Riffle
North Elbow
Bluefish C.
Mary
Second Canyon
Deadmen Valley
Nahanni Plateau
Grotte Mickey
The Twisted Mountain 1,295 m 4,250 ft
May Cr.
First Canyon
Yohin Lake
George's Riffle
Glacier C.
Kraus Hotsprings
Yohin Ridge
The Splits
Nahanni Butte 1,396 m 4,579 ft
Meilleur
PARK WARDEN STATION
Sand Blowouts
Nahanni Butte
Liard River

Only river highways *cross Nahanni National Park, 1,840 square miles set aside in 1972 to mark varied chapters in Canada's geologic history. The park harbors 240 miles of the southeast-flowing South Nahanni and much of its major tributary, the Flat River.*

Few but Indian hunters knew the area until the early 20th century, when adventurers described a land where "rivers all run God knows where."

"Tall, wrinkled up, awful crooked country," longtime Nahanni hand Gus Kraus once described the bush to me. And still remote. By coming to see it during the season when the north country casts its strongest spells, Matt and I had the place as much to ourselves as any traveler of an earlier day.

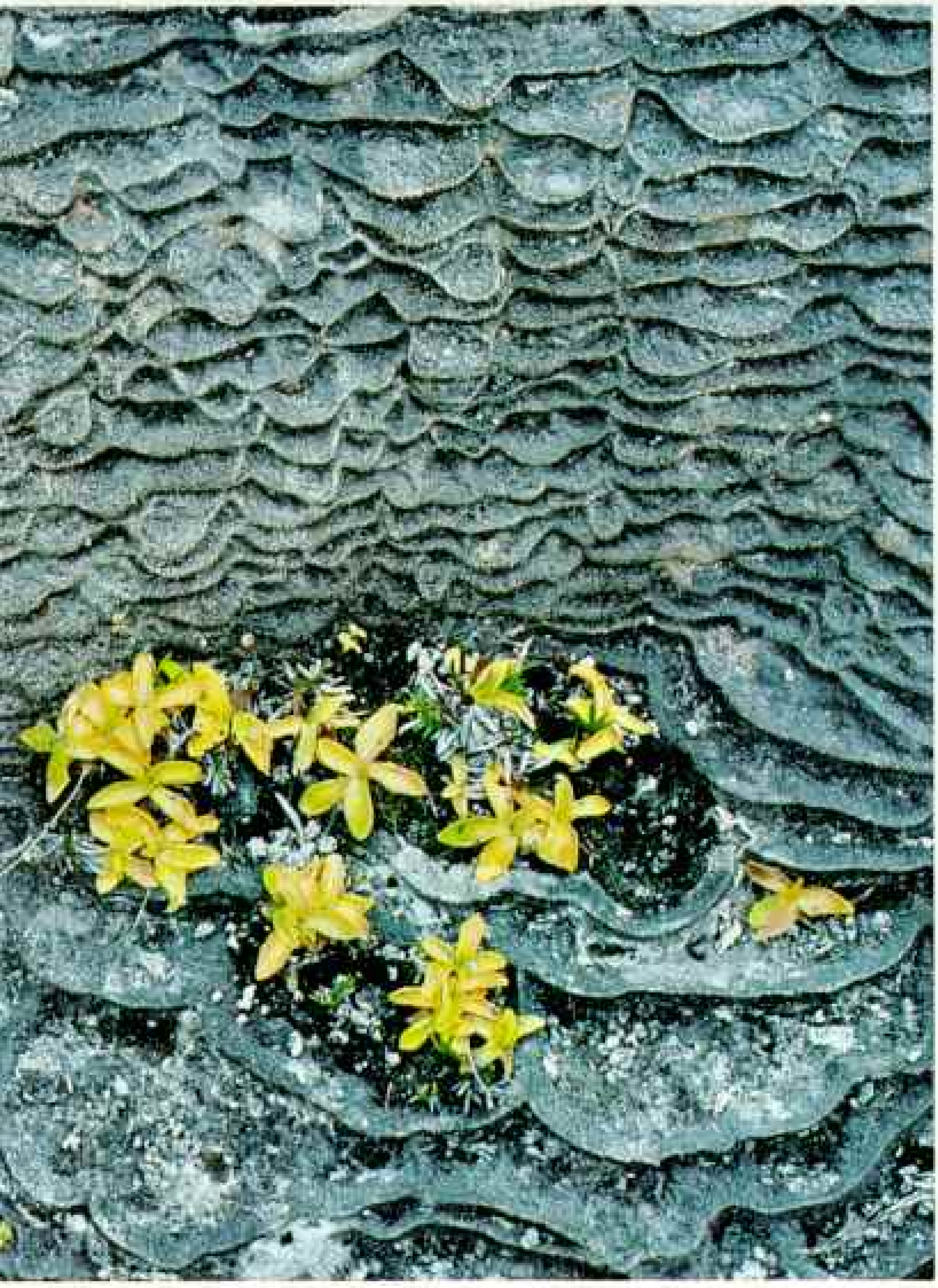
NOT MANY white men ever went into the Nahanni until fairly recently. Fewer still came out again. The first ones, other than a passing fur trader or two, came around the turn of the century. They were nearly all gold fevered, panning their way upriver toward the Klondike area of the Yukon. A rumor developed that a number of them had been done to death by fiercely hostile Indians (of gigantic size, some claimed) said to live year round in the river's headlands and ruled by a mysterious woman of part European blood.

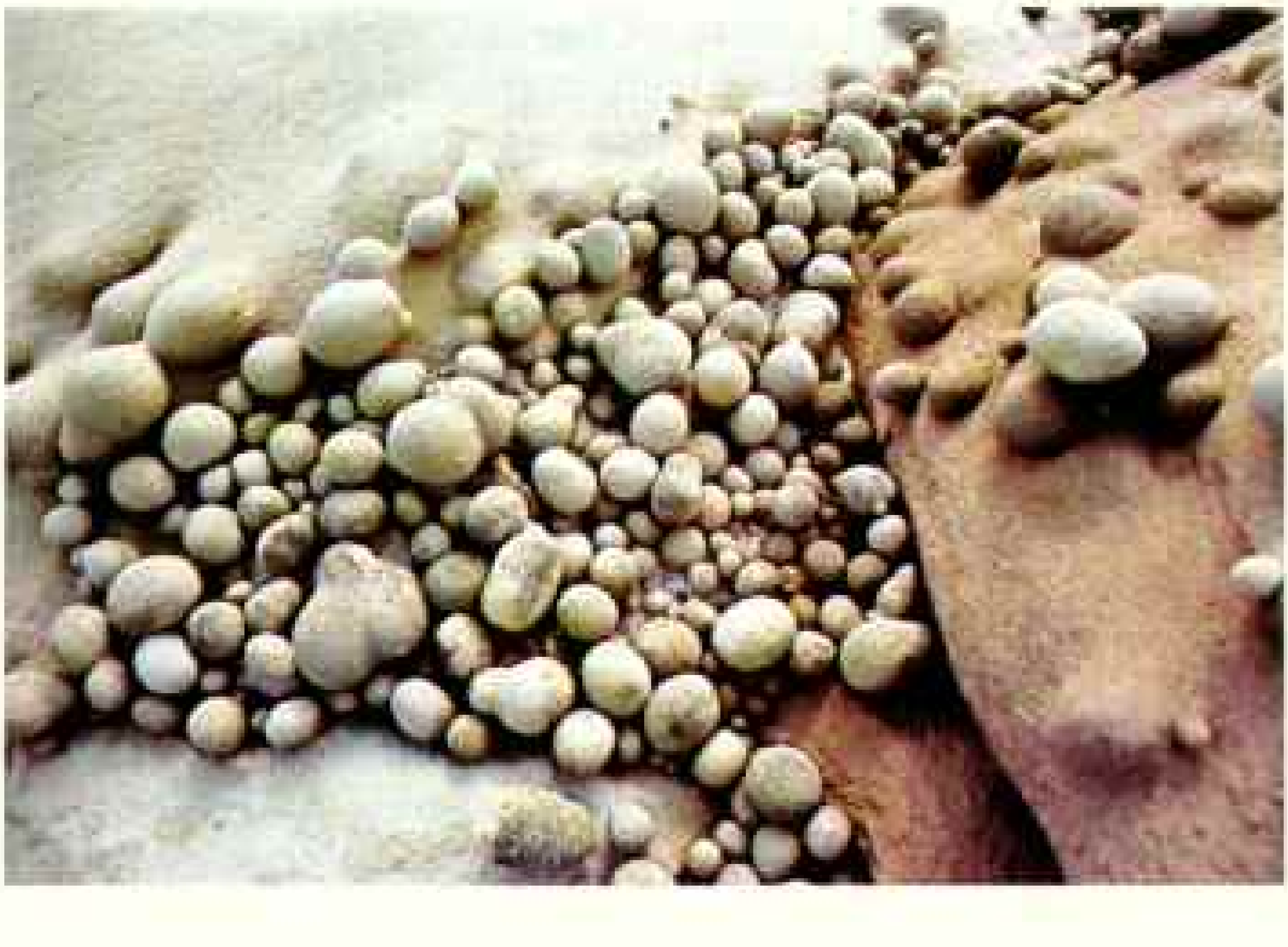
Then in 1908, three years after Willie and Frank McLeod had set out to work gold prospects in the area, a search party led by a third brother, Charlie, found them. Both were headless skeletons. In some versions of the story they were tied to trees.

One guess was that an Indian killed the McLeods. Charlie always believed his brothers were murdered by their partner, a Scotsman who may or may not have been seen later in British Columbia's Telegraph Creek, or maybe Vancouver, with every pocket full of money or gold.

The prospector O'Brien froze, nugget hard, atop The Twisted Mountain. Another named Shebbach starved—or went crazy and *then* starved. Eppler and Mulholland vanished—through the ice, it was assumed. Jorgenson sent a message to a trader friend saying he was onto some gold. The trader arrived to find a burned-out cabin with Jorgenson's bones nearby, minus the skull. Supposedly.

(Continued on page 408)

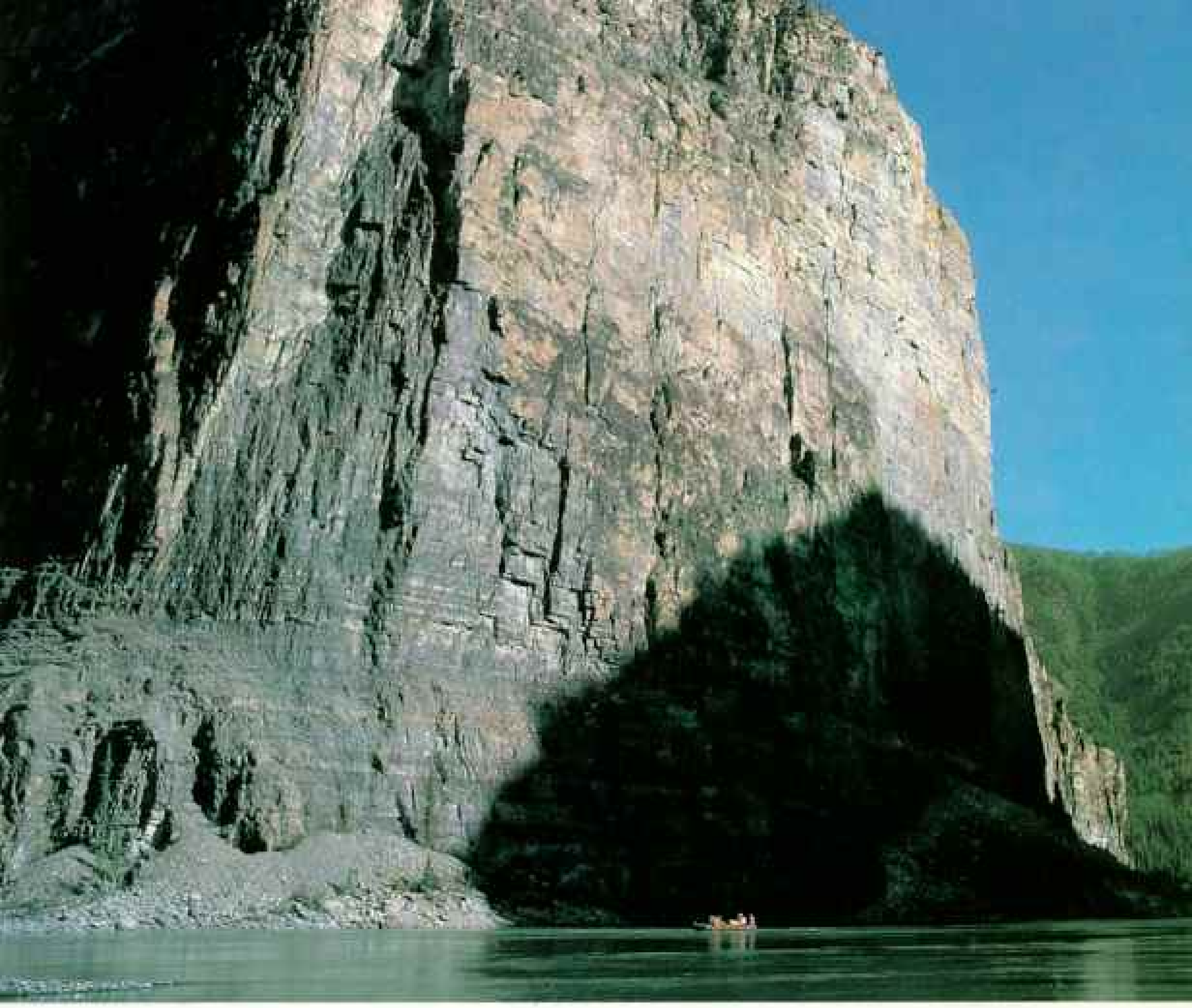




__Waves of rimstone,__ or tufa (__left__)—calcium and other minerals percolated from underground springs—seem to break about butterwort leaves. These fragile tufa scallops crown the Rabbitkettle Hotsprings mounds, Canada's largest, rising as high as 90 feet.

Downriver, the high sulfur content of Kraus Hotsprings checks tufa buildup. Near the main pools, rigors of Nahanni exploration dissolve for the author (__right__), soaking in a 95°F seep on the riverbank. The 20 acres of lush vegetation around the springs once gave rise to tall tales of a tropical valley.

Wind-rounded sandstone orbs the size of marbles to baseballs (__bottom left__) dot the Sand Blowouts, four acres of soft sandstone exposed on a mountainside. Besides forming the spheres, the concentrated air currents have also carved the rock into sculptures as tall as 20 feet.



Sermons in stone *might be read from Pulpit Rock (**above,** right). It faces a 700-foot limestone wall that guards The Gate, a narrow hairpin turn in Third Canyon.*

Accessible only by boat and floatplane, Nahanni Park gets few visitors—only 450 in 1980. Most arrive with the float gear and wilderness savvy that the river demands. Four park outfitters serve the rest.

A small warden staff aims to follow management advice of a 40-year veteran of Nahanni travel, the late Albert Faille: "Let it stay wild, the way it is."

STEPHEN J. KRASEMANN

Nahanni's legendary gold lode *remains unstruck, but the fever still burns. Daily panning earned some keepsake flakes for Byron Clatterbuck of Washington, D. C.* (**below**)*, during a three-week canoe trip through the park. Off duty, his gold-panning tin cooked up side dishes for campfire delicacies such as this four-pound Dolly Varden trout hooked by his father and paddling partner, Larry Clatterbuck* (**bottom right**)*. A clothesline on driftwood poles* (**bottom left**) *airs gear soaked by rain at the end of a journey "worth every ounce of the effort," in Larry's opinion.*

One fellow blew himself up with dynamite. Still others drowned in white water. Or rather fragments of busted boats were found here and there. The river kept most of the bodies. . . .

As tales of the South Nahanni spread, exotic vegetation and queer beasts were added to its hot springs, more and more heads were separated from the bodies of its casualties, and gold glimmered bright on its gravel bars. The country ended up with a legendary reputation and a sinister set of names: Broken Skull River, the Funeral Range, Deadmen Valley, the Headless Range, Hell's Gate. But perhaps this is only the white man's way of acknowledging the nah of Powerful River.

During our four-day stay at Hole-in-the-Wall it once warmed all the way up to 13°F. While Matt and I extended the spokes of our ski trails outward from the hub of camp, the sun reached mountain goats and blue icefalls high on the south-facing cliffs. But we and the resident moose remained shadowed by the practically seamless granite escarpments that skyrocketed up for thousands of feet from the lake's opposite shore.

If there are more formidable walls to scale anywhere, they are in a part of the Ragged Range just beyond the park known as the Cirque of the Unclimbables (pages 418-19).

Not far from camp were the hottest (104°F) hot springs in the park, heated by the residual molten energy of the igneous-rock injection that had raised the Selwyn Mountains. But the pools were too small and too fragile for us to bathe in. Warmth on the sunlit cliffs and deep beneath our feet, yet not a calorie for us.

> Journal—March 22: Matt and I hitched a helicopter ride with Lou Comin, who was making a winter wildlife survey. Lou shuttled us northward to the river near Rabbitkettle Hotsprings, and we have been skiing downstream on the South Nahanni's wide, frozen surface for almost a week now.
>
> Lou told us he had spotted 27 wolves together on this part of the river a couple weeks ago. Matt and I haven't seen the pack, but have had some good gliding in their beaten trails and those of caribou. At other times we make no more than a mile an hour in the baseless, drifted powder. No matter. I am where I want to be already.
>
> Low sun colors on the mountains and new mountains on all horizons. Glistening ice fins heaved up in the center of the channel. The glass sounds of water running under thin ice in the shallows. Around a windless bend this same deep fluff that buries our skis has preserved the perfect tail-to-head feather imprint of a great horned owl where it dived upon a weasel.
>
> At night green flames of the northern lights flicker between the constellations, while I howl and am somehow satisfied if only echoes answer. I call this good prospecting and so, I suspect, did many of those before us who tramped a winter trail in this lonely northern bush.

A warm spell softened the days that followed. The river ice grew soft as well in places, and I twice wet a boot breaking through it. Matt, trailing a safety rope, led the way around a long gash of open water toward surer ice. We failed to reach Sunblood Mountain and Virginia Falls, our downstream targets, before our pickup skiplane arrived. But I would soon be back to run with the river between summer green shores, for I had most of Nahanni's wonders yet to see.

WHEN I DID RETURN in early July, I had a new partner, fellow Montanan Loren Kreck. An orthodontist whose spare time is largely devoted to kayaking mountain rivers, Loren might be described as a man equally attracted to snaggled white sets of rapids, peaks, and teeth. Nahanni Park's Lou Comin, recently promoted to acting superintendent, invited us to join him and warden Ray Breneman on a canoe run down the Flat River, the big tributary that drains from the west to join the South Nahanni about midway through the park.

Floatplanes carried us and our boats to Seaplane Lake, 80 river miles up the Flat. There we made camp on an island in the company of a bald eagle, two curious loons, several beavers, and a ten-pound northern pike that was lured into joining us for dinner. The following morning began with a portage over a tremulous forest floor of peat patterned with lacy horsetail rushes and silver pillows of the lichen commonly called reindeer moss.

Where the portage trail met the river, people on expeditions from previous years had written messages on the bark of birch trees. One inscription mentioned clouds of hungry mosquitoes. Right. Their offspring were here, urging us into the water. It then gave a 1977 date and a name. "A young guy," Lou said over my shoulder. "Climbed into his boat and was never heard from again." As far as Lou knew, we were the first to start down the Flat this year.

The Indians had it right the first time when they named this river Too Nakadeh, or "white-water river." With Lou and Ray poking up out of the spray cover of their canoe and Loren and me in folding kayaks, we spent the first day paddling hard to sort out waves washing up against boulders from those merely in a general lather about getting to a lower elevation.

We were grubstaking ourselves with blueberries, grown up among the rusted residue of a prospector's camp, when it began to rain. The downpour increased throughout the afternoon, canceling a planned bushwhack to Wildmint Hotsprings and raising the water level of the Flat River by more than two feet.

THE END of our first river day involved paddling to the refuge of a back eddy on one shore, then angling the bows of our boats upstream as we raced against the swollen current, hoping to make a landing directly across on the opposite shore. Or mighty close to it.

Two hundred feet beyond our traverse the water turned wolverine, tore its way around a cliff-edged bend, and became a mile-long sequence of 8- to 12-foot-high waterfalls with rock-forked hydraulic curlers between them. My own theory of evolution is that life forms advanced from the water to the land specifically to avoid places like this.

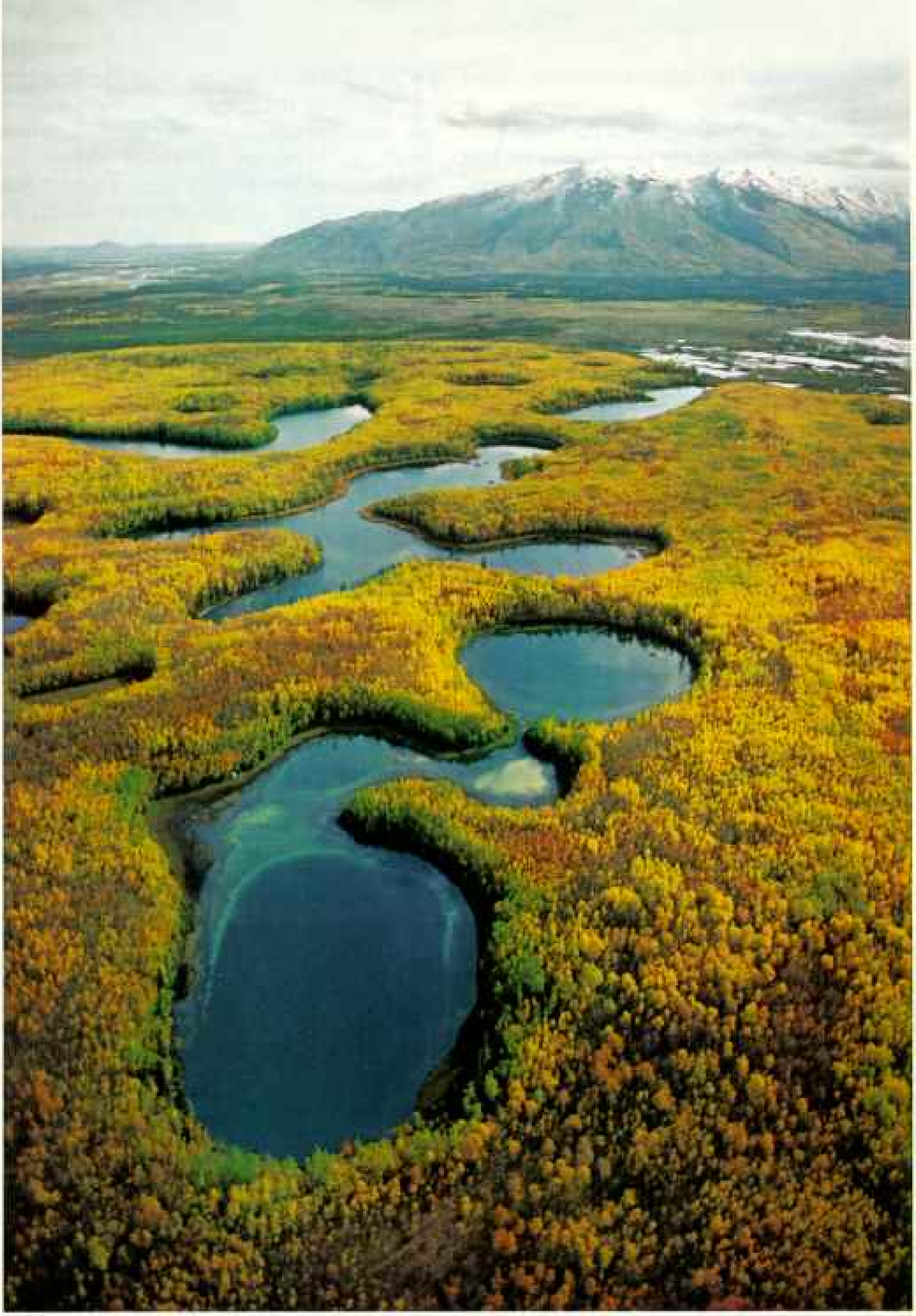
Everything eased up somewhat by the following afternoon. From time to time we took hold of one another's gunwales to drift along together, while sun patches roamed the valleys and beavers slid off the banks and slapped their stern paddles on the quiet water to announce our passage.

Ray, I learned, had only recently come to the Nahanni from the truly flat prairies of Saskatchewan. One reason behind this patrol was for him to become better acquainted with both the park and the travel conditions its visitors are likely to experience.

As for Lou: It says something about a park, I think, that its superintendent is not

STEPHEN J. KRASEMANN

Patience, luck, and a quicker eye *barely catch the proverbial quick red fox, seldom seen in Nahanni Park. This elusive reynard, lightly furred for summer, trailed campers along the southern end of the river, probably lured by their food.*



Autumn sets fire *to aspen and birch around the piping sinkholes* ***(above)*** *near Yohin Lake, a major bird-nesting site. These sinkholes, as deep as 100 feet, have spread as wide as 200 yards when silty earth funneled out through the natural water-eroded pipelines in underlying rock.*

Meltwater ponds lend summer color to a glacier in a spur of the Ragged Range ***(right)****, 20 miles outside Nahanni's northwest border. Park proponents hope to add more of the glacier-carved range.*

necessarily the warden with the most memorandums in his briefcase but the sort of partner you would hope to have in your canoe on any tough, bunched-up piece of water. After we spread all our gear out to dry in the evening, I was happy to discover that this superintendent can also cook bannock as well as any frontiersman who ever flipped the camp bread in a skillet.

There was leftover bannock the next day when we stopped opposite the incoming Caribou River for lunch. A hoodooed lunch. Looming above us was an entire mountainside of dark winglike vanes and pillars as tall as 50 feet. By lunchtime the day after that we were parting company near the juncture of the Flat and the South Nahanni. Lou and Ray planned to patrol their way back to Nahanni Butte headquarters. Loren and I had a floatplane to meet, one that would take us the opposite direction toward Rabbitkettle Hotsprings.

THE RABBITKETTLE AREA marks the point at which both the South Nahanni and most visitors enter the park. A large proportion of these visitors arrive here by canoe, having first flown farther northwest to land at a lake called the Moose Ponds and floated down the upper part of Powerful River. For most of its length this nonpark river section goes by the name the Rock Garden. It has also been called the finest white-water canoeing in Canada.

At a park cabin on the edge of Rabbitkettle Lake we met another park warden, Tom Elliot, who went over a list of survival tips and regulations with us, as he does with

***Men wear the mark** of the South Nahanni no less than its canyons.*

From the Slave tribe of Athapaskan Indians, 82-year-old Charles Yohin (**above**) *holds memories of winter-long hunts upriver, a lost Slave tradition.*

Willie McLeod (**left**) *tells of his two gold-prospecting uncles whose fate gave Deadmen Valley its name: Their headless skeletons were found there in 1908.*

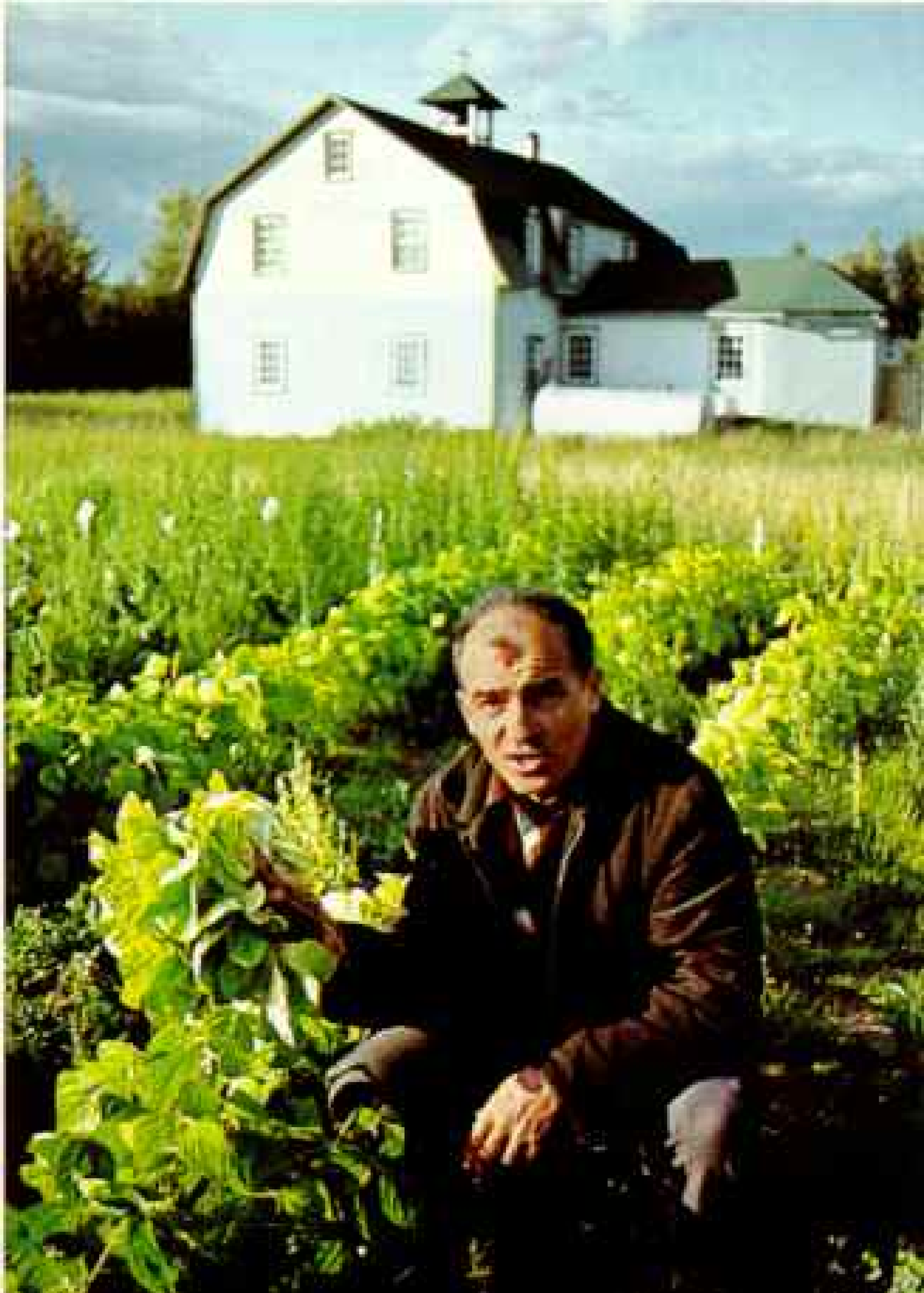
as many park travelers as possible. Nahanni's rules are few, and so are its "improvements"—mainly campgrounds with fire grates and log outhouses. Both are designed more to minimize the impact of visitors at popular sites than to provide services or enforce a preoccupation with safety.

The system works well, primarily because the park's visitors are also few—400 to 600 annually, a mere morning crowd at the gas stations in, say, Banff or Yellowstone. Nahanni's visitors are generally delighted to be left more or less on their own.

The young preserve is becoming better known, though. A current road-building project along the Liard River from Fort Simpson to Fort Liard will soon bring drivers within 20 miles of Nahanni Butte. Newer, closer roads may branch to mining sites (not for the elusive Nahanni gold but for tungsten, copper, lead, and zinc) being developed near the park's borders.

"We have to expect more people," Tom told Loren and me. "But if most of them are like the ones we get now—committed to their own policies of leaving a light track on the land—we should be able to handle quite a few and still keep the Nahanni pretty wild." And free. The way it is.

Together with two just-paddled-in young Canadians, Loren and I hiked behind Tom for about a mile to the Rabbitkettle tufa mounds. The springs here are warm—about 70°F—and rich with dissolved minerals, chiefly calcium carbonate. As the springwater seeps outward, the minerals precipitate as rimstone, or tufa, which tends to be deposited as a web of terraces with slightly



"It's a wonderful life," says Gus Kraus **(above)***, a prospector and trapper at home in Nahanni's wilderness for nearly 50 years. "Everything you need is right here. It gives on and on—and you do too."*

Surviving in the Nahanni bush taught Father Pierre Mary **(right)** *to "live life moment by moment." Traveling by canoe and dogsled, the French missionary began his work with natives in 1955.*

raised dams at their outer edge (page 404). Smaller, even more delicate latticeworks termed vermiculations encrust the sides of the rimstone dams.

Since the last bulldozing Ice Age glaciers retreated from this area 10,000 years ago, the larger of Rabbitkettle's two main mounds has been rising from ground level at the rate of a tenth of an inch a year. Add that fraction up, tier-within-tier-upon-tier, to A.D. 1981. The sum, which we trod carefully across in Tom's footsteps, is a tower almost 90 feet high and 228 feet across, an opalescent, ever changing, three-dimensional mosaic of stone petals and sky-reflecting pools.

THE RIVER between Rabbitkettle and Virginia Falls was broad—a well-shot arrow would scarcely have reached across it—and sleek, relaxed in its power as it moved us through July's 18-hour-bright days. Where Matt Bradley and I had huddled over a night fire during our downriver ski in March, Loren and I now swam in a warm oxbow lake and watched the arabesques of nighthawks hunting insects over twilit water. Stream mouths jammed with overflow ice had become grizzly-tracked sandspits where we fished for our breakfasts of grayling and Dolly Varden trout.

One Fenley Hunter beat his way up the South Nahanni in 1928 and made the first measurements of an astonishingly sudden change in the river's elevation. Mr. Hunter decided to name the phenomenon for his daughter: Virginia. I have no idea what sort of child Virginia was. Virginia Falls is pure detonation.

First the river constricts to a fifth its previous width and forms a jet of foam and thunder called the Chutes. The Chutes roil steeper and steeper, dropping some 90 vertical feet in all, and suddenly Powerful River flares out into four surface acres of mostly airborne water.

The south side of the river, launched over a lip of resistant limestone, spills 294 feet straight down. The center smashes into the prow of a huge pillar, some of the water to split around it, some to be atomized into rainbows of spray (pages 396-7). The north side of the river, meanwhile, cyclones down to a lower lip before free-falling 170 feet.

We descended some mist-slick rocks to

the very edge of the falls for a better look, which is probably what the person who disappeared here two years before was doing. Over the noise of the falls, a noise more felt than heard, Loren said he did not think he would mind dying at such a place. I recall a solitary gull circling through prismed veils and alighting high on the central pillar to preen itself.

At the Virginia Falls campground I signed the visitors' logbook. Here were addresses from several nations around the world (I met Swiss, French, and German adventurers before my trip was over) and paragraphs of comments from everybody. Amid all manner of advice to the wardens and the world and passionate paeans to nature one contribution stood out. It was: "Rub-a-dub-dub, two grubs in a tub, I hope we don't go blub blub blub."

FALLS-GAZING and three round trips to portage kayaks and supplies took up much of the following day. It was almost sunset before we floated away from the base of the cataract. Immediately ahead of us was Five Mile Canyon, the first of the great Nahanni gorges through the Mackenzie Mountains. Rub-a-dub-dub.

They say Five Mile Canyon is strikingly shaped and ribboned with brilliant orange and yellow hues worthy of its alternate name, Painted Canyon. I pass this information on unconfirmed. I was too busy rodeoing the 12-feet-per-second current to look around very much. Besides, I had spray from the breakers in my eyes.

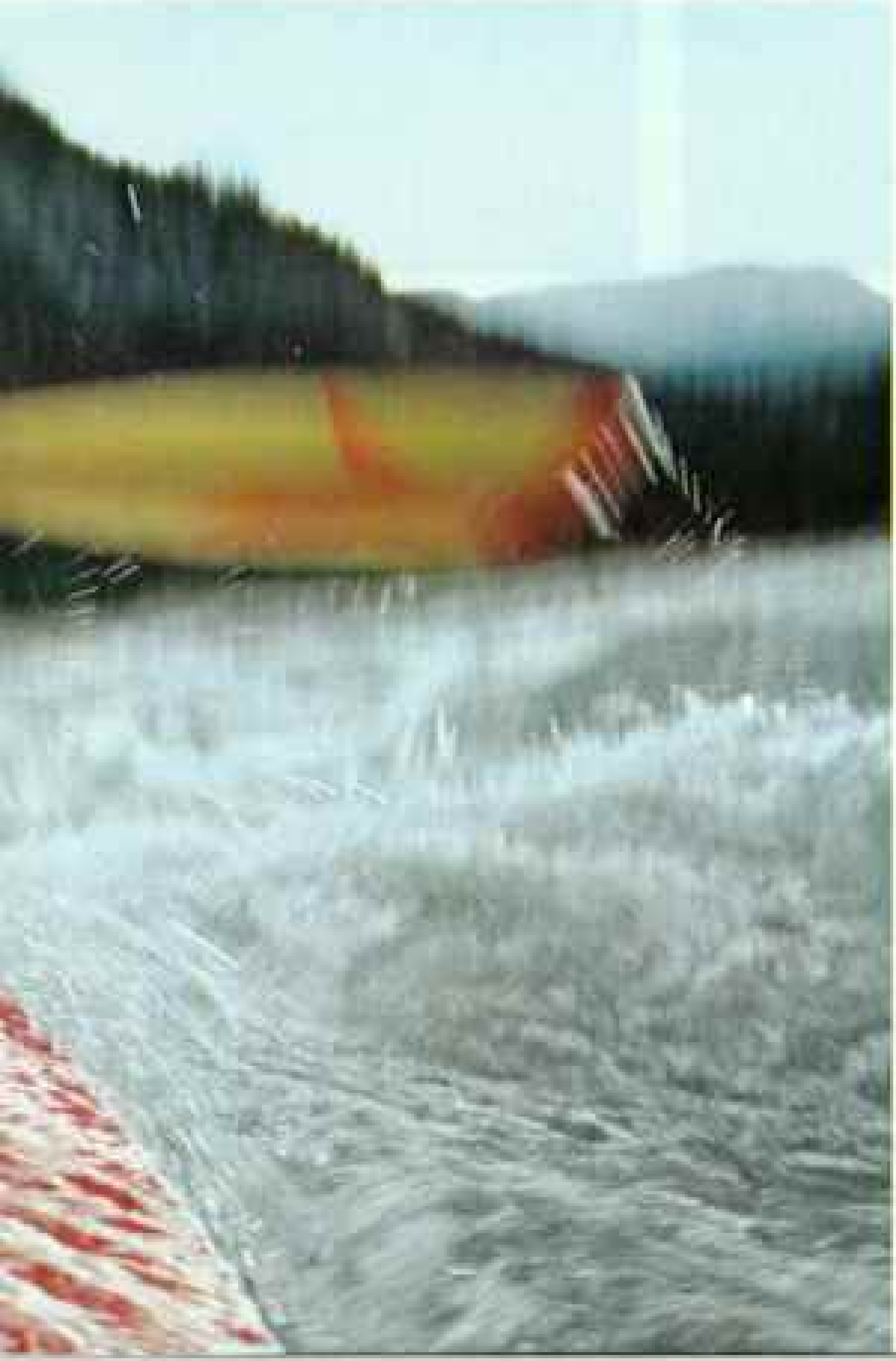
Another day, more troubled water. Where we stopped to look it over, we could see a wall on one shore turn the whole river a fast 90 degrees and send it as a mane of five-foot-tall waves into the cliff wall of the opposite shore. Whirlpools set spinning on both sides of the central surge have given this confusion its name of Figure Eight Rapids. An alternate name of Rapid That Runs Both Ways is equally telling, as is a third title: Hell's Gate.

An impressive percentage of the craft not portaged around Figure Eight come out of it upside down. It has claimed several lives at high water. "There's at least a two-foot drop where that left whirlpool shears back into the current," Loren calculated. "We're best off taking the big stuff right down the middle until the last minute."

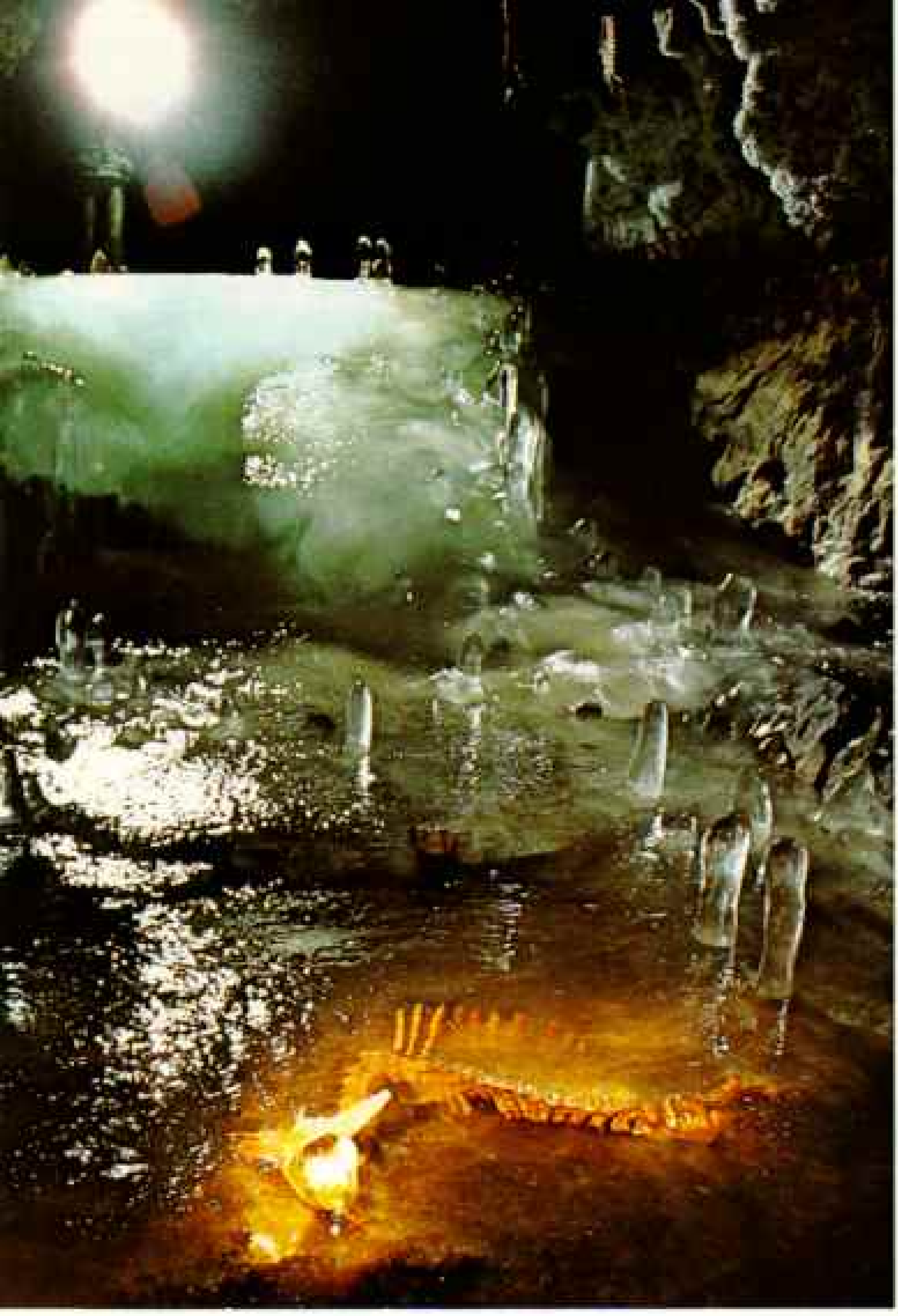
I started in close behind Loren but lost track of him for a moment in the high chop. I was making a high-speed waterwheel out of my double-bladed paddle when I heard a yell above the water's shout.

It was my partner, sliding in his boat down the side of a wall-reflected wave . . . no, not in trouble. In fact, from the expression on his face it was plain that the man could not have been happier. He was just whooping it up. You see, Loren Kreck is 61 years old, but he does not believe that. He believes places like Figure Eight Rapids are fountains of youth.

From the beginning, Nahadeh sliced its three grandest canyons breathtakingly sharp and narrow. And they have stayed



A rapid by any reckoning, *modestly named George's Riffle tests the white-water wits of park warden Joe Buker and the author, behind him. The reward for mastering the erratic five-foot crests is entrance to the majestic First Canyon.*



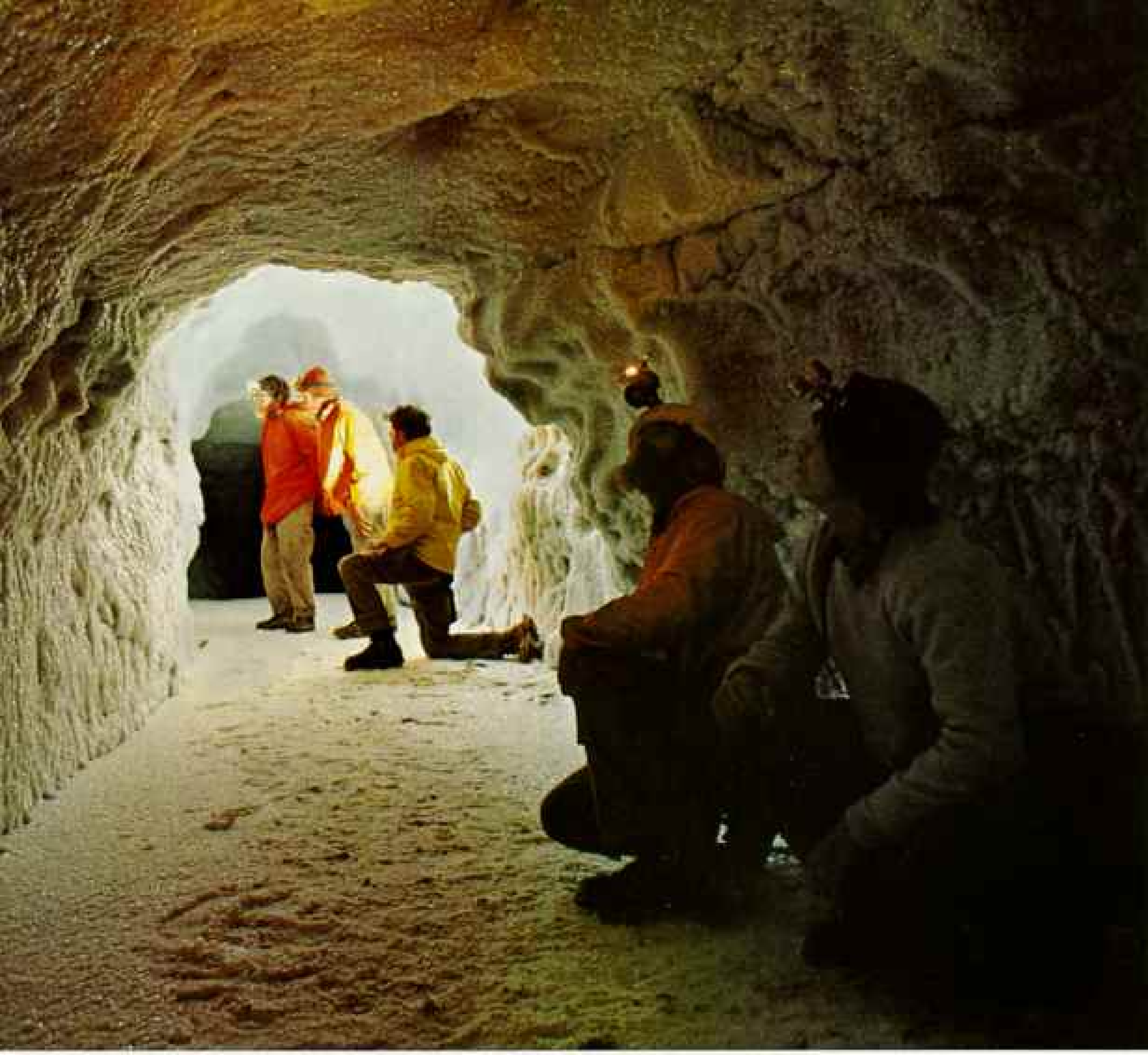
***An icebound crypt** traps a Dall sheep skeleton **(left)** in Grotte Valerie, largest known cave of First Canyon. The cavern turned graveyard some 2,000 years ago; more than 100 sheep have slipped down the icefall or lost direction in the dark.*

that way, because the Nahanni country below Rabbitkettle is one of the few areas in Canada that escaped the last continental ice sheets and their scouring effects.

Since these 3,000- and 4,000-foot incisions through the rocks were named by someone poling and lining his boat upriver, the first one Loren and I came to was Third Canyon. A cross section of the Funeral Range, it was appropriately shrouded in rain clouds during our passage. The soaring strata were mostly shale, bent every which way and overthrust along multiple faults.

"For in the stony bone-work of the Earth," wrote the visionary American architect Frank Lloyd Wright, ". . . there sleep forms and styles enough for all the ages for all of Man." For me Third Canyon held flying buttresses, balustrades, ornamental friezes, steeples; and the river was the aisle within the earth's own temple.

SUN. Stone. Storm. Sleep. I forget the exact order of our days. Somewhere in Second Canyon, a slash across the Headless Range where layer upon level layer of limestone connected the river's edge to the gray hull of the clouds, a wolverine loped



Hoarfrost sparkles in the cave's Ice Gallery (**above**) *as warm summer air condenses on the chill limestone passage 1,500 feet above the river. Man's tread has proved too hard for this delicate world, discovered in 1970, and entrance is now forbidden.*

past us along a narrow bank. A hundred yards farther on and across the waterway a Dall sheep ewe and lamb had climbed down to lick minerals from a clay deposit. Then, after a climb up Headless Creek just past the end of the canyon, I got back into my kayak and practically ran over a swimming black bear I mistook for a floating log.

The entrance to First Canyon is guarded by George's Riffle, which is a riffle like the Flat River is flat. Haystacks is one term for big, incoherently spouting waves such as these. Dancing horses is another. No amount of planning can prepare you for where the next will rear, so you may as well get up a bit of speed and dance with them. Rock 'n' roll did it for me. Loren, of course, just came up from each trough looking younger than ever.

It was dusk in this cleft through the Nahanni Plateau karst lands. Pink tatters of rain clouds sailed directly overhead. The rest of the sky was filled with rock. Especially dark pockets of shadow on the palisades turned out to be cave mouths.

A breeze from downriver carried the smell of sulfur from Kraus Hotsprings, which lie beyond Lafferty's Riffle at the exit from

Sunlight drifts like snow *on the granite face of 8,900-foot Mount Harrison Smith, one of the highest peaks of the Ragged Range. The Cirque of the Unclimbables, behind it,*

First Canyon. Gus Kraus wintered alone at the hot springs in 1941. In 1942 he met an Indian girl named Mary while ferrying her and her relatives across the river at Nahanni Butte to escape a forest fire. The hot springs had two residents that winter and for many years thereafter.

When I visited the Krauses in March at their new home in some nearby mountains, I had to ask 83-year-old Gus what he had decided about Nahanni gold in his years of prospecting. "I know it's there," he replied. "But suppose I'd got myself, oh, a quarter of a million dollars. Tell me, what in the world would I have done with all that money?"

Journal—July 24: I am up to my neck in a 95-degree pool, the Krauses' favorite, watching the early sun attach itself to the leaves of a perfect day. No tufa mound encloses me; the sulfur dissolves the carbonates. Around me are springs and streamlets cushioned with algae of every color from yellow to electric purple. And about 20 acres of warm ground.

In younger days Gus and Mary went

challenges mountaineers from around the world, who yearly disprove its claim. Now outside the park, this powerful landscape may someday enhance Nahanni's wonder.

barefoot all winter on their cabin floor; it was 68 degrees. They planted their garden when the mountains were still avalanching, and they harvested muskmelons and pumpkins.

The place itself favors dense chokecherry bushes and the largest poplars along the river. These provide the music for my morning bath. That is, every branch appears to have a bird full of bugs and berries and song on it.

Look. I do not have a dollar or a pocket to put one in. Tell me, what in the world would I do with a quarter of a million of those odd, square, inedible, songless leaves? Go ask Gus. This is the mother lode right here, and I'm going to stay and soak it into every pore.

TOM ELLIOT, Ray Breneman, and Lou Comin arrived July 25, in the hydrojet boat that the park uses to patrol the river below Virginia Falls—to the considerable annoyance of some independent, quiet-loving wayfarers and the eternal gratitude of the soaked and stranded. The wardens had come to take me on the first park exploration of Grotte Mickey, a cave discovered in 1970 by Frenchman Jean Poirel.

Not much more than a hundred feet of rope passed through our hands during the rappel from the rim of First Canyon down to the cave entrance. It was being able to look between your legs and see the river some 1,000 feet farther down that made this an honest slide. So much exposure. And half an hour later I was squirming along behind Lou in a passageway without room enough to lift my stomach off a floor of ice with three inches of blasphemously cold water on it.

I returned to First Canyon later with Joe Buker, the fourth and final member of Nahanni Park's summer warden staff, to see a different cave. Several hundred yards into the darkness beyond the mouth of Grotte Valerie lie the partly mummified remains of more than a hundred Dall sheep; the oldest of which have been in this strange mausoleum for at least 2,000 years (page 416).

My headlamp ignited alcoves coated with ice crystals, paper thin yet grown as long as three inches with flawless triangular symmetry in the still cavern air. Transparent stalagmites rose from the slick icefall that trapped so many disoriented, wandering sheep in this eternal night.

I stood at the base of the icefall, and the sockets of a sheep skull stared sightlessly up at me through the blear of a frozen pool. Nah! There were dripstone curtains the color of a heart, slender gypsum crystals curling out of the walls like tufts of hair. . . . But O Lord, give me sun on a wide river!

LOREN AND I began the final miles to Nahanni Butte from Kraus Hotsprings:

Through the Splits, where the river spreads out more than two miles wide along braided channels and where wood buffalo, an indigenous species, have just been reintroduced to the area.

Past deadheads, those half-drowned logs with one end anchored in river-bottom silt and the other bobbing erratically across the current in search of boats to scuttle.

Past the Sand Blowouts (page 404), which Gus Kraus dubbed the Devil's Kitchen and Charles Yohin, who told me of the skin-boat days, refers to as Nintzi Enda—"live wind." Here at the very downstream edge of the park, blasts of air funneled by upper-ridge contours have arranged a four-acre display of mushrooming, noduled, hollow-centered statuary on a floor of fine white sand. I returned to this site later, as I did to many others in the park.

And I kept returning upstream—sometimes with photographer Matt Bradley, who flew in for an August rendezvous, and sometimes by myself—until the first snow found me alone on a divide between three huge, nameless valleys in the chasmed maze of the karst lands.

OFTEN I THOUGHT of R. M. Patterson, an early traveler along the Nahanni. He described the land in his book, *The Dangerous River*, and, in a foreword to the Canadian edition, wrote the following:

"Those of us who had the good fortune to be on the South Nahanni in those last days of the old North may, in times of hunger or hardship, have cursed the day we ever heard the name of that fabled river. Yet a treasure was ours in the end: memories of a carefree time and an utter and absolute freedom which the years cannot dim nor the present age provide."

In 1979 the United Nations Educational, Scientific, and Cultural Organization (UNESCO) made this preserve the first natural area on the globe to be officially dedicated as a world heritage site—preserved now for all the family of man. Part of the UNESCO proclamation reads, "Nahanni National Park . . . contains outstanding examples of the major stages of the earth's evolutionary history and of significant on-going geological processes. . . ."

The key words here are "history" and "on-going." The earth did not just make this diverse splendor long ago. It is still creating it. Right now. The earth moves, as collapsing banks of silt, ice jams grinding against canyon walls, dust blowing off the gravel bars, sand swirling through stone arches, as waterfalls, dripping cave ceilings, and as tufa mounds fashioning that tenth of an inch of annual beauty.

The lesson of the Nahanni is that our connection with the earth is the connection of one living thing to another. Powerful River. Powerful Park. □

NATIONAL GEOGRAPHIC SOCIETY

WASHINGTON, D. C.

Organized "for the increase and diffusion of geographic knowledge"

GILBERT HOVEY GROSVENOR
Editor, 1899-1954; President, 1920-1954
Chairman of the Board, 1954-1966

THE NATIONAL GEOGRAPHIC SOCIETY is chartered in Washington, D.C., in accordance with the laws of the United States, as a nonprofit scientific and educational organization. Since 1890 the Society has supported more than 1,990 explorations and research projects, adding immeasurably to man's knowledge of earth, sea, and sky. It diffuses this knowledge through its monthly journal, NATIONAL GEOGRAPHIC; its books, globes, atlases, filmstrips, and educational films; *National Geographic WORLD*, a magazine for children age 8 and older; information services; technical reports; exhibits in Explorers Hall; and television.

GILBERT M. GROSVENOR, President
OWEN R. ANDERSON, Executive Vice President
HILLEARY F. HOSKINSON, Vice President and Treasurer
WILLIAM T. BELL, FREDERICK C. GALE, LEONARD J. GRANT, JOSEPH B. HOGAN, ADRIAN L. LOFTIN, JR., LEWIS P. LOWE, RAYMOND T. McELLIGOTT, JR., Vice Presidents
EDWIN W. SNIDER, Secretary and Corporate Counsel

BOARD OF TRUSTEES

MELVIN M. PAYNE, Chairman of the Board
ROBERT E. DOYLE, Vice Chairman
LLOYD H. ELLIOTT, Vice Chairman
President, George Washington University
MELVILLE BELL GROSVENOR, Chairman Emeritus
THOMAS W. McKNEW, Advisory Chairman

OWEN R. ANDERSON
Executive Vice President, National Geographic Society

THOMAS E. BOLGER
Executive Vice President, American Telephone & Telegraph Company

FRANK BORMAN, Chairman of the Board and President, Eastern Airlines

J. CARTER BROWN, Director, National Gallery of Art

WARREN E. BURGER
Chief Justice of the United States

GEORGE M. ELSEY, President, American Red Cross

GILBERT M. GROSVENOR
President, National Geographic Society

ARTHUR B. HANSON, Attorney

CARYL P. HASKINS, Former President, Carnegie Institution of Washington

JEROME H. HOLLAND
Former U. S. Ambassador to Sweden

CARLISLE H. HUMELSINE
Chairman of the Board, The Colonial Williamsburg Foundation

MRS. LYNDON B. JOHNSON

CURTIS E. LeMAY, Former Chief of Staff, U. S. Air Force

WM. McCHESNEY MARTIN, JR.
Former Chairman, Board of Governors, Federal Reserve System

LAURANCE S. ROCKEFELLER
Chairman, Memorial Sloan-Kettering Cancer Center

ROBERT C. SEAMANS, JR.
Dean of the School of Engineering, Massachusetts Institute of Technology

JAMES H. WAKELIN, JR., Former Assistant Secretary of Commerce for Science and Technology

JAMES E. WEBB, Former Administrator, National Aeronautics and Space Administration

CONRAD L. WIRTH, Former Director, National Park Service

Trustees Emeritus
CRAWFORD H. GREENEWALT
FREDERICK G. VOSBURGH
LOUIS B. WRIGHT

COMMITTEE FOR RESEARCH AND EXPLORATION

MELVIN M. PAYNE, Chairman
T. DALE STEWART, Vice Chairman
EDWIN W. SNIDER, Secretary

BARRY C. BISHOP, HARM J. DE BLIJ, Professor of Geography, University of Miami, ROBERT E. DOYLE, GILBERT M. GROSVENOR, MELVILLE BELL GROSVENOR, CARYL P. HASKINS, THOMAS W. McKNEW, BETTY J. MEGGERS, Research Associate-Anthropology, Smithsonian Institution, CHARLES H. SOUTHWICK, Professor of Biology, University of Colorado, GEORGE E. STUART, JAMES H. WAKELIN, JR., GEORGE E. WATSON, Curator of Birds, Smithsonian Institution, FRANK C. WHITMORE, JR., Research Geologist, U. S. Geological Survey, CONRAD L. WIRTH, LOUIS B. WRIGHT, and PAUL A. ZAHL

ASSISTANT VICE PRESIDENTS: James P. Kelly, Ward S. Phelps, Cletis Pride. **ASSISTANT TREASURER:** Alfred J. Hayre. **ASSISTANT SECRETARY:** Earl Corliss, Jr. **ASSISTANTS TO THE PRESIDENT:** Joyce W. Graves, Thomas E. Kulikosky, Richard E. Pearson

ADMINISTRATIVE STAFF: *Accounting:* Dorothy L. Dameron, Jay H. Givans, Laura L. Leight, William G. McGhee, George E. Newstedt, David H. Peters. *Administration:* D. Evelyn Carnahan, Ruth E. Clark, Robert V. Koenig, Zbigniew Jan Lutyk, Marta M. Marschalko, Myra A. McLellan, Ross L. Mulford, Shirley Neff, Jimmie D. Pridemore, Joyce S. Sanford, Karen F. Shrewsberry, Janet C. Soper, Frank M. Twigger. *Computer:* James G. Schmelzer, William L. Chewning, Ronald C. Kline, Richard A. Mechler, Harold E. Smith. *Educational Services:* Wendy G. Rogers, Dean R. Gage, Carl W. Harmon, Jr. *Employee Benefits:* Howard R. Hudson. *Explorers Hall:* Peter Purpura. *Membership Services:* Margaret L. Bassford, Robert C. Dove, Erma T. Goetzinger, William T. McDonnell, Paul B. Tylor, Dorothy M. Wagner, Marguerite M. Wise, Peter F. Woods. *Personnel:* Thomas L. Hartman, M.D., Robert E. Howell, Glenn G. Pepperman, Shirley N. Wilson. *Printing:* Joe M. Barlett, Frank S. Oliverio, Margaret A. Slifer, Hans H. Wegner. *Promotion:* Charles T. Kneeland, Robert J. Warfel, Eileen W. Bowering, James R. Dimond, Jr., Robert L. Feige, Joseph S. Fowler, Thomas M. Kent, Mary A. Mattingly, F. William Rath, Towne Windom. *Purchasing:* Robert G. Corey, Thomas L. Fletcher, Sheila H. Immel

ADVERTISING: *Director:* James L. Till, 1251 Avenue of the Americas, New York 10020. *Asst. to Dir.:* Blanche Coffey. *Assoc. Sales Director:* George W. Kellner. *Managers—East:* Bart W. McDonnell, New York. *Midwest:* Robert R. Henn, Chicago. *San Francisco:* Cecil H. London. *Los Angeles:* Richard H. Lehman. *Detroit:* George E. Moffat. *International Editions:* Robert W. Horan, New York. *Travel:* Gerald A. Van Splinter, New York. *Europe:* Michel A. Boutin, Paris. *Business Manager:* Peter W. Michaels. *Production Manager:* G. Sarita Lapham

---

COPYRIGHT © 1981 National Geographic Society, 17th and M Sts. N.W., Washington, D. C. 20036. Second-class postage paid at Washington, D. C., and elsewhere. Cover design and title protected by U. S. and foreign trademark registrations. $13.50 a year, $1.70 a copy. **POSTMASTER:** Send address changes to National Geographic (ISSN 0027-9358), P. O. Box 2174, Washington, D. C. 20013.

MELVIN M. PAYNE *Chairman of the Board*
MELVILLE BELL GROSVENOR *Editor Emeritus*

NATIONAL GEOGRAPHIC MAGAZINE

GILBERT M. GROSVENOR *President*
WILBUR E. GARRETT *Editor*
JOSEPH JUDGE *Associate Editor*

SENIOR ASSISTANT EDITORS

James Cerruti, *Contract Writers* Richard J. Darley, *Cartography*
Robert E. Gilka, *Photography* William Graves, *Expeditions*
Robert P. Jordan, *Special Projects* H. Edward Kim, *Layout*
Edward J. Linehan, *Manuscripts* Samuel W. Matthews, *Production*
O. Louis Mazzatenta, *Control Center* Howard E. Paine, *Art*
Carolyn Bennett Patterson, *Legends* Thomas R. Smith, *Illustrations*
Mary G. Smith, *Research Grant Projects* Kenneth F. Weaver, *Science*
Ann K. Wendt, *Research*

TEXT

ASSISTANT EDITORS: Rowe Findley, Bart McDowell, Elizabeth A. Moize, Merle Severy

SENIOR WRITERS: Thomas J. Abercrombie, David S. Boyer, Thomas Y. Canby, Mike Edwards, William S. Ellis, Rick Gore, Noel Grove, John J. Putman, Peter T. White

SENIOR EDITORIAL STAFF: Harvey Arden, Robert Booth, Kent Britt, John L. Eliot, Boyd Gibbons, Alice J. Hall, Bryan Hodgson, David Jeffery, Michael E. Long, Ethel A. Starbird, Priit J. Vesilind, Gordon Young

EDITORIAL STAFF: Allen A. Boraiko, Larry Kohl, Douglas Lee, John L. McIntosh, Cathy Newman, Cliff Tarpy

RESEARCH: Frances H. Myers (Associate Chief); *Researcher-Editors:* Susan L. Anderson, Judith Brown, Lesley B. Rogers, Michaeline A. Sweeney. *Researchers:* Carolyn H. Anderson, Julia A. Gamble, Ann B. Henry, Jan Holderness, Patricia B. Kellogg, Kathy B. Maher, Barbara W. McConnell, Jean B. McConville, Jeanne E. Peters, Frances W. Shaffer. *Geographic Information:* Bette Joan Goss. *Legends:* Abigail A. Tipton

ILLUSTRATIONS

PHOTOGRAPHERS: Dean Conger, Joseph J. Scherschel (Assistant Directors); James L. Amos, Joseph H. Bailey, James P. Blair, Victor R. Boswell, Jr., Jodi Cobb, Bruce Dale, Gordon W. Gahan, David Alan Harvey, Otis Imboden, Emory Kristof, Joseph D. Lavenburg, Bianca Lavies, Bates Littlehales, Robert W. Madden, George F. Mobley, Robert S. Oakes, Steve Raymer, Robert F. Sisson (*Natural Science*), James L. Stanfield, Volkmar Wentzel (*Archivist*). *Administration:* Claude E. Petrone, Susan A. Smith

ILLUSTRATIONS EDITORS: W. Allan Royce (Assistant Director); David L. Arnold, Taylor Gregg, Declan Haun, Bruce A. McElfresh, Charlene Murphy, Robert S. Patton, Elie S. Rogers, Jon Schneeberger

LAYOUT: Constance H. Phelps

ART: William N. Palmstrom, J. Robert Teringo (Associate Directors); Walter Q. Crowe, John D. Garst, Jr. (Assistant Directors); Elie Sabban (Production). *Artists:* Lisa Biganzoli, William H. Bond, John W. Lothers, Ned M. Seidler. *Map Editors:* John T. Blozis, Gus Platis. *Research:* Virginia L. Baza, Harold A. Hanson (Supervisors); Ross M. Emerson, Margaret Deane Gray, Dorothy A. Nicholson. *Map Artists:* Isaac Ortiz, Leo B. Zebarth (Supervisors); Iskandar Baday, Peter J. Balch, Snejinka Stefanoff, Alfred L. Zebarth

DESIGN: Charles C. Uhl, Betty A. Clayman, Robert E. Pullman

ENGRAVING AND PRINTING: William W. Smith (Director); James R. Whitney (Associate Director); Bill M. Aldridge, John T. Dunn

CARTOGRAPHY

John F. Shupe (Associate Chief); Ted Dachtera, Richard K. Rogers (Assistant Chiefs); John F. Dorr (Art Director); Margery K. Barkdull, Charles F. Case, Henri A. Delanghe, Russel G. Fritz, Martin J. Golden, Charles W. Gotthardt, Jr., Thomas L. Gray, Catherine M. Hart, Karen P. Jacoby, Harry D. Kauhane, Mary C. Latham, Mary Anne McAleer, Charles L. Miller, Roland R. Nichols, Robert W. Northrop, Charles L. Stern, Douglas A. Strobel, Tibor G. Toth, Thomas A. Wall, Thomas A. Walsh, Elizabeth Wolf, Susan Young

EDITORIAL SERVICES

ADMINISTRATION: M. Jean Vile (Asst. to the Editor), Elaine Rice Ames, Marie L. Barnes, G. Merrill Clift, Neva M. Collins, Lilian Davidson, Virginia H. Finnegan, Eleanor W. Hahne, Mary F. Klemann, Lucille L. McInerney, Patricia M. Oakes, Barbara A. Shattuck. *Correspondence:* Carolyn F. Clewell, Gwendolyn C. Blackman. *Indexes:* Jolene M. Blozis. *Travel:* Virginia A. Bachant

LIBRARIES: *Publications:* Virginia Carter Hills (Librarian); Patricia Murphy Smith, Susan M. Fifer, Carolyn Locke, Louise A. Robinson, Marta Strada. *Illustrations:* L. Fern Dame, Carolyn J. Harrison, M. Scott Bolden. *Records:* Lorie Northrop, Mary Anne McMillen, Marguerite S. Northwood, Mennen M. Smith. *Films:* Betty G. Kotcher

NEWS SERVICE: Paul Sampson (Chief); Donald J. Frederick, Ellen E. Kohlberg, Barbara S. Moffet, William J. O'Neill, Robert C. Radcliffe

PHOTOGRAPHIC LABORATORIES AND TYPESETTING: Carl M. Shrader (Chief); Milton A. Ford (Associate Chief); Lawrence F. Ludwig (Assistant Chief); Herbert Altemus, Jr., Billy R. Barnett, Richard A. Bredeck, David H. Chisman, Ellwood M. Kohler, Jr., Geoffrey T. McConnell, Arletta M. Molinari, William S. Petrini, Bernard G. Quarrick, Joan S. Simms, James H. Trott, Alfred M. Yee

RELATED EDUCATIONAL SERVICES OF THE SOCIETY

ROBERT L. BREEDEN *Vice President*

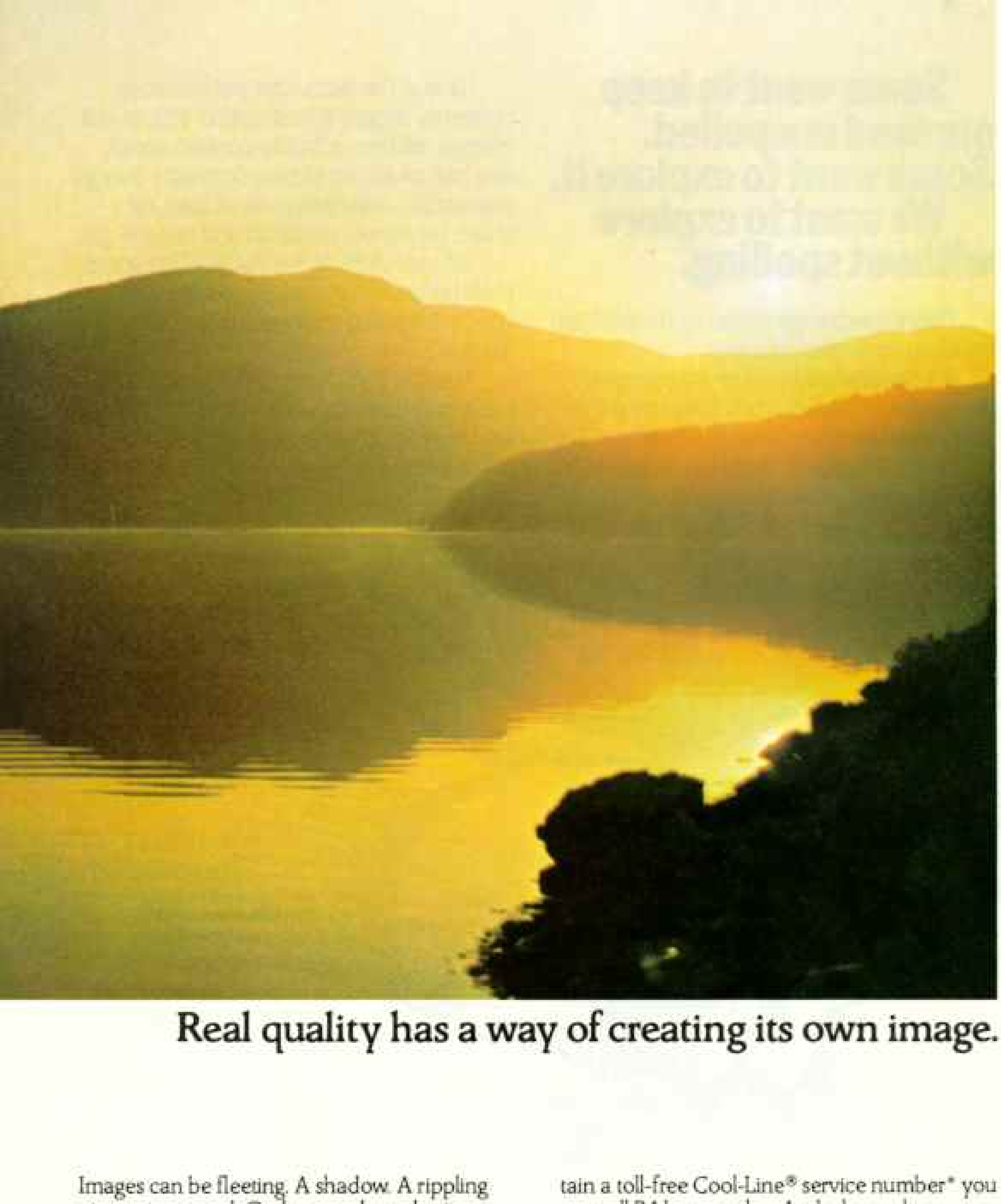
SENIOR ASSISTANT EDITORS: Donald J. Crump, *Special Publications and School Services;* Charles O. Hyman, *Book Service*

BOOK SERVICE: Kenneth C. Danforth (Assistant Director); Thomas B. Allen, Ross Bennett, Mary H. Dickinson, Karen F. Edwards, Robert C. Firestone, Anne Dirkes Kobor, J. Edward Lanouette, Carol Bittig Lutyk, Linda B. Meyerriecks, David F. Robinson, Shirley Scott, David M. Seager, Margaret Sedeen, Verla Lee Smith, George E. Stuart, Anne E. Withers

SPECIAL PUBLICATIONS AND SCHOOL SERVICES: Philip B. Silcott (Associate Chief); William L. Allen, Jody Bolt, Toni Eugene, Seymour L. Fishbein, Ron Fisher, Patricia F. Frakes, William R. Gray, Barbara Grazzini, Sallie M. Greenwood, Mary Ann Harrell, Suzanne J. Jacobson, Bonnie S. Lawrence, Christine E. Lee, Tee Loftin, Louisa V. Magzanian, Tom Melham, Robert Messer, H. Robert Morrison, Raja D. Murshed, Thomas J. O'Neill, Thomas B. Powell III, Cynthia Ramsay, Kathleen F. Teter, Jennifer C. Urquhart, George V. White, Merrill Windsor. *National Geographic WORLD:* Ralph Gray (Editor); Pat Holland, Ellen Joan Hurst, Margaret McKelway, Pat Robbins, Eleanor Shannahan, Veronica Smith, Ursula Perrin Vosseler. *Educational Media:* George Peterson (Editor); Jimmie Abercrombie, James B. Caffrey, Margery G. Dunn, Jacqueline Geschickter, Jane R. McCauley, Judith E. Rinard

TELEVISION AND FILMS: Dennis B. Kane (Chief); Sidney Platt (Manager, Educational Films); Donald M. Cooper, Anne B. K. Krumbhaar, Yeorgos N. Lampathakis, Louise C. Millikan, Marjorie M. Moomey, Patricia F. Northrop, Nola L. Shrewsberry, Carl E. Ziebe

AUDIOVISUAL: Joanne M. Hess (Chief); Jon H. Larimore (Technical Director); Ronald S. Altemus, Robert G. Fleegal, Mary W. McKinney, Gerald L. Wiley



Real quality has a way of creating its own image.

Images can be fleeting. A shadow. A rippling picture in a pond. Or they can be as lasting as a lifetime. A lifetime of hard work.

As a maker of home appliances, Whirlpool Corporation believes that a lasting quality image is simply the reflection of the people who build and stand behind the product. Special people. Motivated by pride of concept. Of craftsmanship. Of their ability to make things that last.

This is why we take pride in stocking parts for as many years as we do. Why we maintain a toll-free Cool-Line® service number* you can call 24 hours a day. And why we have a nationwide organization of authorized Tech-Care® service companies that are as close to you as your phone book.

You see, at Whirlpool we believe every appliance we build should create its own image of quality. And do it for one person — you.

It's our way of saying this is more than just an appliance. This is our way of life.

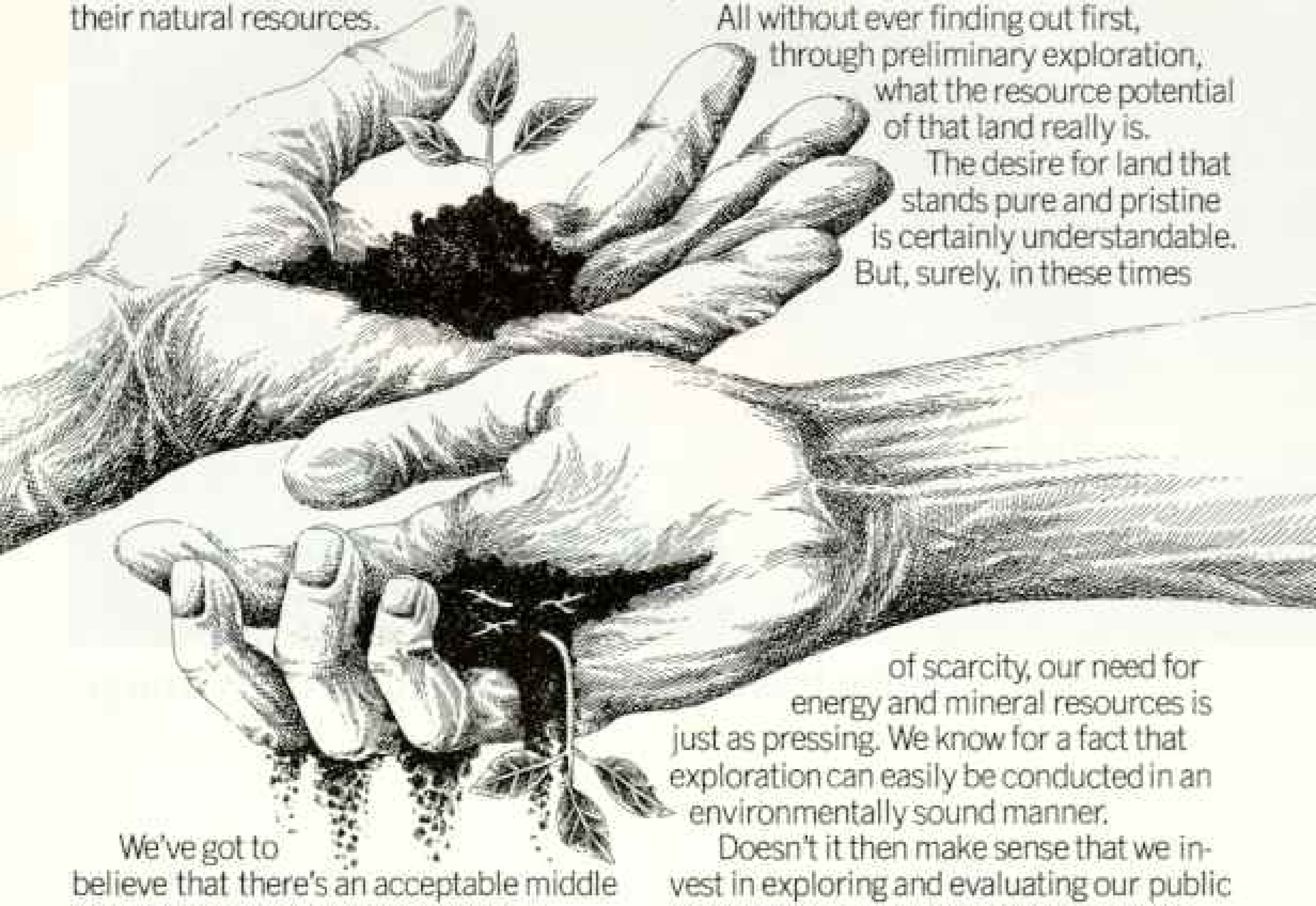
Whirlpool
Home Appliances

*800-253-1301. In Alaska and Hawaii 800-253-1121. In Michigan 800-632-2243.

Some want to keep our land unspoiled. Some want to explore it. We want to explore without spoiling.

There's a strange either-or proposition building up in this country.

It's one that says either we completely preserve our public lands by turning them into permanent wilderness, or we tear them up and exploit them to the fullest for their natural resources.



We've got to believe that there's an acceptable middle ground between these two extremes.

Because neither one is really in the long-range interest of our country.

At least that's what all of us at Atlantic Richfield believe. And so do the many Americans who have invested with us.

Look at the facts. Our public lands currently supply an estimated 10% of our energy. Yet they actually contain about one half of all our known domestic energy resources—vast amounts of coal, oil shale, tar sands, crude oil and natural gas.

Yet over 40% of the 760 million acres that the federal government owns has been withdrawn from mineral mining or leasing.

Another 25% has been placed under such restricted regulation that oil, gas and mining operations are effectively precluded.

All without ever finding out first, through preliminary exploration, what the resource potential of that land really is.

The desire for land that stands pure and pristine is certainly understandable. But, surely, in these times of scarcity, our need for energy and mineral resources is just as pressing. We know for a fact that exploration can easily be conducted in an environmentally sound manner.

Doesn't it then make sense that we invest in exploring and evaluating our public lands before classifying them as wilderness or otherwise, and locking them up forever?

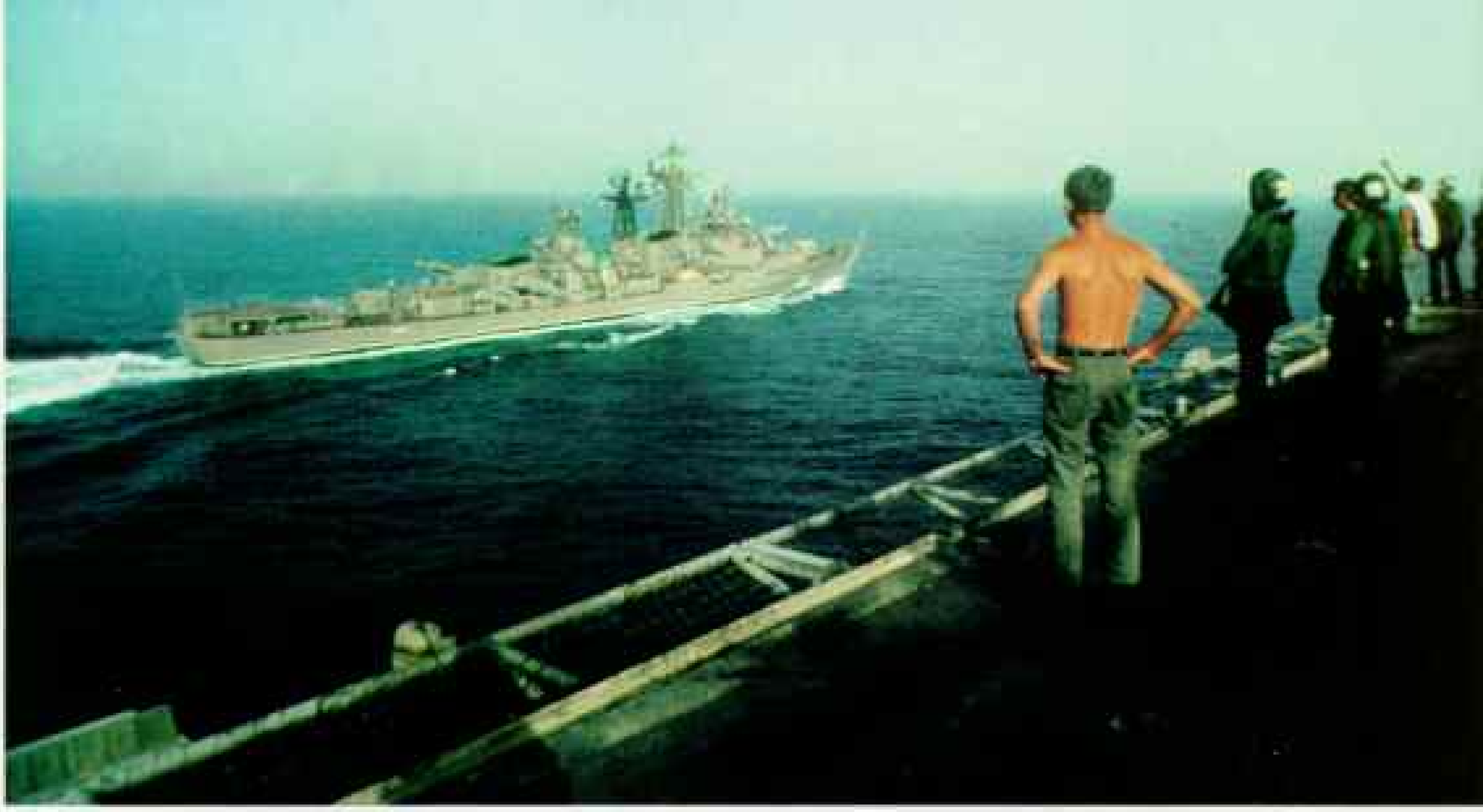
At least then we could make sure we're doing the right thing.

Or so it seems to us at Atlantic Richfield.

There are no easy answers.

ARCO

Atlantic Richfield Company



U. S. NAVY

Tense times in the Indian Ocean

NATIONAL GEOGRAPHIC PHOTOGRAPHER STEVE RAYMER

EYEBALLING THE OPPOSITION: Sailors on the nuclear carrier U.S.S. *Nimitz* watch a Soviet Kashin-class destroyer pass (**above**) in the strategically sensitive Indian Ocean. Assistant Editor Bart McDowell (**right**), taking notes for a report next month, accompanies a helicopter strike force in the region. Though the mission is simulated, the world's concern is real. Flecked with little-known islands—the Maldives, Seychelles, Comoros, and Chagos—the Indian Ocean has become a global arena. Petroleum crucial to West and East alike must pass through its waters under the eyes of big-power navies.

Share the GEOGRAPHIC's coverage of such vital areas with friends; use the form below.

NATIONAL GEOGRAPHIC SOCIETY MEMBERSHIP

$13.50 **CALENDAR YEAR 1982 MEMBERSHIP DUES INCLUDE SUBSCRIPTION TO THE NATIONAL GEOGRAPHIC**

ANNUAL DUES in the United States and throughout the world are $13.50 U. S. funds or equivalent. To compensate for additional postage and handling for mailing magazine outside the U.S.A. and its outlying areas, please remit: for Canada, $18.70 Canadian or $15.50 U. S.; for all other countries, $21.50 if paid in U. S. currency by U. S. bank draft or international money order. Eighty percent of dues is designated for magazine subscription. Annual membership begins with the January issue.

EIGHTEEN-MONTH MEMBERSHIP: Applicants who prefer delivery of their NATIONAL GEOGRAPHIC to start with the July 1981 instead of the January 1982 issue may upon request become members and receive the magazine for 18 months from July 1, 1981, through December 1982. Upon expiration, such memberships will be renewable annually on a calendar-year basis. For 18-month membership check here ☐ and remit: for U.S. and its outlying areas, $19.25 U. S. funds or equivalent; for Canada, $27.50 Canadian or $22.80 U. S.; for all other countries, $30.70 if paid in U. S. currency by U. S. bank draft or international money order.

Mail to: The Executive Vice President
National Geographic Society
Post Office Box 2895
Washington, D. C. 20013

CHECK BELOW

I WISH TO JOIN the NATIONAL GEOGRAPHIC SOCIETY and enclose my dues of $________ ☐

(FILL IN YOUR NAME AND ADDRESS BELOW.)

ENTER A GIFT MEMBERSHIP for the person named at left. I enclose $________ for membership dues. ☐

Send gift card signed: ________

NOMINATION ONLY: Check here if you want us to send membership information only (not a gift) to the person named at left. Use separate sheet for additional nominees or gifts. ☐

NEW MEMBER ________
PRINT NAME OF AN INDIVIDUAL ONLY (MR., MRS., MISS, MS.)
____
STREET
____
CITY, STATE/PROVINCE, COUNTRY, ZIP/POSTAL CODE

MY NAME ________
PLEASE PRINT (MR., MRS., MISS, MS.)
____
STREET
____
CITY, STATE/PROVINCE, COUNTRY, ZIP/POSTAL CODE

[illegible]

PHILIPPINES
Philippine Eagle Habitat

★A Philippine eagle photographed by G. Ziesler in the Philippines

Wildlife as Canon sees it: A photographic heritage for all generations.

When a work of creation is gone, there is no way to bring it back.

We can never bring back the great auk or any of those birds and animals that have vanished forever from the face of the earth.

The Philippine eagle, a spectacular bird of prey found only in the Philippines, is in danger of going the way the last great auk went. It lives under the spectre of total extinction.

Should it vanish forever, it would be very sad indeed. But sadder still would it be, were we to be left with no records of it at all.

And that's where Canon comes in. With Canon, the Philippine eagle and all of wildlife can be recorded for posterity.

It would be a photographic heritage worthy to be handed down from generation to generation.

A-1 with FD 300mm f/2.8L

Philippine Eagle

Genus: *Pithecophaga*
Species: *jefferyi*
Adult size: *Approx. 1m long*
Adult weight: *Approx. 4kg*
Habitat: *Luzon, Samar, Leyte and Mindanao islands in the Philippines; now found mainly in Mindanao*
Surviving number: *Estimated 300 – 500*

Canon
Images for all time

We know vitamin C does a lot for them. What new discoveries lie ahead?

Like you, these youngsters can be susceptible to infection that overwhelms the body's natural immunities. Vitamin C, along with other essential nutrients, optimizes your body's natural capacity to resist illness and helps keep your tissues healthy.

Tripping and falling means cuts, scrapes, bruises or a fracture. None of these will heal properly without adequate vitamin C, along with other essential nutrients.

Vitamin C also increases the body's ability to absorb iron from foods. Iron, the most common deficiency in the diet, may be related to a loss of energy.

What about the future? A great deal of research is being directed at possible relationships of vitamin C to infections, diseases, cholesterol levels, stress, and air and chemical pollution.

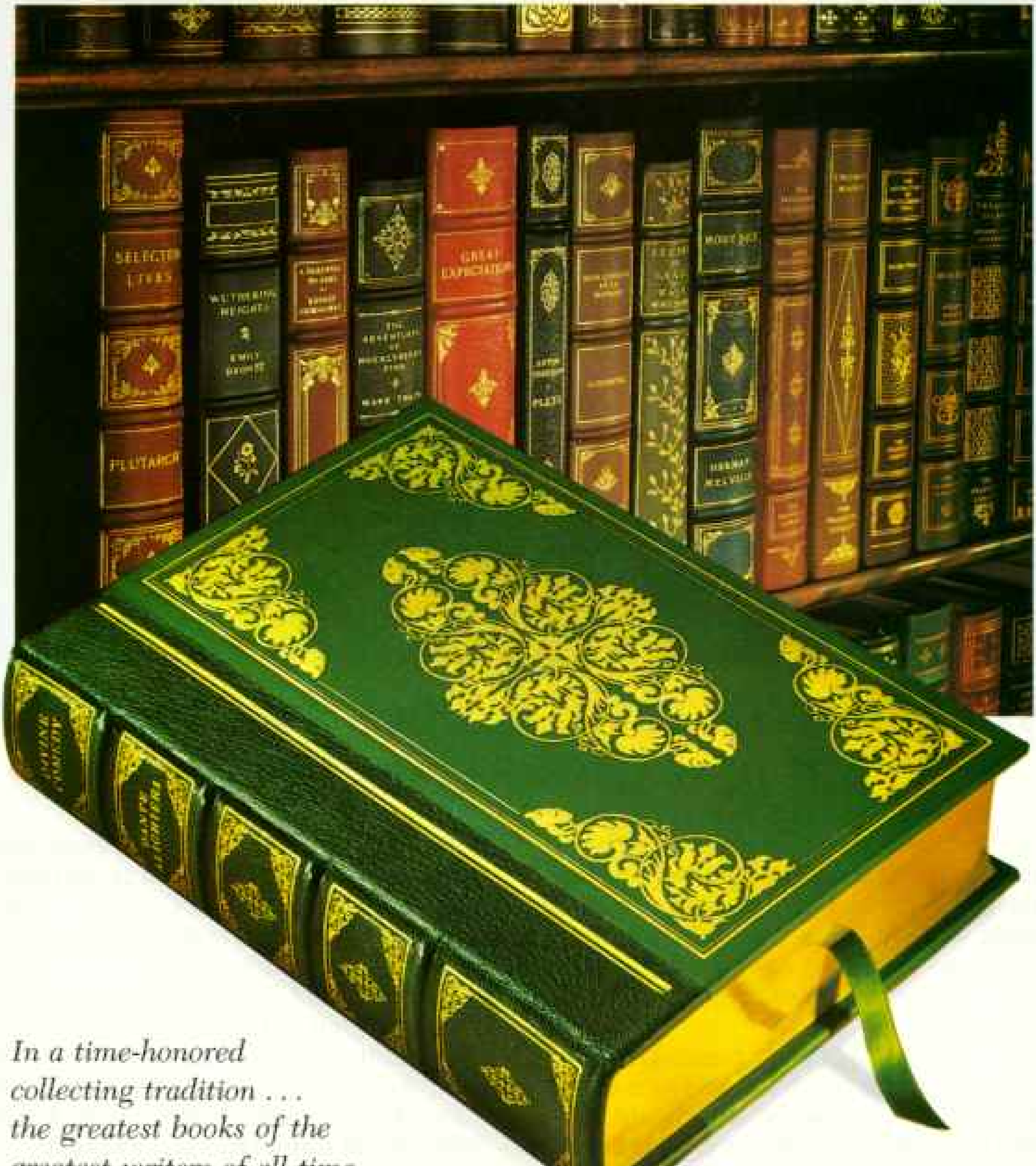
The role of vitamin C is still being evaluated, but in the meantime it's still important to get enough. So eat foods rich in this essential nutrient. To be sure, you can take a vitamin C supplement. A wide selection of formulations is available. Read the label to make sure you get your vitamin C in the amount you want.

Vitamin Communications, Hoffmann-La Roche Inc., Nutley, N.J. 07110.

Vitamins. Something you can do for your health.

RCD 3389

Build your own private library for less than $20 a month!


SELECTED LIVES
PLUTARCH
WUTHERING HEIGHTS
EMILY BRONTË
GREAT EXPECTATIONS
MOBY DICK
HERMAN MELVILLE

In a time-honored collecting tradition . . . the greatest books of the greatest writers of all time. Bound in genuine leather and fine fabrics. The leather embellished with 22 karat gold.

THE HEIRLOOM LIBRARY OF THE WORLD'S GREATEST BOOKS · Collector's Edition

- *Fifty beautiful volumes to enjoy and display in your home*
- *Issued monthly at a price not much higher than you pay for an ordinary book–just $19.50 a volume*
- *Price guaranteed for the duration of your subscription*
- *To be sure of acquiring your library at this low price, your subscription form should be postmarked by September 30, 1981*

Each volume bound in genuine leather and fine fabric . . . the leather embellished with 22 karat gold.

Imagine being able to glance up at your bookshelf, and see there your own private library. With its proud expanse of leather spines, richly ornamented in gold, bearing the titles of the greatest books ever written.

Here, clearly, would be something of permanence in a changing and uncertain world. Something to treasure now . . . and to pass along to future generations in years to come.

A treasure, indeed, you might think—but surely an expensive luxury. *Far from it.*

For this is The Heirloom Library of the World's Greatest Books. Fifty enduring works of genius, selected by a distinguished board of advisers. In the handsome Collector's Edition, crafted for posterity in bindings of leather and fine fabrics. Ornamented with exclusive designs, the spines embellished with 22 karat gold.

Beautiful books, at a guaranteed low price—yet you make no long-term commitment

The Collector's Edition of the Heirloom Library will be issued at the convenient rate of one great book per month, for just $19.50 a volume—a price *guaranteed* for the duration of your subscription. However, *you* need make no long-term commitment. You may cancel your subscription at any time, on 30 days' written notice.

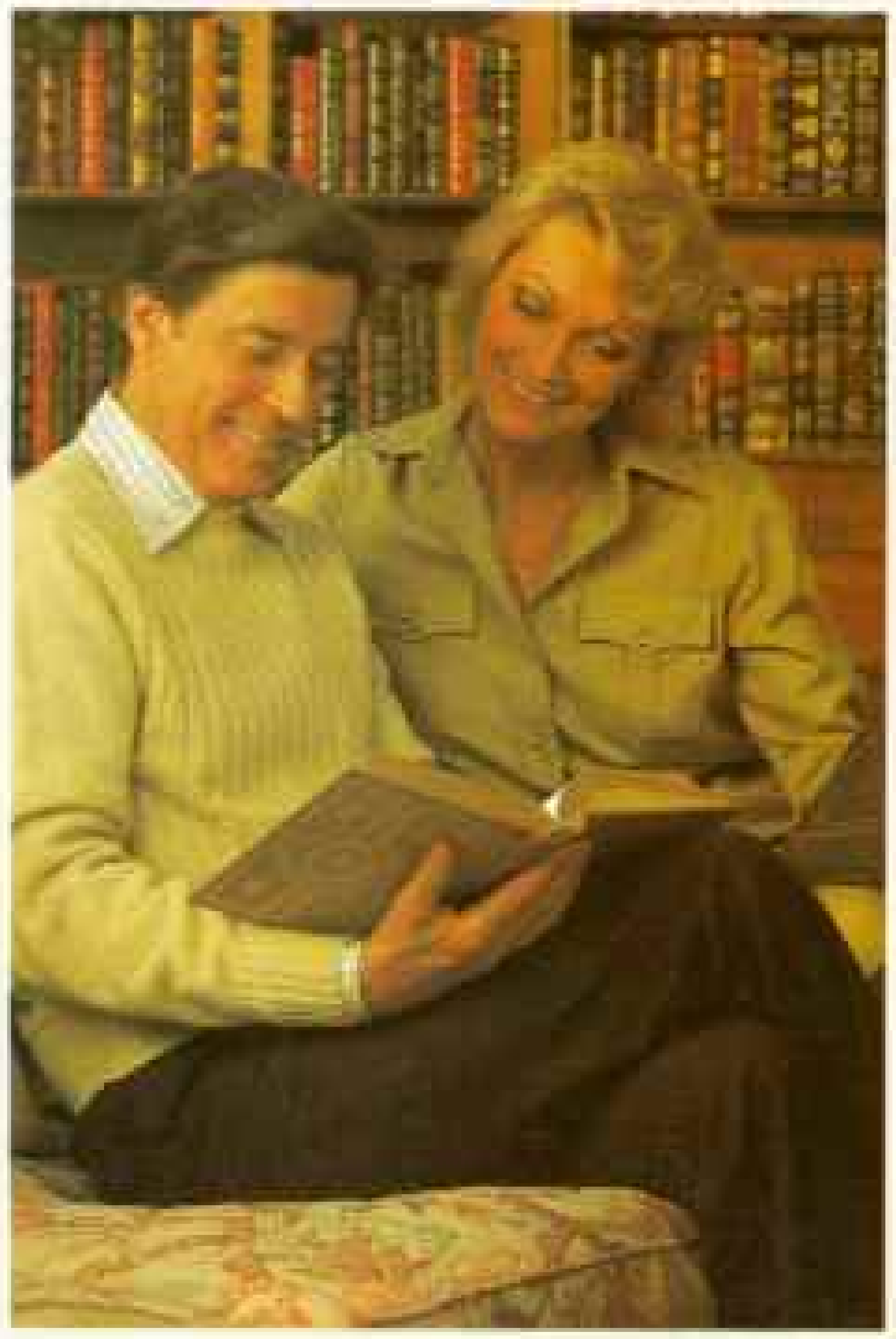
The rare pleasures of owning this personal library

As a subscriber, you would enjoy, whenever you wish, the rich pleasure of taking one of these books from your shelf—with its fragrance of leather, its satisfying weight in your hands. Then savor a moment of anticipation as you open the volume, to see your own inscribed bookplate on the decorated endpapers. And leaf through the pages admiring the burnished edges . . . the smooth, opaque paper . . . the crisp, legible type . . . the wonderfully evocative illustrations.

Above all, you would be able to enter at will . . . as one embarking on a voyage of discovery . . . the world of Hemingway or Melville, Shakespeare or Dante, Dickens or Mark Twain. The greatest books ever written, in bindings worthy of the incomparable works they contain.

Mail your order by September 30th

By the time your library is complete, even ordinary books may be selling for more than $19.50. For the costs of materials, of printing and binding, are rising almost daily. And thus it may *never again* be possible to offer subscriptions to the Collector's Edition of the Heirloom Library at this guaranteed low price. *So, to be sure of acquiring this remarkable private library for no more than $19.50 a volume, please mail the subscription form at right by September 30, 1981.*



© 1981 FM

SUBSCRIPTION APPLICATION

THE HEIRLOOM LIBRARY
OF THE WORLD'S GREATEST BOOKS

Please mail by September 30, 1981.

The Franklin Library
Franklin Center, Pennsylvania 19091

Please enter my subscription to the Collector's Edition of The Heirloom Library of the World's Greatest Books: 50 volumes, to be bound in genuine leather and fine fabrics, the leather accented with 22 karat gold. I will be sent one book per month, at the price of $19.50*, guaranteed for the entire series. However, I may cancel my subscription at any time upon 30 days' written notice.

I need pay nothing now. I will be billed for each volume in advance of its shipment.

**Plus my state sales tax, and $2.50 per book shipping and handling, subject only to postage increases.*

Signature ____________________

Mr.
Mrs.
Miss ____________________

Address ____________________

City ____________________

State, Zip ____________________

THE BOOK AS A WORK OF ART

Anatomy of an Heirloom Library Book

Traditional raised bands, long associated with the finest bookbinding.

Spine bound in genuine leather decorated in 22 karat gold.

Finely textured fabric covers, ornamented with designs exclusive to this edition.

Special Heirloom Library bookplate, inscribed with your name.

Richly decorated endpapers.

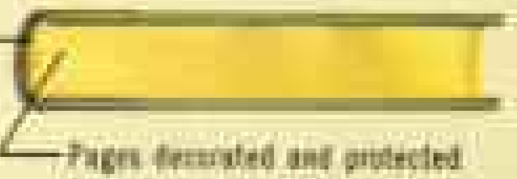
Opaque book paper, milled to endure for generations.

Handsome illustrations specially chosen—and some specially commissioned—to complement the book.

Elegant, legible type, specially selected for its appropriateness to the text.

Bound-in-ribbon marker to keep your place.

Striped headbands, specially woven for lasting strength.



Pages decorated and protected from dust and moisture with tarnish-free gilding on all edges.

Each volume is designed, printed and bound by The Franklin Library's own artists and craftsmen.

WE'RE EXXON

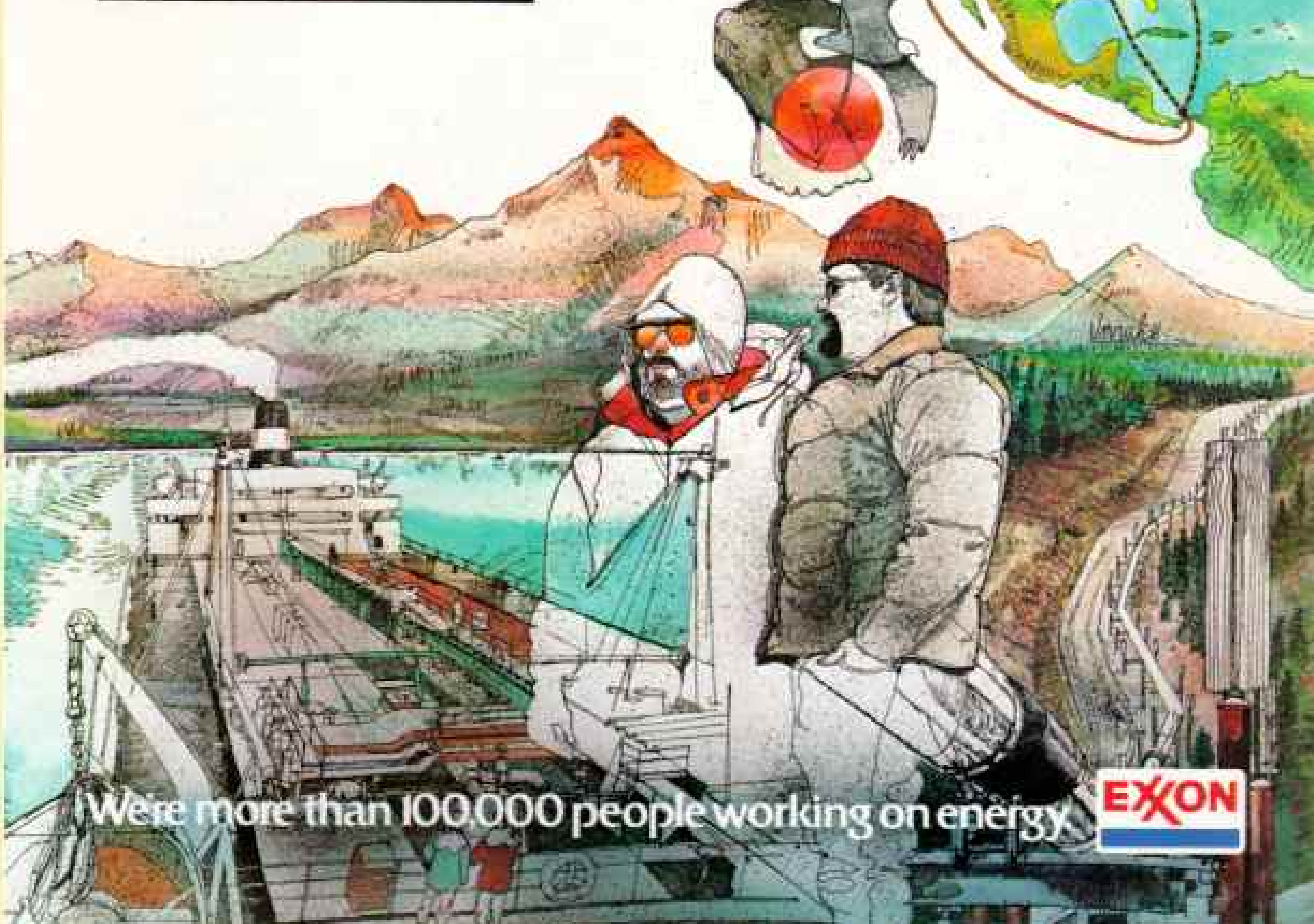
We're Dale Silcox, bringing Alaskan oil to the "Lower 48."

Tanker Captain Dale Silcox has sailed nearly all the world's oceans. Now he's traveling a new route from the Alaskan port of Valdez to the Lower 48 states and back.

Every thirty days Captain Silcox's ship, the *Exxon Baton Rouge*, brings more than a half-million barrels of oil south, from the Alaska Pipeline, either to a refinery in California, or to the Panama Canal.

At the Canal, the Alaskan oil is transferred to smaller tankers that can fit through the waterway. They continue on to our refineries in Louisiana and New Jersey.

Exxon's tanker fleet and captains like Dale Silcox are among the most important links in the distribution of Alaskan crude. That gives Captain Silcox great satisfaction. Because he's bringing American oil to the Lower 48.



We're more than 100,000 people working on energy.

EXXON

Members Forum

MOUNT ST. HELENS

Your coverage was like the eruption itself—awesome, stupendous, and magnificent.

Tom Koenninger
Editor and Vice President
The Columbian
Vancouver, Washington

How dare you, I repeat how dare you censor Harry Truman! If his words had meaning, why must we guess what they were? You have insulted me, but worse, you have insulted Harry.

Charles E. Christensen
Chicago, Illinois

Mr. Truman, who died in the eruption, had a salty way of speaking but secularized his speech when children were present. We applied his standard to our readership of more than 35 million.

I have just finished reading what you have written about my brother Harry Truman. The tears were close to the surface when I read "The mountain he elected never to leave rewarded him with an eternal embrace"—so very fitting and touching. Thank you and God bless.

Geri Truman Whiting
Castle Rock, Washington

The eruption dammed lakes and streams within 20 miles of the crater, stimulating the growth of microorganisms, including at least one known human pathogen, *Legionella*. Until we know the extent of the public health problem, precautions are warranted. Contact with the water should be avoided.

John A. Baross
James R. Sedell
Clifford N. Dahm
Oregon State University
Corvallis, Oregon

Too late for photographer Steve Raymer, who was at the mountain this summer working on an update for our December issue. His helicopter landed in a contaminated area, and he became ill with symptoms of legionnaires' disease, but with prompt treatment is well again.

SOMALIA

I am sending food to the little boy on page 763 and the lamb that he was holding. Give it to him right away from Oliver.

Oliver Stone
Oklahoma City, Oklahoma

DISCOVER
AMERICA'S NATIONAL PARKS

Plan your visit now with the new "Complete Guide to America's National Parks"

The official guide, published by the National Park Foundation, covers 353 of America's National Park areas. One easy-to-read, fact-filled volume contains everything to plan your trip efficiently: • permit/fee information • park activities • camping/hiking • telephone numbers • accommodations • supplies • first aid/hospitals • maps. An ideal gift item!

You can order copies of the *Complete Guide to America's National Parks* at $4.95 each plus $0.85 postage and handling per copy. D.C. residents add $0.25 Sales Tax per copy. (Enclose check or money order.)

Mail to: National Park Foundation
Department GP
Post Office Box 57473
Washington, D.C. 20037

(Please allow 3 weeks for delivery.)

TABASCO®
Aged for Flavor
© 1981. TABASCO is a registered trademark of McIlhenny Company, Avery Island, Louisiana 70513

I was deeply moved by your story about Somalia. . . . Maybe by making people aware of the situation there, more people will act to find solutions.

Thomas E. Stone
Lynden, Washington

ENERGY SPECIAL

If they do *not* call you "old doom and gloom," they should.

Harold A. Leach
North Webster, Indiana

The brilliant future that you have visualized in your article is but a figment of your imagination; cruel, because it creates false hope.

John E. Loskot
Baker, California

There is not now and *never* was any oil or gas shortage in this country. Either the oil companies got to you people, or are you really that naive?

Irvin Golden
Phoenix, Arizona

Your National Geographic Survey on Energy . . . comprehensive, literate, and clearly the best thing of its kind I have ever read.

David A. Morowitz, M.D.
Washington, D. C.

I wish to register my disappointment in your February issue. We threw it away. . . . We have no desire to read pages of highly scientific and technical data. It's a very strange feeling to throw away a NATIONAL GEOGRAPHIC.

Mary Frances Reineger
San Francisco, California

A few members did confuse our special report on Energy, which they received about the same time, with the regular February issue. The vast majority liked it. An additional 200,000 copies of the special issue have been bought by members, requiring us to go back to press.

SHARK SUIT

Clothing a blonde in 15 pounds of steel mesh and then offering her arm to sharks—only to have her face bitten—sounds like playing in traffic on roller skates.

Rick Hamika
Seattle, Washington

Ron and Valerie Taylor are experienced divers. We agree their experiment should not serve as an example for others less skilled.

National Geographic, September 1981

IRELAND

I am here from Northern Ireland on a one-year teacher exchange. Your article gives readers a true account of the realities of life at home. I have rarely read such an accurate and unbiased account.

Alan Turner
Pittsburg, Kansas

The author is attempting to steer the readers' opinions against the pro-British, fundamentalist Protestant majority led by the Reverend Ian Paisley.

Dennis L. Peterson
E. Greenville
Pennsylvania

Your story, I'm sure, carries the imprimatur of Her Majesty.

Patrick J. O'Connor
Staten Island, New York

There is little middle ground in Ireland, but we did our best to find it.

IOWA

Your article states that Iowa does not fit its stereotype, and yet the photos show only the stereotypes.

Virginia Hooper
Santa Clara, California

I've spent my entire life in Iowa, and your article and photos are exactly what Iowa is. I am proud of this fine heritage.

Nancy Lindstrom
Newton, Iowa

Your picture caption states that the name of the Iowan state capital "derives from the French *des moines*, meaning 'of the monks'—referring to monks who lived along the Des Moines River." The fact is that the name stems from the Moingona tribe of Indians. The French simply abbreviated the name as *Moin*. The area was designated as *le pays des Moins*. Phenomena of this kind are not rare in areas explored by the French. The word Ozark, for instance, derives from the Anglo-Saxon pronunciation of the French abbreviation of *aux Arcansas*, the Arkansas Indians, *aux Arcs*.

James A. Kilker
Professor of French
Southern Illinois
University at Carbondale
Carbondale, Illinois

We think Professor Kilker is correct.

TABASCO
Aged for Flavor
© 1981. TABASCO is a registered trademark of McIlhenny Company, Avery Island, Louisiana 70513

EVOLUTION

I consider it an insult to my intelligence to continually be told through your book that evolution has been taking place for millions of years. Evolution is not scientific. It is a theory without any basis in fact. The only reason one would continue to uphold the theory would be a strong revulsion to faith in God, as revealed in Scripture.

Curtis Dickinson
Alamogordo, New Mexico

We receive about 100 letters every year from readers who feel that our articles sometimes present the theory of evolution as a fact while ignoring the biblical account of creation, which they regard as an equally valid and scientific thesis. We make every effort to ensure that articles by scientists about their work accurately reflect that work. Evolutionary mechanisms are normally taken for granted by the majority of scientists. The GEOGRAPHIC does not, cannot, and should not referee in the field of cosmology.

PHOTOGRAPHY BOOK

Numerous times I have wondered whether you've had requests for an article on equipment and mechanics of producing those superb pictures. I'm sure many amateur photographers would be interested.

Kenneth L. Rice
St. Louis, Missouri

In response to a continuing demand, the Society is preparing a book on photography that will be available later this year.

NEW USE FOR OLD MAG

This past week we had a child break her leg at school; I needed a quick splint. So I grabbed a NATIONAL GEOGRAPHIC magazine. She was taken 80 miles away to a hospital—the doctor remarked that it was the best splint he'd ever seen and not to remove it until morning. I'm the school nurse and anxious to replace the magazine. It is good to know it was a good splint; her leg was broken three inches above the ankle.

Mary L. Linne, R.N.
Stephenville, Texas

……

Letters should be addressed to **Members Forum,** *National Geographic Magazine, Box 37448, Washington, D.C. 20013, and should include sender's address and telephone number. Not all letters can be used. Those that are will often be edited and excerpted.*

10 good

When you buy a Smith-Corona® cartridge electric portable, you get a lot more than a typewriter. You get a *total typing system.*

That's because our unique cartridge ribbon system lets you change from fabric to clean, crisp film (like the expensive office machines have) in a snap—literally. And your typing always looks just right, no matter what.

Best of all, there are two different ways of correcting. And both of them are easy, quick and effective. There's our new Lift-Rite™ correction cartridge, which works with its own companion film ribbon. It actually *lifts* mistakes right off the page! Which means you can type more neatly than ever before—and on any color paper. And our Re-Rite® cartridge covers mistakes with a thin white impression.

How Smith-Corona corrections are different (and better).

Now, it's true that other electric portables have correction systems. But none of them work like the Smith-Corona system does. For one thing, no other portable has a cartridge that snaps in and lifts off mistakes.

Coronamatic
Coronamatic
Coronamatic
Coronamatic

1. Lift-Rite correction cartridge. Lifts mistakes right off the page.

2. Lift-Rite black film cartridge. The companion film for Lift-Rite correction.

3. Re-Rite correction cartridge. It works with cartridges 4-9.

4. Black film cartridge. Like the professionals use.

5. Color film cartridge: Red.

reasons to buy a Smith-Corona.

(No other electric portable has them.)

For another thing, the Smith-Corona correction system lets you erase whole words, sentences, even paragraphs without the time-consuming single correction backspacing you have to do with many other portables and even some office typewriters.

And with Smith-Corona correction cartridges—unlike some other correction ribbons—you don't ever type over a spot that has already been used. Or have to fumble around to find an unused spot. And they never flake. Never. Or fail to correct the mistake. (We don't believe in corrections that are as sloppy as mistakes.)

The typewriter at the center of the system.

When you buy a Smith-Corona cartridge electric portable, you're buying a typewriter that's built to last. It's still made to the same exacting quality control standards that have made Smith-Corona a household word for "typewriter."

Smith-Corona typing *looks* the way typing should look. Crisp, clean, straight-as-a-die, and absolutely even. And Smith-Corona has more authorized typewriter service centers than anyone else in America—just in case something ever does go wrong. (And we might add, a Smith-Corona electric portable comes with a carrying case worthy of the machine it carries.)

So there are really ten good reasons to buy a Smith-Corona. Nine unique cartridges, and a typewriter built to give you years of dependable use. Which is something no other electric portable in the world can give you.

Smith-Corona. Makes your words (and your mistakes) sing. (Like no other portable.)

Smith-Corona

Coronomatic

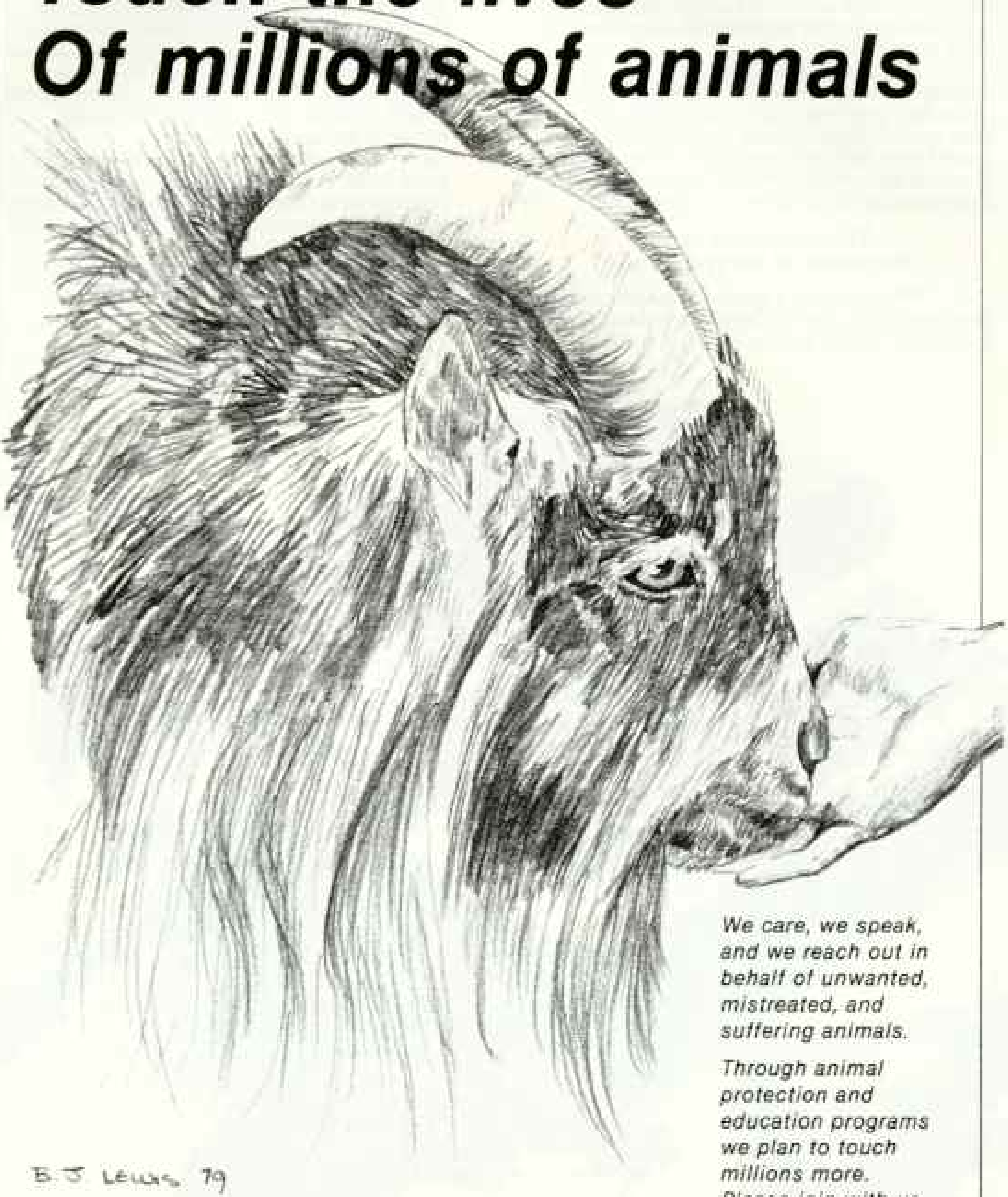
10. The Smith-Corona electric portable. The center of the system.

9. Reusable fabric cartridge.

6. Color film cartridge. Brown.

8. Color film cartridge. Green.

7. Color film cartridge. Blue.



We
Touch the lives
Of millions of animals

We care, we speak, and we reach out in behalf of unwanted, mistreated, and suffering animals.

Through animal protection and education programs we plan to touch millions more. Please join with us.

Write for our brochure: "Animals . . . It's Their World, Too!"

The Humane Society of the United States, 2100 L St., N.W., Washington, D.C. 20037

ADVANCED AND EVER ADVANCING **MITSUBISHI ELECTRIC**

Getting better all the time.

Now Mitsubishi Electric offers the first VTR with Dockable Wireless Remote Control.

Mitsubishi Electric's VHS video system was the first to achieve Speed Search. And now we're first again with Dockable Wireless Remote Control.

When the remote unit is in position on the deck, it looks like a built-in control panel. But — surprise — it pops off the VTR to allow wireless control of the 14 deck functions. Very convenient. Use it to advance or reverse tapes at seven times normal speed. That's Speed Search — made possible by an exclusive direct-drive 5-motor system and advanced microprocessor circuitry. Also advanced is the HS-310U's automatic timer. Records up to eight different selections during a full two-week period.

Just like you, Mitsubishi Electric prides itself on constant improvement. And that ongoing progress isn't limited to VTRs; it's reflected in a wide range of quality products. From home entertainment equipment, to ultra-high-speed trains.

Dockable Wireless Remote Control. It's a symbol of Mitsubishi Electric's innovative electronics. And it's a compelling promise of more advances to come.

Simulated TV picture

MITSUBISHI ELECTRIC

Mitsubishi Electric Sales America, Inc., 3030 East Victoria Street, Compton, California 90221 Tel: (213) 537-7132
Mitsubishi Electric Corporation, 2-3, Marunouchi 2-Chome, Chiyoda-ku, Tokyo 100 TELEX: J24532 CABLE: MELCO TOKYO

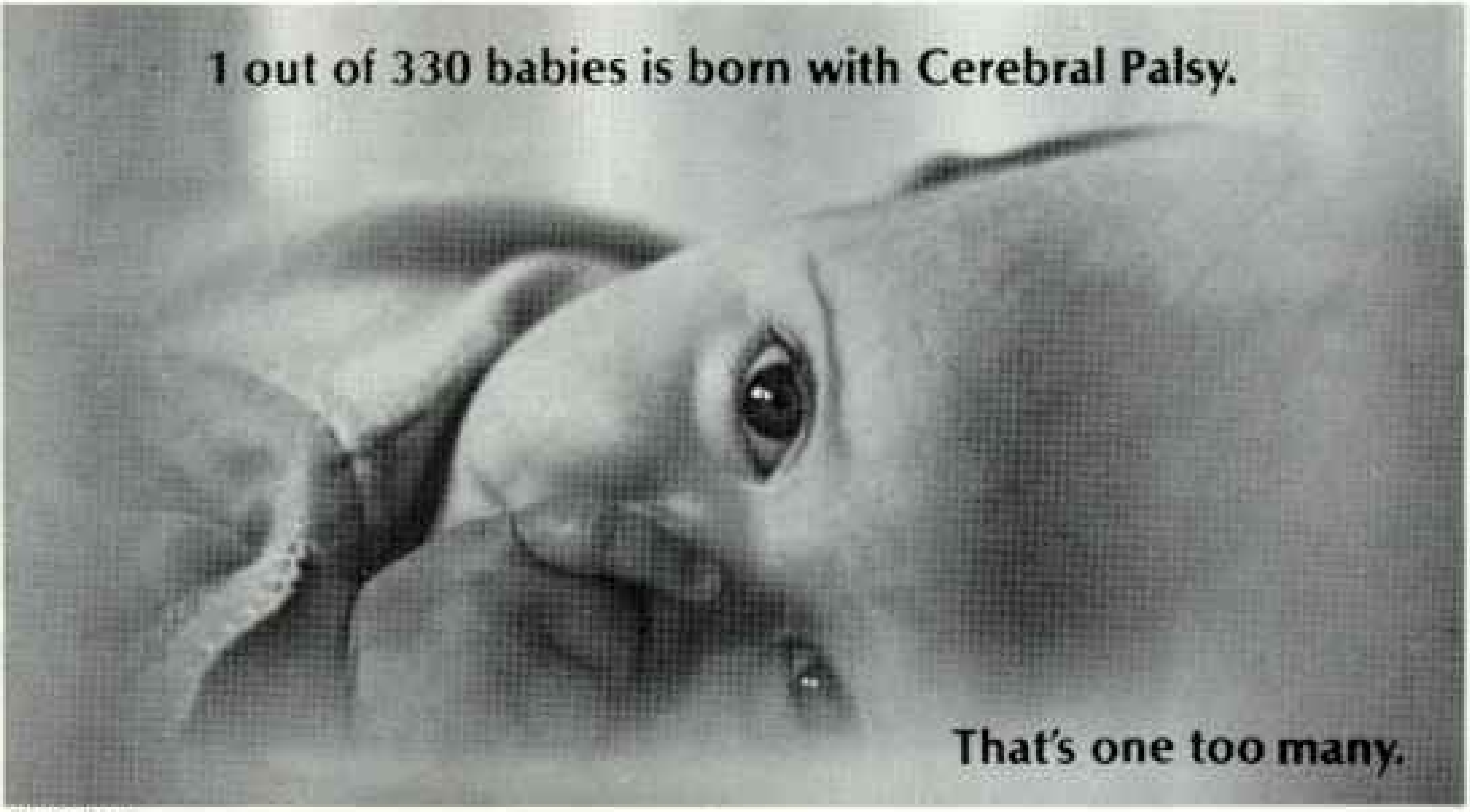
Hunter. Ironclad Quality Since 1886.

All ceiling fans are not alike. Hunter is the original. Since 1886. Whisper quiet. Cast iron housing. Fine hardwood blades. Hunter can cut summer cooling costs up to 40%, and pull warm air down in winter to save on heating costs. Models and finishes for any decor. Send $1 for 16-page color catalog. Dept. V-1, Box 14775, Memphis, TN 38114. Or telephone 1-800-238-5358 for your nearest dealer. Then put your Hunter Original Olde Tyme Ceiling Fan in your will. It's that good.

Put Some Youth in Your Life.

If you're an enthusiastic adult willing to share what you know, give us a call. There's a place for you as a club leader, a board member or a project organizer—a place to let you grow and learn and feel young. Because at Camp Fire we think growin' up in this world takes a lifetime. So come on and have a little fun growing with us.

Call your local Camp Fire council


1 out of 330 babies is born with Cerebral Palsy.
That's one too many.

Phoebe Dunn

The odds are, your baby will be born healthy. Because thanks to research and improved medical care, the chances of brain damage at birth are becoming less and less. But it still happens. So the fight against Cerebral Palsy goes on, as does the need for money to support programs that bring help to the children and adults affected by it. Whatever you contribute can mean better odds for the next generation of babies.

TO BENEFIT UNITED CEREBRAL PALSY

"We met some schoolchildren in St. George's and they were absolutely charming. Everyone here is."

Ed and Cindy Stegemann talk about their twentieth visit to Bermuda.

"We sipped champagne underneath
a Bermuda moongate.
They say it's good luck."

"Our daughters have
grown up on sweaters from Bermuda."

Bermuda

Get away to it all!

See your Travel Agent or write Bermuda, Dept. [illegible], 630 Fifth Ave., New York, N.Y. 10111 or Suite 1010, 44 School St., Boston, Mass. 02108 or 300 North State St., Chicago, Ill. 60610 or Suite 2008, 235 Peachtree St. N.E., Atlanta, Ga. 30303

TRANS-CONTINENTAL
MOVING
TRANS-CONTINENTAL
MOVING

You can count on Sears service

Few places in the U.S. are beyond the reach of Sears 16,000 service trucks—and even if you move to Ely, Nevada or Blairs Mills, Kentucky, Sears will arrange for your service and honor your warranties.

EVERY YEAR one American family in five moves to a new home. New address, new schools, new friends—but if your appliances came from Sears, the same old reliable service is only a phone call away.

If you want help hooking up Sears appliances you've taken with you, call your new Sears store in advance and let them know when you expect to move in. Sears will do its level best to be there that very day.

Every Sears store and service center in the U.S. will offer you service on your Sears appliances—and of course you can charge it on your Sears credit card.

If you bought a maintenance agreement from Sears, every Sears store will honor it.

Sears operates 16,000 service trucks, each driven by a Sears-trained technician and

Sears
National SERVICE Fleet
Sears

Sears operates 16,000 service trucks across America. It's one of the largest privately-owned service fleets in the world.

to follow you when you move

stocked with parts for Sears products. Chances are good that a single call will have things humming again.

Most American homes are within easy reach of this immense service organization. But if you happen to move beyond its range—for example, to some parts of Nevada or Kentucky or Montana—Sears will arrange for a qualified technician in a town near you to handle things. If any Sears warranty or maintenance agreement applies, Sears will pay all charges under it.

Sears service is the final link in a chain of activities that goes far beyond mere selling.

Sears works closely with hundreds of manufacturers to make sure that Sears products give customers what they want, and perform as they expect.

Sears own laboratory tests over 10,000 Sears products a year. Its suggestions have led to improvements in thousands of Sears products.

And backing up everything you buy at Sears is this famous promise:

Satisfaction guaranteed
or your money back.

Sears

© Sears, Roebuck and Co. 1981

You may be in a position to justify an airplane and not even know it.

The Beechcraft Bonanza A36TC can carry 6 people at speeds up to 246 mph.

To find out, take this simple test.

1. Do you or your people travel several times a month? Yes ☐ No ☐
2. Do you travel to, or come home to, destinations not well served by airlines? Yes ☐ No ☐
3. Have you ever been out of town two days and a night for a two hour meeting? Yes ☐ No ☐
4. Have you ever lost business or money, or both, because your top management couldn't be there, when and where they were needed? Yes ☐ No ☐
5. Do you often travel on a moment's notice? Yes ☐ No ☐
6. Do your salesmen log more time on the road than in selling? Yes ☐ No ☐

If you answered yes to any of the above questions, you'll have no trouble justifying a Beechcraft company airplane. To your accountants. Your board of directors. Or your stock holders. Because a Beechcraft means more efficient, more productive travel.

It means one of your most valuable resources, good people, can be there, when and where they're needed. And that's even more critical to small and medium sized companies, with fewer resources, than it is to large companies.

Our free Management Guide to Business Aviation shows that virtually any size company can, and has, used a Beechcraft to increase profitability and/or productivity. The size of your company isn't nearly as important as the size of your ambition. The Guide lays it all out in black and white, net dollars and capital recovery. And the more you travel, the more sense it makes.

Especially when your Beech dealer makes owning an airplane so simple. He has a unique plan for managing many of the details for you. Maintenance, scheduling, upkeep, helping to find pilots, whatever you need. So all you get are the benefits.

Send for your free 1981 kit.

If you answered yes to any of the quiz questions, write us at Beech Aircraft Corporation, Dept. AB, Wichita, KS 67201. We'll send you all you need to start thinking.

If you answered yes to all the questions, maybe you should call collect. 316-681-7072. Ask for Dick Schowalter, Jr.

Member General Aviation Manufacturers Association

Beechcraft

Be there in a Beechcraft.

The Beechcraft Baron E55. A 6-seat twin that combines speed, fuel-efficiency and comfort. Up to 239 mph.

A Raytheon Company

FOR HEALTHY EATING AND NATURAL LIGHTNESS. USE THE ONLY LEADING BRAND MADE FROM CORN.

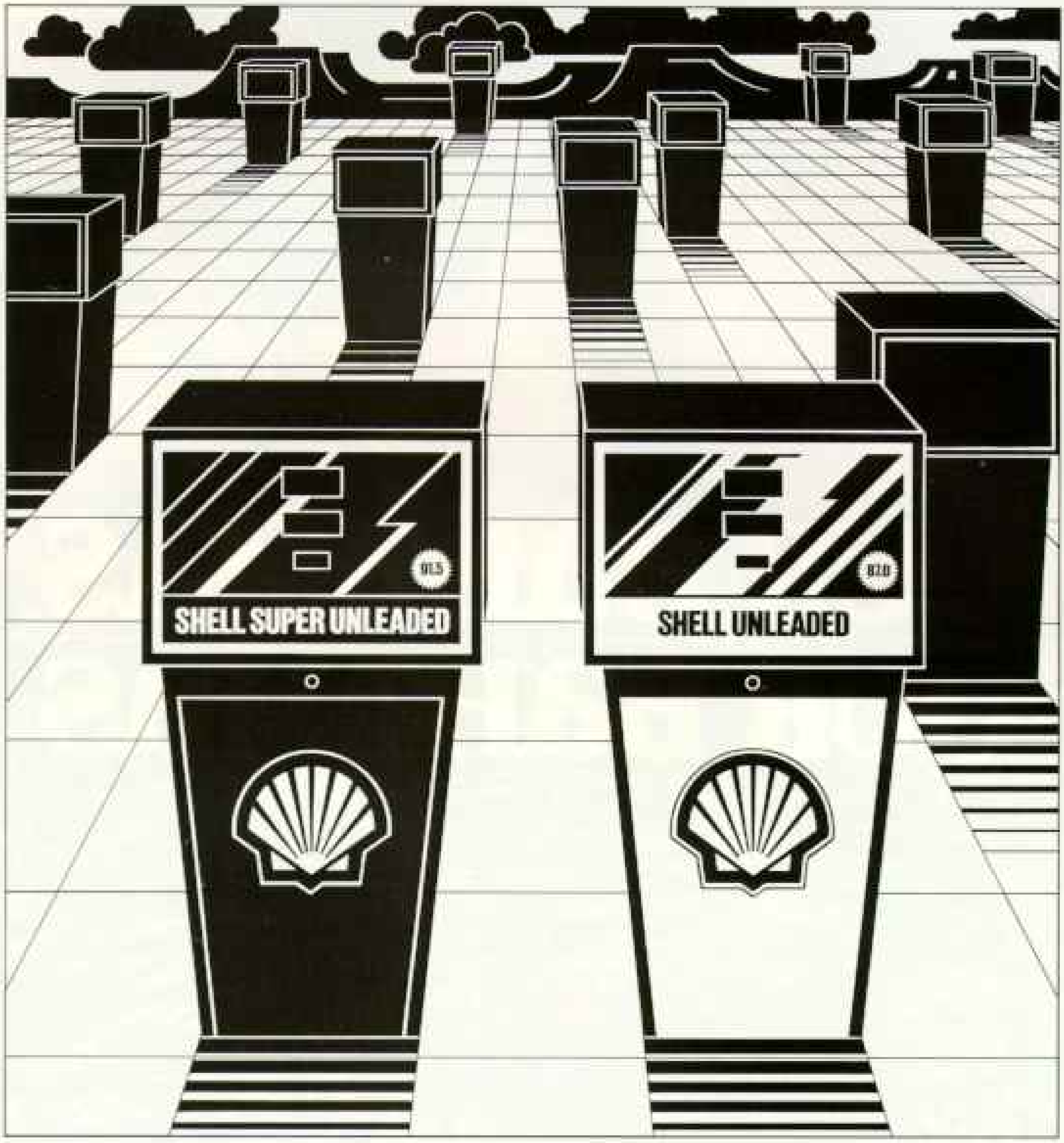
THE SOURCE IS WHOLESOME CORN. Mazola® Corn Oil is made purely from golden American corn, so Mazola is low in saturated fats and has no cholesterol, whatsoever.

NO LEADING OIL TASTES LIGHTER. So all the natural tastes of fresh foods come through. That's why Mazola is a natural with fresh vegetables and today's lighter eating.

ASK YOUR DOCTOR...
Mazola
100% PURE
CORN OIL

MAZOLA® 100% PURE CORN OIL.

© 1985 Best Foods, CPC International Inc.



Which unleaded gasoline is right for your car?

Shell has two answers.

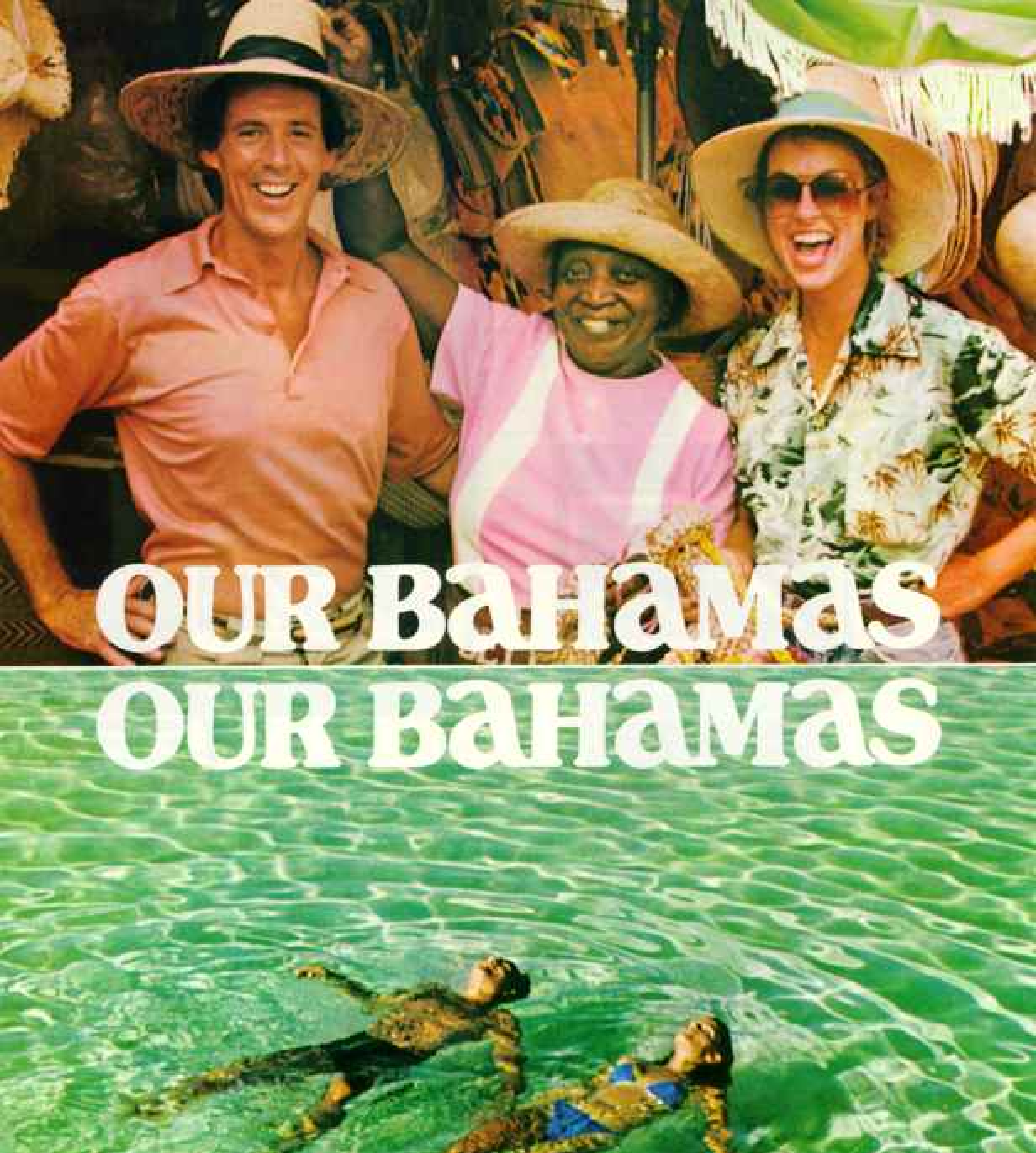
Shell Super Unleaded Gasoline, in the red pump, is for cars that need a premium unleaded gasoline with extra octane. It can help keep those cars from knocking and running on. It helps prevent hesitation and stalling, too, because it's blended for good driveability.

But not every car needs the superior quality of Shell Super Unleaded.

Maybe your car will run just fine on the lower octane of Shell Unleaded. About half of the cars that need unleaded will.

If you don't need the difference in octane, why pay the difference?

Come to Shell for answers



In The Bahamas, you never run out of things to do. Until you want to.

You really want to have some fun today? Good.

Spend a morning sailing on clear turquoise water. Splash in it. Or scuba.

Have a quick lunch of conch fritters. Then stroll about town. Browse a Straw Market. Bargain for a hat. Play some tennis before dinner. Then dig into a Bahamian lobster. Later, it's on to disco, baccarat and blackjack.

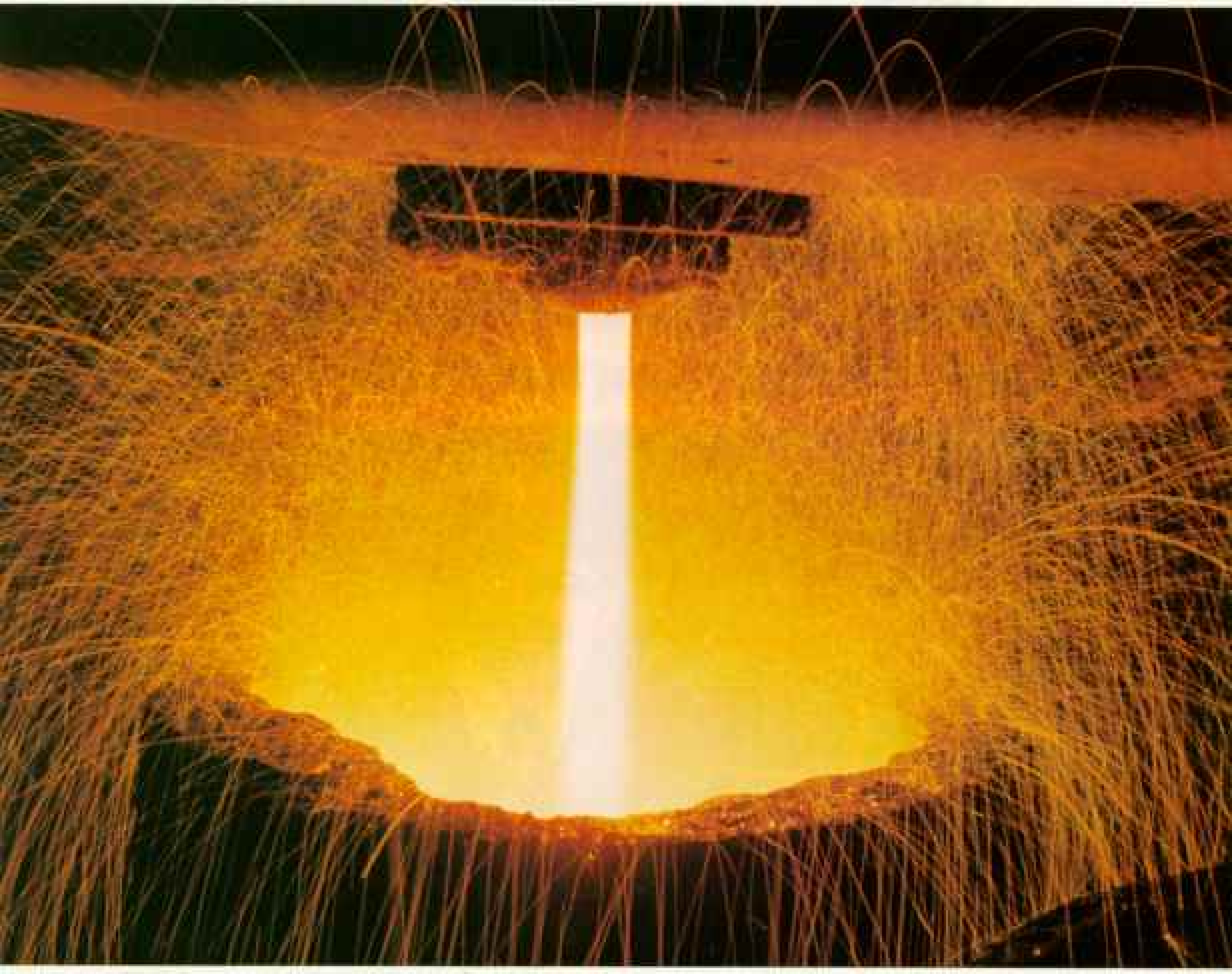
Tomorrow, let it begin at noon. Just the two of you on a beach. It's peace. It's tranquility. And it's all yours.

You can do it all. Or nothing at all. In one place, in The Bahamas.

The Bahamas, including The Out Islands of Abaco, Andros, Eleuthera and Exuma, is closer to the U.S. than any Caribbean island. For reservations and information, call your Travel Agent. Or toll free 800-327-0787. Florida 800-432-5594. Dade County 443-3821.

It's Better In The Bahamas.

Mr. President, we're in steel to stay. And to prosper.



That's a Bethlehem commitment.

Mr. President, you've called the revitalization of the American steel industry... "The first major step in the industrial revitalization of our country."

And you've taken steps to revive our economy and spur business investment...steps that we believe will help stimulate demand for steel products and provide work for steelworkers.

At Bethlehem, we realize we have a job to do on our own. So we've put our top priority on self-improvement. We're determined to make Bethlehem the most efficient... the lowest-cost...the highest-quality ...and the most profitable steel producer in the business.

We'll be satisfied with nothing less.

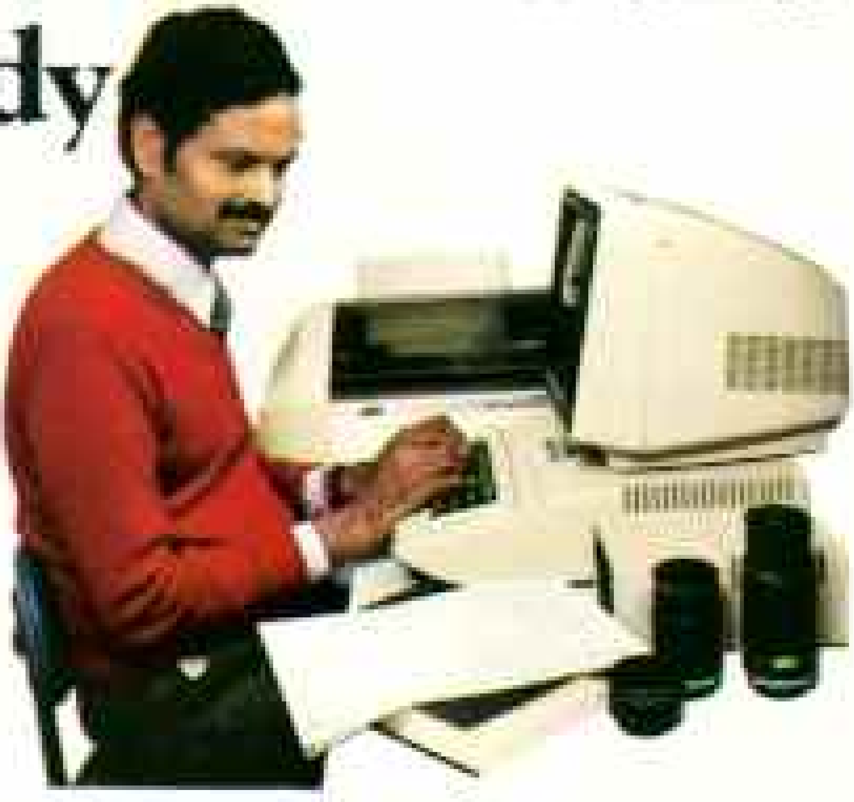
Bethlehem

Reddy Chirra improves his vision with an Apple.

Reddy is an independent optical engineer who's helped build zoom lenses for some of the biggest names in photography.

Now, a zoom lens is a complicated bit of work–and prototypes cost a fortune. So big companies have used big

computers to cut development costs and improve quality. But Reddy is on his own. He's not a big company and renting time on a big computer is expensive. So he bought himself a small computer. An Apple Personal Computer.



Can an Apple actually match the capabilities of a $1,000,000 machine? In two letters, no. But Reddy says it's powerful enough to help him choose from 250 different optical glasses and handle optical formulas with up to 80 variables.

So he's cut the time he has to spend on a big computer way, way down. And his productivity is way, way up.

That's what happened when we invented the personal computer. And that's why it's a good idea to spend some time with your authorized Apple dealer.

It'll change the way you see things.

The personal computer. apple

For the dealer nearest you, call (800) 538-9696. In California, call (800) 662-9238. Or write: Apple Computer Inc., 10260 Bandley Dr., Cupertino, CA 95014