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IT IS NO SECRET that when the Congress selected the bald eagle as our national symbol on June 20, 1782, Ben Franklin was not pleased—opting instead for the turkey. He wrote to his daughter, Sarah, that the bald eagle "is a bird of bad moral character" and "a rank coward." Ornithologists disagree on its cowardice. As for moral character, who can say? Bald eagles are thought to mate for life and may live together for 25 years, often returning to the same neighborhood to improve upon the same nest year after year.

The magnificent bald eagle (actually not bald at all, but having white head feathers) is the second largest bird of prey in North America. He—or more rightly she, since the female is larger and more aggressive—may soon be the largest if the California condor is driven to extinction, as seems possible.

After serving elegantly as our seal and symbol for 200 years, the eagle now has its day. President Reagan has proclaimed June 20 Bald Eagle Day.

This recognition could be likened to a warden commending an innocent prisoner for good behavior just before execution. In 1782 bald eagles in many thousands lived in the lower 48 states—there are fewer than 1,500 nesting pairs today. Fortunately eagles are still plentiful in Alaska, despite the bounty on their heads from 1917 to 1952 that cost some 128,000 birds.

Bald eagle adorns a quilt made by 76-year-old Madge H. Murphey of Manassas, Virginia, for the bicentennial of Washington's victory at Yorktown.

Passage of laws protecting the bald eagle, the banning of DDT in 1972, and efforts to control chemical dumping have stopped—perhaps even reversed—the decline.

We hope old baldy can continue to find enough nesting room and nonpolluted fish to hang in there. Yet concerned citizens dare not relax, for Americans continue to shoot, inadvertently poison, and crowd out our majestic bird of freedom.

We owe the bald eagle a debt of gratitude for existing at all. If Ben Franklin had had his way, our great national seal might have featured a turkey and our Boy Scouts might be aspiring to the exalted rank of Turkey Scout.

Wilbur E. Garrett

EDITOR

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COVER: *Sentinel on stilts, a mother ostrich keeps a wary eye on her hatching eggs in Namibia's Etosha National Park. Photograph by Des and Jen Bartlett.*

Sacred and profaned, the roof of the world is flooded with visitors and falling into disrepair. With outside help, Nepal has moved to safeguard the fragile environment that bears the crown jewels of world mountains—some of them the abode of gods, according to local tradition.

Preserving a

By SIR EDMUND HILLARY

Mountain Heritage

I FIRST VISITED Mount Everest in 1951 as a member of Eric Shipton's British Reconnaissance Expedition. Our objective was to reconnoiter a feasible route to the summit up the south slope of the mountain.

In the wet monsoon season we struggled across Nepal, traversing high, cold ridges and flooded rivers. On September 12, our first fine day, we crossed the pass above Chaunrikarka and looked up the beautiful forested Dudh Kosi Valley. Khumbila, the sacred peak of the Sherpas, was clear against the Tibetan sky to the north, and we knew we were fast approaching the Khumbu district on the flanks of Everest—the heartland of the Sherpas.

JONATHAN T. WRIGHT

Hammering home *his commitment to the Sherpas, whose homeland he helped bring to world attention, the author works on a school in Gumila village. Since 1953, when he and Tenzing Norgay became the first to scale Mount Everest, Sir Edmund has built 17 schools.*

Next day we climbed through pine forests up the long steep hill to Namche Bazar. This whole region was dense with greenery. Below the village, giant conifers soared, framing the snow and ice peaks that lined the other side of the valley. We moved up valley to Thyangboche Monastery at 13,000 feet, a site clothed in forest and surrounded by a ring of superb mountains. Above the giant mountain wall stretching from 25,850-foot Nuptse on the west to 27,890-foot Lhotse on the east peeped the summit of Everest—blocky and massive.

We reached Pangboche village, with its ancient monastery and tall gnarled juniper trees. Most of the junipers from here on were shrubs, but in places the forest remained, and there were ample supplies of firewood. When we turned into the Khumbu Glacier Valley, the forest had disappeared, but the dark green juniper bushes covered the slopes, and yaks grazed on the dry grass.

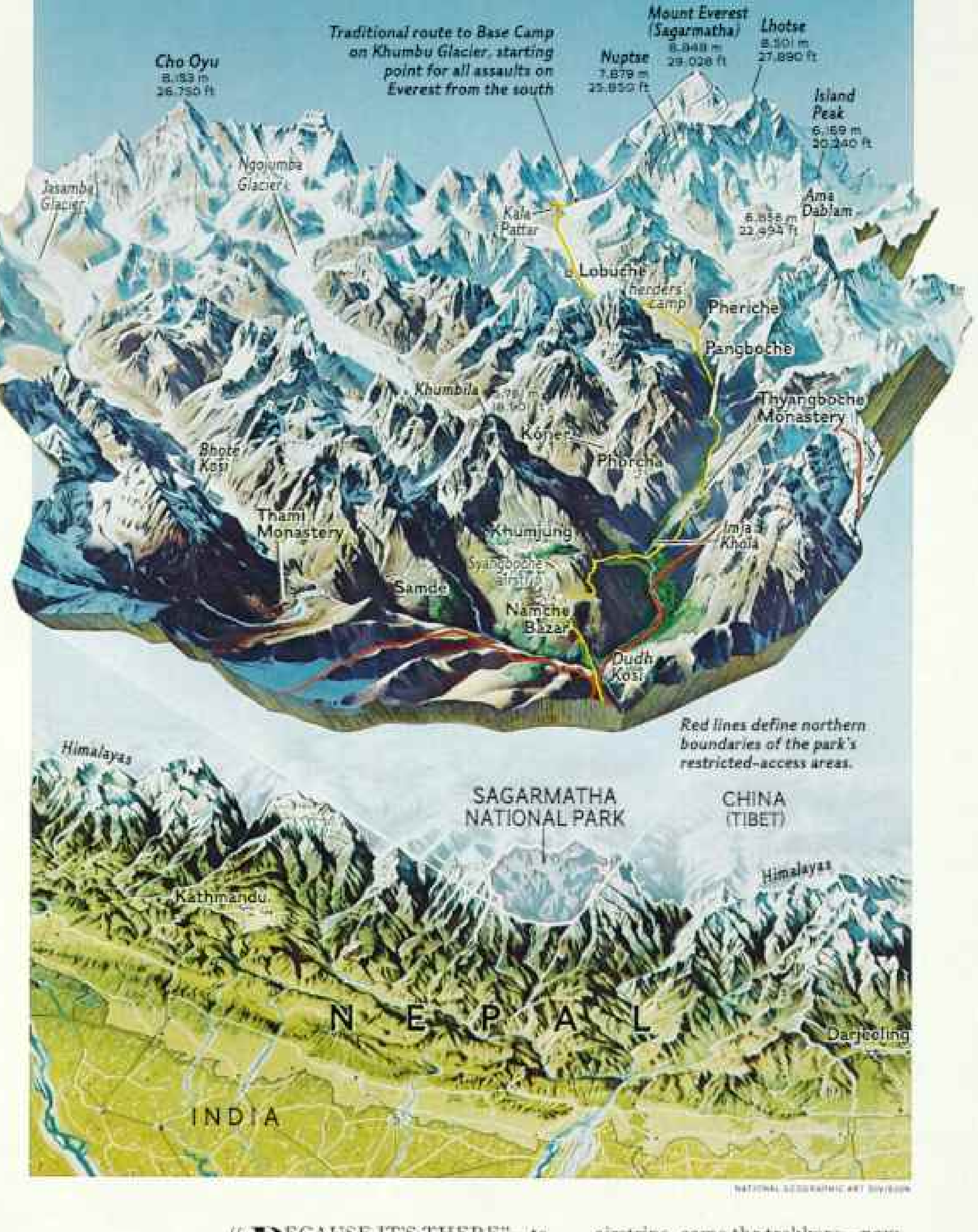
We carried on to a base camp at the foot of the Khumbu Icefall and became convinced that a feasible route existed up the south slope. Two years later, on May 29, 1953, my Sherpa companion, Tenzing Norgay, and I stood on the summit of Everest.*

ALMOST 30 YEARS LATER I repeated this very same journey. The valley of the Dudh Kosi river was still very beautiful, but the forest was woefully thinned by the axes and saws of the Sherpas, cutting timber for buildings. The trees below Namche Bazar were scarred by the *kukhris* (heavy knives) of Nepalese porters taking branches and bark for fuel. The forests around Thyangboche had lost many of their mighty trees, and the Pangboche area was almost bare. Up the Khumbu Glacier Valley there was hardly a juniper to be seen.

What had happened to produce such a change? Our conquest of Everest brought mountaineers of many nations eager to attain the top of the world. Fuel for their expeditions rapidly exhausted supplies of the widespread juniper—but at first the forests themselves were left almost untouched.

In a way, I was inadvertently responsible for the subsequent damage to the forests. In the early sixties I made an effort to assist

*Sir Edmund's account of "The Conquest of the Summit" appeared in the July 1954 GEOGRAPHIC.

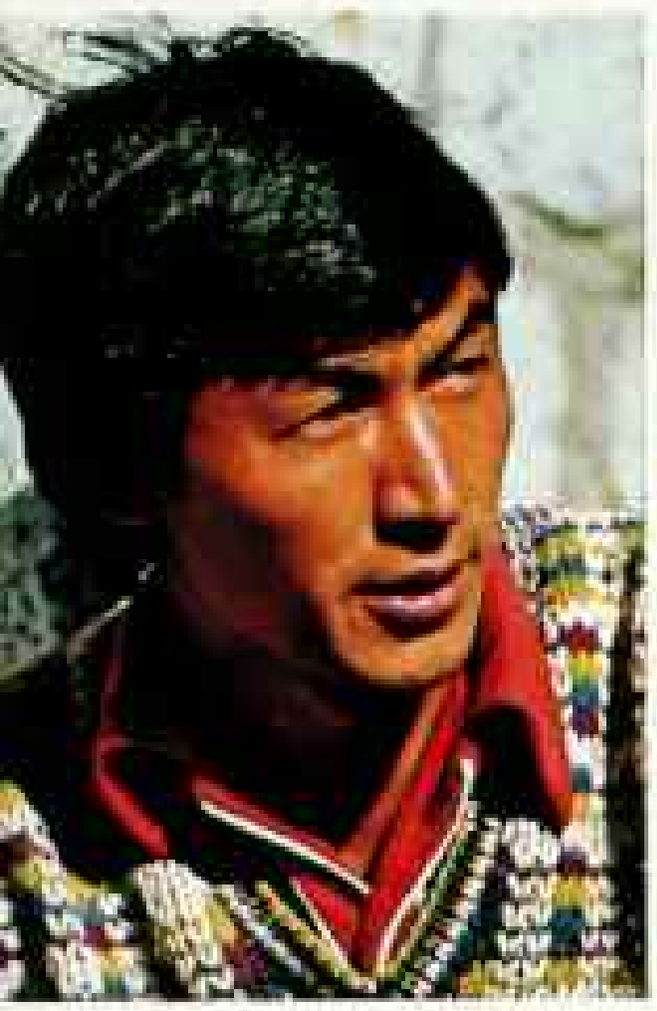


"BECAUSE IT'S THERE"—to borrow mountaineering's most quoted phrase—Everest, the world's highest mountain, has transformed Nepal's Khumbu district into a shrine. After the kingdom opened the region in 1950, first came the climbers, walking 175 miles from Kathmandu. Then, aided by two airstrips, came the trekkers—now more than 5,000 a year, or twice the local Sherpa population. At the author's behest, New Zealand and a number of world conservation groups volunteered funds and staff for a national park to halt environmental decline. Last year Nepal assumed operation of the 480-square-mile park.

Sagarmatha, *the Nepalese call their national treasure and its surrounding park. The peak's 1865 name honors British surveyor Sir George Everest. Mount Everest, left, its back in Tibet, joins Lhotse, center, and Nuptse as a cradle for*

NICHOLAS DEVORE III

Khumbu Glacier, traditional southern route to the summit. Booked years in advance, these slopes offer a veritable world climbing Olympics each spring and fall for expeditions employing scores of Sherpas.



*"**My biggest job** is to teach my own people to believe in the park," says Sherpa Mingma Norbu, who was born in the village of Khumjung (**facing page,** background, with Ama Dablam rising in the distance). Forest-conservation laws, unpopular with the wood-burning Sherpas, pose the new park warden's most difficult enforcement problem.*

NICHOLAS DEVORE III (ABOVE) AND SCOTT ROWED

my friends the Sherpas by building schools, hospitals, bridges, and water pipelines. To help in the transport of building materials, my group constructed an airfield at Lukla. But the airfield had an unexpected effect—it gave much easier access to the Everest area, and increasing numbers of trekkers and tourists accelerated the demand for fuel.

By 1973 I realized that some sort of control would have to be exerted if the Khumbu district were not to become a treeless desert. The Khumbu was a very remote area, government administration was very difficult—and government funds were hard to come by. The answer seemed to be the establishment of a national park.

In October 1973 I talked with the United Nations adviser on forestry in Kathmandu, who had already been discussing a park with B. N. Upreti, director of Nepal's national parks. It was felt that outside help was needed. New Zealand was a country with a topography similar to Nepal's and a well-developed national park system. Would New Zealand be prepared to help get the Sagarmatha National Park established? (Sagarmatha is the official Nepalese name for Mount Everest.)

I approached the New Zealand Ministry of Foreign Affairs and, astonishingly, got immediate action. A three-man mission was sent to Nepal and reported favorably. In 1975 the first New Zealand national park adviser moved up to Namche Bazar: The Sagarmatha National Park was under way.

The 1970s were a period of tremendous expansion in the Khumbu. Five thousand foreigners a year now visit the Everest region. Dozens of hotels were constructed. *Char* (tea) shops and *chang* (beer) shops abounded. The weekly bazaar at Namche was thronged, as Nepalese vendors offered food and fuel to visitors and their porters. The forests suffered as the demand for firewood and building timber escalated.

All this put great pressure on the area, but even more of a problem were the grave doubts the Sherpas had about the national park. They worried that it might restrict both their firewood supplies and yak grazing pastures. They even feared they might be moved out of the park to leave it to the trees, wild animals, and tourists.

In the 1976 elections of the *panchayat* (village council), all the chief candidates were anti-national park. One, an old friend of mine, Khunjo Chumbi, was aware of my original support of the national park and commented in his speeches that "Hillary first brought sugar to the lips of the Sherpas, but he is now throwing salt in their eyes."

I had to agree that his concern was valid. The economic temptations offered by thousands of well-heeled foreigners have much appeal to the Sherpas. Local resistance to controls on firewood has made the national park slow to enforce regulations against its use by expeditions and trekking groups, and efforts to make other fuel sources, such as bottled gas and kerosene, readily available in Namche have proved ineffective. The fuel problem remains serious.

NOW New Zealand's aid program is completed, and the Nepalese are on their own. Sherpa Mingma Norbu (above), who spent five years training in New Zealand, is in charge of forestry and other outdoor park activities. The future of Sagarmatha National Park may well depend on him. If he can persuade his people to cooperate with the park programs, if he can discipline the mountaineering expeditions that are often arrogant in their demands for fuel, if he can ensure that trekkers and tourists bring with them all the fuel they need—then maybe the park will succeed.

It is all in the balance—a superb national park or a treeless desert. With courage and imagination, it can be a superb park. * * *

Park at the Top of the World

By RICK RIDGEWAY

Photographs by NICHOLAS DEVORE III

I ENJOY HIKING in lands far from automobiles and buses because anywhere people must walk from place to place you can expect good trails. The path leading to the village of Namche Bazar—only 18 air miles from Mount Everest—was no exception: a steep, switchbacking staircase of fitted stones smoothed by the passage of generations. With still an hour to go before I arrived at this Sherpa trading center, sweat beaded my forehead. Even at 11,000 feet in April, the noon sun sapped strength.

Claire McAuliffe, a 34-year-old paralegal adviser from San Francisco, hiked a few paces behind. We had met the day before on board a twin-engine Otter flying from Kathmandu, capital of Nepal, to Lukla, a tiny airstrip servicing the Everest region.

I had hiked this trail once five years before, and now I recognized a bend ahead that provided a vista far up the valley. "Just up there we get our first view of Everest," I said to Claire.

"I hope I don't start crying again," she replied. We had already seen Everest from the airplane—and that is what brought on Claire's tears. "I've backpacked in the Sierra and the Tetons," she said, "but nothing prepared me for that view of the Himalayas. I was so overwhelmed I cried."

Claire's goal, like that of most trekkers to the Everest region, was Kala Pattar, a mountain vantage point that, at 18,200 feet elevation, offers a panoramic view of Mount Everest. She hoped to reach there in a week. I intended to continue past Kala Pattar another half day to Base Camp, at the foot of Everest, where expeditions begin the rigorous ascent.

Trek Recalls Earlier Trips

The thought of returning to Base Camp filled me with nostalgia. My visit five years before was as a member of the American Bicentennial Everest Expedition, and it was at Base Camp that our team headquartered for the 44 days it took to ascend the mountain. Though I have been to the Himalayas several times on climbing expeditions, this present journey was my first as a trekker.* ("Trek" is a South African word meaning a slow, arduous journey, but it is used in the Himalayas to describe a multiday hike, usually with porters.)

The goal of my trek was Sagarmatha National Park. Sagarmatha is the Nepalese name for Mount Everest, which the Sherpas regard as the "Goddess of the Universe."

*The author was also a member of the first successful American expedition to climb K2. See the May 1979 issue of NATIONAL GEOGRAPHIC.

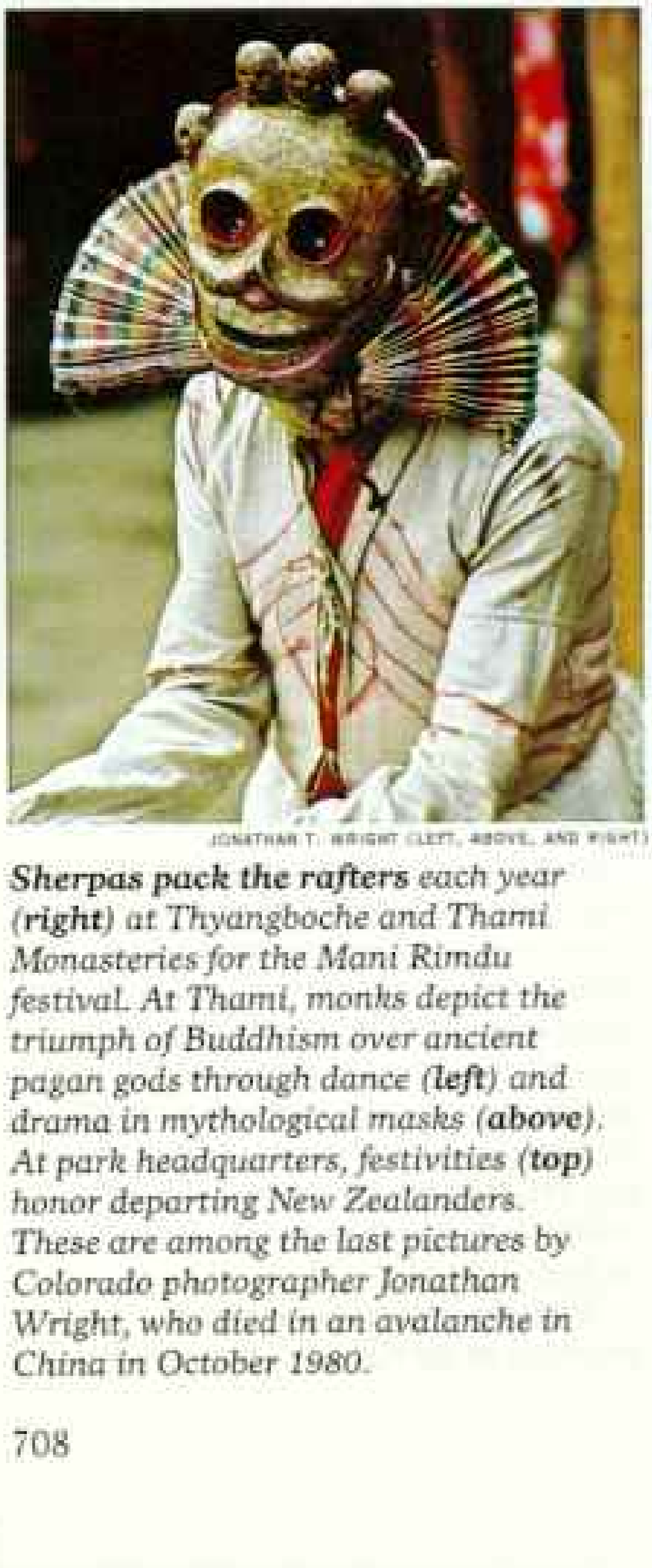
A bold concept, *the inclusion of an indigenous people sets Sagarmatha apart from most of the world's national parks. Home to some 2,500 Sherpas, such as 17-year-old Changi Phuti (**right**), the park is gradually gaining their acceptance after initial fears that it would disrupt their livelihoods.*

JONATHAN T. WRIGHT

***Home of tigers**—the "Tigers of the Snow," as Sherpa climbers are known—Namche Bazar fills a natural amphitheater near the park entrance. From here, a major Sherpa trading center, depart most hiking and climbing expeditions, trailing a majority of the region's men, loaded with gear. Many are gone for six months of the year, or all the spring and fall seasons, when wives and children tend crops and mind the livestock pastured in grassy upland valleys.*

*With the Saturday market in progress, at far right, Namche cools under a post-rain mist. In June, when several species of rhododendron **(left)** that embellish park trails have begun to seed, Namche's men will return home in time for the monsoon rains.*

Long before the coming of climbers, Sherpas were in the portering business. Strategically located between Buddhist Tibet—their ancestral homeland—and Hindu kingdoms to the south, they found livelihood as traders and bearers. Portering, today's chief source of Sherpa income, has grown more dangerous because mountains are now goals, not obstacles.



JONATHAN T. WRIGHT (LEFT, ABOVE, AND RIGHT)

Sherpas pack the rafters *each year* ***(right)*** *at Thyangboche and Thami Monasteries for the Mani Rimdu festival. At Thami, monks depict the triumph of Buddhism over ancient pagan gods through dance* ***(left)*** *and drama in mythological masks* ***(above)****. At park headquarters, festivities* ***(top)*** *honor departing New Zealanders. These are among the last pictures by Colorado photographer Jonathan Wright, who died in an avalanche in China in October 1980.*

Down to earth in a lofty land, *Sherpa villagers husband with great prudence the hillside soil they have terraced. Most of their stone-walled fields, like these in*

Established in 1976 to safeguard an area of "major significance not only to Nepal but also to the rest of the world," the 480-square-mile park contains three of the world's highest mountains: Everest, Lhotse, Cho Oyu.

The fledgling park faces many problems, the result of too many people using limited resources. It has to administer not just a natural area and its wildlife, but also a native people, the Sherpas. The Sherpas' need for grazing land and firewood would be in better balance with the region's ecology were it not for the demands of the trekkers. In the past decade the number of trekkers has increased exponentially: Four thousand came to Nepal in 1971; in 1981, 20,000—and 5,000 visited the Everest region. Annual visitors to Sagarmatha National Park now outnumber Sherpas two to one.

Despite their impregnable appearance, the Himalayas are a fragile environment. The demand of Sherpas and trekkers for firewood has left some slopes deforested, exposed to erosion. What are park officials, Sherpas, trekkers doing to meet the challenge to preserve this great national park?

With this thought, I reached the bend and, looking up the valley, I saw Everest. Though partially veiled behind the shimmering snow-and-rock rampart of the

Phorcha, are planted in potatoes, a 19th-century import. As devout Buddhists, Sherpas can eat meat but must hire others to slaughter their livestock.

Nuptse-Lhotse wall, and surrounded by other giant peaks, it was immediately recognizable: It alone flew a plume, the banner cloud that streams to leeward of its black, pyramidal summit, which, like others in the area, punctures the jet stream.

Claire arrived, and for a long time we stood silent, staring. Then she said, "I feel like I'm going to cry again."

"Tigers of the Snow" Earned Respect

Everest straddles the Nepal-Tibet border, and it is only in the past 32 years—since Nepal opened its borders to outsiders—that Everest has been approached from the south. In the 1920s and '30s, when the first expeditions tried to climb Everest, they had to attempt the north side, following a roundabout route from eastern India, journeying north, then west across Tibet. This approach, all on foot, was nearly 300 miles.

Those early expeditions hired Sherpas who had been working in India. For generations Sherpas had been traders, freighting goods over high, glaciated passes. Recognizing these mountain skills, the expeditions hired Sherpas to backpack food and equipment high on Everest. Many proved so strong that they earned the nickname "Tigers of the Snow."

Those early Everest expeditions all failed; so when Nepal opened up, climbers were quick to seek a possible route on the south side of Everest. On May 29, 1953, Edmund Hillary, a New Zealand beekeeper, and Tenzing Norgay, a Sherpa on his seventh trip to Everest, stepped onto the summit in time for the news to crown Queen Elizabeth's coronation. Hillary was knighted, and Tenzing's fame made the word Sherpa recognizable the world over.

Today climbers must line up years in advance to try Everest. With Tibet again open, climbers for the first time can attempt Everest from all sides, and sometimes three or four groups at a time are trying different routes. Those who have reached the summit, though, still form an exclusive club of little more than a hundred members.

Employment as high-altitude porters is important business for Sherpas. On our successful 1976 Everest climb, we hired 46 Sherpas to cook and carry food, equipment, and oxygen to camps as high as 27,450 feet. With so many trekkers now coming to the Himalayas, guiding groups of hikers is even more important to the Sherpa economy. In Namche Bazar more than 80 percent of the households benefit from money spent by mountaineers and trekkers.

New Zealanders Bow Out

Returning to this charming village, with its some 140 houses arranged horseshoe-shape on a steep hillside, I hoped to look up Sherpa friends from our expedition. They were all away on climbs or treks. This new business may be bringing more money to Sherpa families, but it is also bringing problems: With so many months of separation

each year, the divorce rate here is rising.

On a hilltop above Namche Bazar I came on the biggest change since my previous visit, a complex of half a dozen or so buildings: Sagarmatha National Park headquarters. The smartly designed, stone-wall-and-tile-roof buildings had been constructed over the past six years by a succession of four park advisers, all from New Zealand.

I found the last of these, Mal Clarbrough (page 715), and his wife, Margaret, in their small cottage among the headquarters buildings. Tall and sinewy, with a bushy yellow beard, Mal looked more lumberjack than ranger. "Come in," he said with a wide smile, and before I could sit, Margaret had a cup of tea in my hand.

Sir Edmund Hillary had taken the idea for a national park to his own country to seek support; New Zealand agreed to help fund

RICK RIDGEWAY (ABOVE)

Bending the law, *Sherpa youths finish quietly what a noisy ax began (**top**). Cutting green wood from the park's ailing forest cover is illegal. Trekkers, though required by law to bring their own fuel, are the most profitable customers for baskets of firewood (**left**). In a park nursery New Zealander Lawrie Halkett (**above**) inspects tender seedlings for a reforestation program.*

the development for five years, to construct buildings, to provide advisers, to assist the Nepalese in devising a management plan. I arrived at a critical time, when this collaboration was near its end; in a few weeks the total operation of the park was to transfer to the Nepalese.

"Margaret and I have been here a year now," Mal said, "and it will be sad to leave. You grow fond of this place fast."

I think he regretted leaving behind unsolved problems. "The thorniest controversy surrounds cutting firewood. We've got a law against cutting green wood in the park, but it's hard to enforce. Up the valley they're getting 50 rupees [about $4.00] a porter load, and selling firewood is big business."

While much of the wood is sold to trekkers, the Sherpas also need it to heat their homes and cook. Without alternative fuel, many Sherpas resent the no-cutting-green-trees rule, and have grown cynical about the park in general.

I later suggested to a Sherpa that the tree-cutting rules were, in the long run, in their best interest. "Otherwise, what will you do when all the trees are gone?"

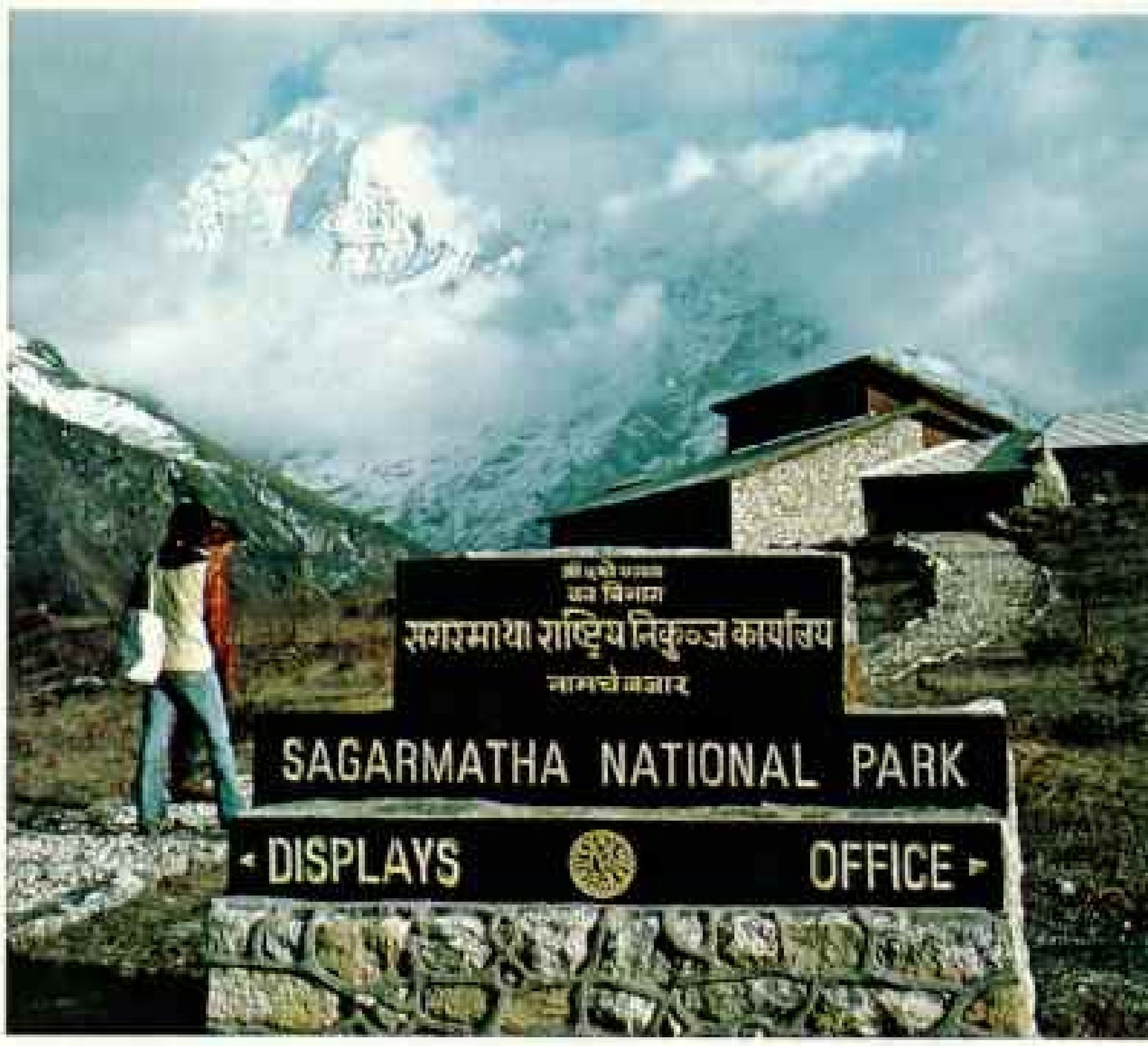
Tired of outsiders telling him what to do, the Sherpa replied heatedly, "What will you do after you've blown up the world with your bombs?"

Park officials realize that to enforce the cutting rules reasonably they must supply alternative means of producing energy. The management plan calls for limited use of solar energy for communications and for heating water at Kunde Hospital, and eventual construction of a series of small hydroelectric plants.

Warden Strives for Cooperation

The answers to these problems are in large part in the hands of a handsome 26-year-old Sherpa named Mingma Norbu (page 702). Mingma had been appointed junior ranger of the park, and along with Syam Bajimaya, the senior ranger, was scheduled to run the park after the New Zealanders left.

I found Mingma (who has since become the park warden, replacing Bajimaya) in his one-room dwelling behind Mal's house. I noticed that he spoke English with a distinct New Zealand accent. "I spent five years there in college, studying forestry and park management," he said. "My main concerns are the visitors' center, the reforestation project, and public relations—trying



SCOTT ROWED (LEFT)

*Last New Zealander at park headquarters (**right**), Mal Clarbrough (**above**) says, "We're leaving it in good hands." Warm as the open hearths in many wayside guesthouses (**left**), Sherpa hospitality can help ensure the park's success.*

to win the Sherpas over to the park.

"I've got to enforce laws that are not always popular," Mingma continued. "Yesterday I had to get after my best friend for burning a fire outdoors—against park rules. I know I'll be unpopular, until the people understand my position."

Mingma has some ideas to further that understanding. He has $10,000 from the World Heritage Fund to restore Buddhist temples within the park. "I'm going to hire Sherpas for the work, get them involved. Religion is important here." Mingma also plans to use Sherpa labor on trail and bridge maintenance and reforestation.

Most important, he feels, is a class he conducts in grade school. "I teach the kids forest conservation. I tell them if they don't believe our forests are disappearing to go home and ask their granddads what the forests looked like when they were kids."

To emphasize his point, Mingma invited me along to visit *his* grandfather. We found old Nima Tashi sitting on a homespun blanket, quartering potatoes for planting. The old man's shirt was open to the bright morning sun, and his gray hair, braided in two long ponytails reaching nearly to his waist, was topped with an Aussie hat, the type with one side turned up. Nima Tashi is 87, with a face as sculpted as the mountains in which he has passed his life.

When he saw us, he smiled and called for chang. A woman appeared and produced three glasses, filling them with the thick, milky rice beer that is the Sherpas' favorite drink. I took a sip and the woman insisted on refilling my glass. This is the custom, and it is impolite to refuse until after downing three glassfuls. The ritual can leave you tipsy, especially in bright sun at 13,000 feet.

Nepal's national bird, *the Impeyan pheasant (***above***) is one of 120 species in the park, which include the golden eagle and the great Himalayan griffon vulture. Park protection has increased its population and that of the Himalayan tahr (***facing page***), a goatlike creature that mocks gravity. Other park mammals include musk deer and the rarely seen snow leopard.*

The Re-greening of Sagarmatha

After a couple of glasses old Nima Tashi started to tell stories, and Mingma translated: "My granddad says now there are only stumps or bare ground, but 40 years ago there were thick forests around Syangboche [a short walk from Namche, now the site of an airstrip]. He remembers how thick they were because when they prepared a caravan to Tibet, it would take days to find the yaks among the trees."

What does he think about the national park? "He says it is still young, and we have to wait and see. But he thinks the reforestation is a good idea. It takes a long time for trees to grow, he says, but we have to think of our great-grandchildren."

The reforestation project is under way: the fencing of two plots of land for later planting of seedling trees. Lawrie Halkett (page 713), the young New Zealander in charge, took a break from stretching barbed wire to give me a tour. Volunteering their labor were a dozen men and women from the German Alpine Club, on their way to climb 20,240-foot Island Peak.

Lawrie and I crossed the steep hillside, hopping boulder to boulder. "My wife and I

have been here 18 months," he told me, "but we leave in a few weeks at the close of New Zealand's participation. It's a little difficult, you know, planting trees. You don't really see results for 40 years."

Despite the long-term payoff, and hands bloodied by barbed wire, Lawrie seemed undaunted. As we whisked along the fence, he said, "We're growing mostly blue pine and silver fir in two nurseries. One is below Namche, the other near Thyangboche."

I said I was continuing to Base Camp tomorrow via Thyangboche, and he volunteered to go along and show me the nursery.

There Lawrie took me on a tour of 20,000 seedlings. Two attractive Sherpa women were watering the three-inch-high trees, which would be ready for planting in June, at the beginning of the monsoon.

"This project is small scale," Lawrie said, "but it will help educate the people to the importance of forest conservation."

Finished watering, the two women insisted we share a bowl of boiled potatoes with them. One pulled out a canteen and poured glasses of chang. An hour later I was still pleading I had to get to Thyangboche before dark. "One more glass," they insisted.

Fueled with high-octane chang, I made good time toward Thyangboche Monastery. Darkening clouds shrouded the higher peaks, and many Sherpas I met predicted an early monsoon. The mood was eerie.

The hike to the monastery was wonderful for observing wildlife. I spotted two Himalayan tahrs, goatlike animals that grow to 200 pounds, with brown ruffs and short horns. I flushed two male Impeyan pheasants, scintillating in nine iridescent colors. The Impeyan is the national bird of Nepal and an unforgettable sight sparkling against the backdrop of a distant glacier. Sagarmatha has about 120 species of birds.

The area is said to be frequented by musk deer, but I didn't see any. Despite protection of law, this dwarfish deer was extensively

Only yaks are unmoved *by the vistas at Lobuche Camp, where trekkers leave their tents for a day trip to 18,200-foot Kala Pattar—loftiest goal for most park visitors. At the right lies cloud-shrouded Nuptse Ridge.*

poached for a small gland on the underbelly of males, used to make a perfume popular in the Orient. (The poachers were outsiders from down-valley tribes; Sherpas, being strict Buddhists, abhor killing.) Now the Chinese have learned to raise musk deer and tap the gland without killing the animal. Despite that breakthrough, the black market for Nepalese musk oil continues to flourish.

The area is rich in flora too. From below the monastery I could see distinct forest zones of Himalayan birch, blue pine, and silver fir mixed with juniper. The forest surrounding the monastery was lush with rhododendron. So far the lust for firewood has not run rampant here.

Founded in 1923, Thyangboche Monastery commands a view of Everest, Nuptse, Lhotse, and the swordlike summit of Ama Dablam. I pitched my tent on the monastery grounds, and in the morning 19-year-old Kami Tenzing, a Sherpa I hired to accompany me to Base Camp, called, "Tea ready, sahib." (This word, pronounced "saab" like the automobile, no longer connotes servility, but simply means "sir.")

I opened my tent and Kami handed in a mug of hot tea. A few minutes later he set a pan of steaming wash water outside the door. Hospitality is typical of Sherpas, a very winning people. As Sir Edmund had told me, "The Sherpas have so many characteristics that we, as Westerners, like to think we have: They are tough, courteous, tolerant, cheerful."

The Sherpa quality I value most is unfailing honesty. With only Sherpas around I could leave my pack outside a teahouse, or go off and leave my camera and money in my tent. When other trekkers were present, I could not be quite so trusting.

JONATHAN T. WRIGHT (ABOVE)

Bearing the burden *for his own future, a Sherpa lad carries rocks for a new school. Because Nepal is one of the world's poorest nations, outside funds and the efforts of Sir Edmund Hillary have been vital to the school-building program. That aid, along with the Sherpas' zeal for education, will help prepare their children* ***(facing page)*** *to deal with the world on equal terms.*

Yaks Thrive Where Humans Pant

Five hours after leaving Thyangboche, we arrived at the day's destination, Pheriche. With one wide and lonely street, the town seemed desolate. A chill wind blew; a few miles away a glacier lay in the valley floor like the gray tongue of a dead animal. In the distance were three black dots, grazing yaks. Despite the dismal setting, I felt comforted to know that nature could create animals happy to live in that barren realm.

All day we had passed these amazing animals, each freighting more than a hundred pounds: trade goods, fuel, expedition equipment. Yaks have to stay at high altitudes; Sherpas hesitate to take them below Namche (11,290 feet). If yaks go lower, one rather fanciful Sherpa told me, "Oh, no good. Yak get very sick. Get malaria!"

Altitude works just the opposite for humans. Mountain sickness can be serious, and the majority of trekkers above Pheriche (14,435 feet) suffer some symptoms: headaches, even pulmonary edema, a potentially

deadly buildup of fluid in the lungs.

I had been to more than 28,000 feet without oxygen on climbing expeditions, but that was no guarantee I wouldn't get mountain sickness on this trek. I planned to spend an extra day in Lobuche (16,170 feet) to acclimatize before ascending to Base Camp. I actually took a second day of rest above Lobuche, but still I suffered a sharp headache, one of the first signs of mountain sickness, as I continued the ascent. I was then less than half an hour from Base Camp, so I pressed on anyway.

At about 17,300 feet I was on the Khumbu Glacier, following a faint path through avalanched rock debris. Everywhere rose fantastic ice towers, some more than 50 feet high, created by the thawing and evaporation of surrounding ice. Overhead, a solitary golden eagle wheeled. I couldn't imagine what he was hunting for up there.

A cluster of orange and red tents came into view, like confetti decorating the monotone mountainscape. I had been told two expeditions occupied Base Camp: a Japanese team attempting a new route on Everest, and a Bulgarian expedition attempting Lhotse, the world's fourth highest mountain. (The Bulgarians succeeded; the Japanese came within 325 vertical feet of the summit.) On various peaks within the park there were six other major expeditions: from Australia, France, Yugoslavia, two from Spain, and another from Japan.

Even though I was nearly 18,000 feet up, I forgot my headache in the excitement of returning to Base Camp. Familiar was the notorious Khumbu Icefall, a jumble of ice blocks and crevasses where the glacier spills from the high frozen cirque surrounded by Everest, Lhotse, and Nuptse. Expeditions following the normal ascent route must find a passage through it. Always shifting, collapsing, splitting, the icefall has claimed many lives. Our 1976 expedition, which traversed this icefall, was lucky; two reached the summit, and nobody was killed or injured. I was happy to make it to 26,000 feet.

Others have been less fortunate. Nearly ten stone monuments memorialize Sherpas killed on climbs. Six died in a single disaster when, during shooting of the Japanese film *The Man Who Skied Down Everest*, part of the icefall shifted. One of the six was the

A pilgrim's progress *to Everest can be a cumbrous affair, as witness an American trekker with his entourage of porters (**right**). Less demanding than high-altitude work, trekking pays Sherpas nearly as well and is less dangerous. Since 1950, 22 Sherpas have died in accidents on mountains now in the park. Though physically unsurpassed, Sherpas have not been as well trained in mountain climbing as most of their employers. A new Nepalese climbing school hopes to remedy that.*

Repetitious as a trekker's footfalls, the Buddhist chant "Om Mani Padme Hum"—Hail to the Jewel in the Lotus—decorates stones near Kunde, under the gaze of a Buddhist chorten.

father of Mingma Norbu, the park warden with the New Zealand accent.

I sat in the warm sun chatting with the Japanese. Their camp differed from ours in 1976: no stacks of firewood for cooking. Following the park's no-wood rules, the Japanese burned butane from metal cylinders carried up on yaks.

I soon felt the lethargy that thin air induces; climbers jokingly call it high-altitude foot disease, the inability to put one foot in front of the other. I had completed the trekker's most ambitious goal—to stand at the base of Everest—and now I told myself that while I had the energy, I'd better start the long return hike—"head down valley."

Will the Challenge Be Met?

Back in Namche I attended a party given by New Zealand adviser Mal Clarbrough to celebrate the transfer of the national park's operation to the Nepalese. More than 200 people were there, and the party went full-swing when two Sherpas carried in a barrel of chang. Following a buffet of yak stew and potatoes, the Sherpas were in a mood to dance. They locked arms, forming a long line, stepping first forward, then backward, in time to singing. There were twice as many women dancers as men; many of the younger men were absent on treks and climbs. I was reminded again of the extent to which these people's lives have changed in only 30 years.

Before the trekkers and climbers, when only Sherpas lived in these mountains, they did a good job of taking care of their problems. Each village had a forest guardian to protect against overcutting. There was community support of monasteries, maintenance of trails and bridges. There was more harmony between people and land. But, as dramatically portrayed by the disparity between men and women dancers, the advent of trekking and climbing has stolen the men away from communal responsibility.

Can it be restored? Or will Shangri-la turn from sanctuary to slum?

"It's teetering on the brink," Sir Edmund told me, "but the potential to solve the problems is there."

It's the challenge of Sagarmatha National Park to realize that potential, to find again that harmony of people and land. □

Beseeching the wind *for divine grace, a litany of prayer flags festoons a tree in*

the new national park. As if in answer, a monsoon sky promises a summer of rain for the great Himalayan watershed, fount of life for the Indian subcontinent.

Suspended between heaven and earth, Toledo—Spain's spiritual heart—

TOLEDO—El

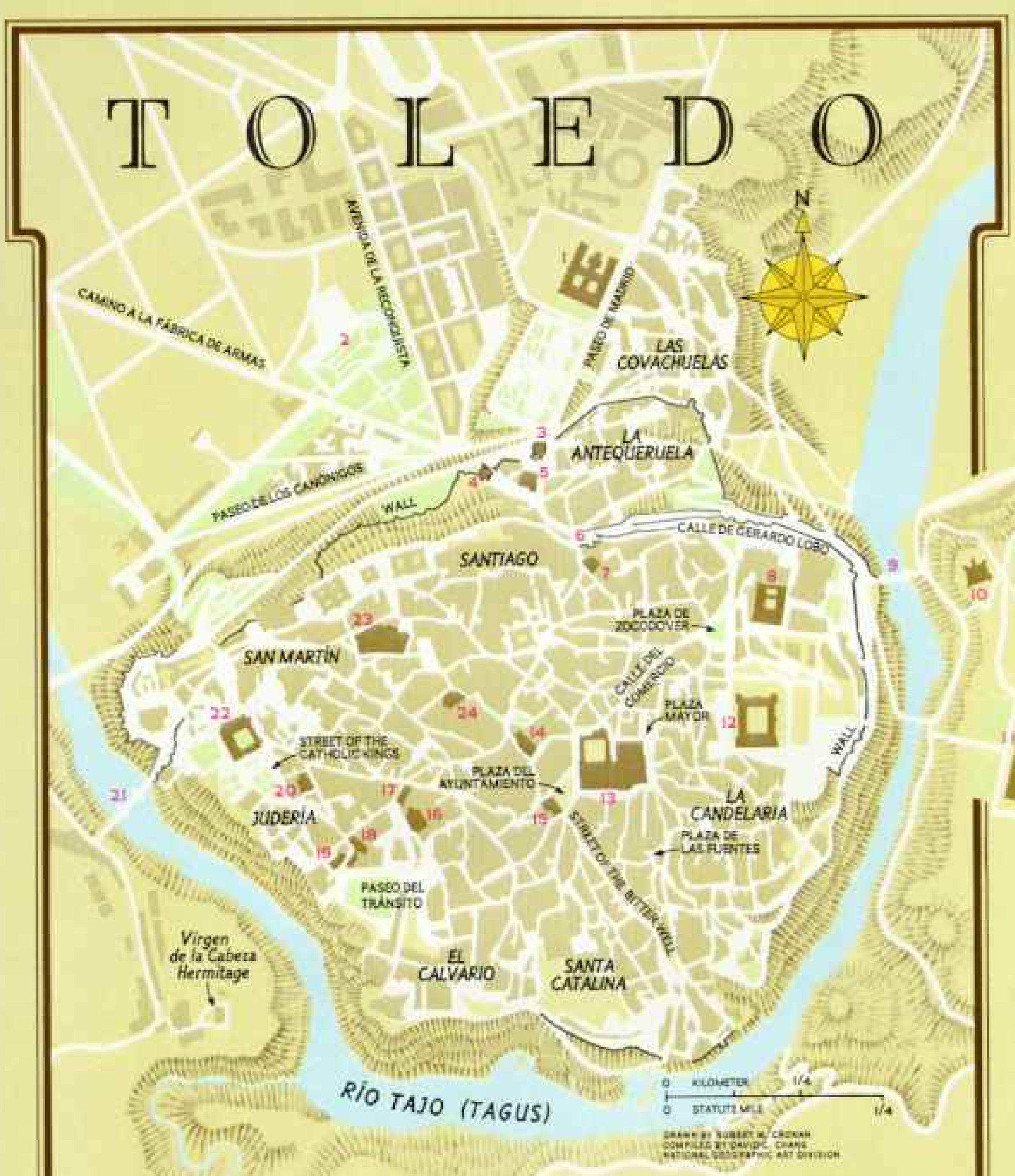
By LOUISE E. LEVATHES NATIONAL GEOGRAPHIC STAFF

has changed little from the day the Greek painter El Greco arrived in the 1570s.

Greco's Spain Lives On

Photographs by JAMES P. BLAIR NATIONAL GEOGRAPHIC PHOTOGRAPHER

TOLEDO



"EMPRESS in everything." So dramatist Lope de Vega lauded the city claimed in turn by Romans, Christian Visigoths, and Moors as a seat of power. Alfonso VI's conquest in 1085 returned it to Christianity. But its fortunes began to wane after Philip II moved the court to Madrid in 1561.

1 TAVERA HOSPITAL
2 ROMAN RUINS
3 NEW BISAGRA GATE
4 OLD BISAGRA GATE
5 CHURCH OF SANTIAGO DEL ARRABAL
6 PUERTA DEL SOL (GATE)
7 CRISTO DE LA LUZ HERMITAGE
8 SANTA CRUZ MUSEUM
9 ALCÁNTARA BRIDGE
10 SAN SERVANDO CASTLE
11 INFANTRY ACADEMY
12 ALCÁZAR
13 CATHEDRAL
14 CONVENT OF JESÚS Y MARÍA
15 AYUNTAMIENTO (CITY HALL)
16 PALACE OF FUENSALIDA
17 CHURCH OF SANTO TOMÉ
18 HOUSE AND MUSEUM OF EL GRECO
19 EL TRÁNSITO SYNAGOGUE
20 OLD SANTA MARÍA LA BLANCA SYNAGOGUE
21 SAN MARTÍN BRIDGE
22 CHURCH OF SAN JUAN DE LOS REYES
23 CONVENT OF SANTO DOMINGO EL ANTIGUO
24 CHURCH OF SAN ROMÁN

THE MORNING was cool, a merciful relief from weeks of relentless heat that scorched Spain's summer wheat harvest. I decided to take a walk along the Tagus River just north of Toledo. Twenty years ago Toledans swam in the swiftly flowing waters. Now factories in Aranjuez upstream and wastes from Madrid and Toledo itself have turned the stream to a lifeless brown. Still, the shimmering poplars and graceful weeping willows on the banks attracted picnickers and provided shade for a siesta.

On one of the bluffs at a bend in the river several Gypsy families were camped for the summer. They had come to pick tomatoes and green peppers, but because of the poor harvest there was little work. Donkeys dozed in the shade. Several women in their full, colorful skirts bent over a fire stirring a stew. As I entered the cluster of carts, an authoritative man approached me. He was not friendly, but he was not unfriendly.

"You have found a nice place," I said.

"There is a breeze . . . ," he said.

I went to the edge of the bluff. My eyes followed the silent stream to the graceful arches and towers of the Alcántara Bridge a quarter of a mile away. The walls and rooftops of Toledo rose sharply on the right side of the bridge, and on the left was the castle of San Servando, an old Moorish fortress taken over by the Christians after the reconquest of the city by Alfonso VI in A.D. 1085. The scene looked familiar, and yet I surely had never seen it before. Or had I? Suddenly I realized that this was *the* view, the famous "View of Toledo" El Greco completed about 1600 (pages 736-7). Nothing had really changed in almost 400 years.

"To think El Greco might have walked here," I said.

"El Greco? I don't know him," said the man. "Is he a *gitano*?"

Gitano, or Gypsy, in fact, might have been a rather tame epithet for the outspoken, flamboyant Greek painter named Domenikos Theotokopoulos, who, as a young art student in Italy, dared to criticize the great Michelangelo. In about 1577, in his mid-30s, El Greco journeyed to Spain to seek his fortune. In time his adopted land would claim him as one of its greatest artists, and the identities of El Greco (The Greek) and Toledo would become closely linked. Temperamentally, the man and the city were much alike—brooding, tempestuous, romantic, proud, contradictory.

Although El Greco was admired by his contemporaries, they may have wondered about his extravagant habits. He made a lot of money in Toledo but lavished it on large living quarters and musicians who entertained him like a prince while he ate. The artist was forever in debt, and argued with his patrons about the price of his paintings.

As I stood on the bluff, I saw that El Greco had taken some liberties with the landscape, making the city grander and more dramatic in the "View of Toledo" than it really is from this perspective. Some scholars believe that this might have been El Greco's contribution to the citywide campaign to woo back to Toledo the court of Philip II, which had departed for Madrid in 1561. Those efforts failed, and—fortunately for us—Toledo has remained frozen in time.

ANTICIPATION had built up for weeks. Workmen hoisted canvas canopies high above Toledo's crooked streets. Colorful banners, flags, and embroidered mantillas were hung from balconies. Finally, the day before the feast of Corpus Christi, garlands of wild thyme that had been collected in the surrounding hills were crushed in the streets and filled the air with their fresh, pungent scent.

A canon paced up and down in front of the side entrance of the cathedral, whispering commands into a walkie-talkie, and then suddenly the river of people began to move. The procession had begun.

Soldiers lining the route dropped to their knees when the dazzling, jeweled monstrance containing the Sacred Host passed (page 746). Women wept and prayed aloud. Others leaned from their balconies, showering the precious receptacle with rose petals.

What I will never forget were the faces in the parade. The innocence and shyness in the scrubbed faces of the boys choir. The fierce pride in the faces of the Mozarabs, descendants of Toledo's early Christians. The faces of the nobility, aloof and reserved, framed in the lavish cloaks of their medieval orders. The solemn faces of priests.

Great artists such as El Greco remind us

that the palette of human emotions has varied little through the centuries. In perhaps the most splendid group portrait in the history of art, "Burial of the Count of Orgaz" in Toledo's Santo Tomé Church (page 742), there is a similar procession of faces and stunning range of inner feeling on display.

The painting depicts the miraculous appearance of St. Augustine and St. Stephen at the funeral of Don Gonzalo Ruiz de Toledo, the philanthropic second lord of Orgaz, in 1323. In 1586 the parish priest of Santo Tomé, having won a large support settlement from the town of Orgaz, commissioned El Greco to paint the famous burial scene. The cream of Toledan society in the 16th century is believed to be represented in the group of mourners at the grave site.

Every spring on Corpus Christi, when Don Gonzalo Crespi de Valldaura, current bearer of the title of Count of Orgaz, puts on the scarlet cloak of the charitable holy order of the Infanzones de Illescas, he looks as if he has stepped out of El Greco's painting.

"Ah, these robes are too heavy, and it is always a very hot day on Corpus Christi," said the 46-year-old nobleman, who bears a slight resemblance to his famous ancestor. "But, I do what I can for Toledo."

The count said that he is the first member of his family to hold a job in addition to managing the family properties. He heads his own small advertising agency in Madrid. He insists that all of his five children, ages 16 to 21, work for their allowances. According to the family tradition, his first sons were named Augustine and Stephen, for the saints who appeared at the funeral.

"I am among the more open-minded of my generation," said the count. "My daughter is studying for a university degree, which some noble families would consider a waste of time. They believe that the only duty of a daughter is to marry well."

It's kosher *for Father José Bermejo* ***(above)*** *to lunch at the Sinai Restaurant. Owner Albert Elmalem Chocron, right, a Moroccan-born Jew, serves potato latkes and gefilte fish to an ecumenical clientele.*

Geranium-filled balconies overlook the Calle del Comercio ***(right)****. New construction is restricted in Toledo, a national monument since 1941.*

AS EL GRECO delved into the personalities of the noblemen who commissioned his portraits, he carefully studied the clergymen he painted as well. In his exquisite portrait of his close friend, scholar Fray Hortensio Félix Paravicino (page 744), he saw the compassionate side of the clergy—tolerant, urbane, understanding. In other portraits El Greco captured the face of a church that also produced the horrors of the Inquisition.

One wonders how he would have painted Marcelo González Martín, Archbishop of Toledo and Cardinal Primate of Spain. I saw Don Marcelo in the Corpus Christi procession, walking in the wake of the monstrance and the rain of rose petals, his gold-embroidered vestments sparkling in the sunlight. The great pastor and promoter


EL DEDÉ

of social works looked neither right nor left to acknowledge the crowds. Even in this conservative city, Don Marcelo is known as one of Spain's most conservative churchmen. It was he who conducted Generalissimo Francisco Franco's 1975 funeral Mass.

Usually the minister of justice follows the archbishop in the procession, but this time Don Marcelo had not invited him. Francisco Fernández Ordóñez, who held the post, was the author of Spain's divorce legislation.

Señor Fernández Ordóñez decided to come to Toledo anyway. He viewed the proceedings from a balcony above the Plaza de Zocodover. Undoubtedly spotting the minister, the archbishop stopped the procession in the square and made a brief impromptu speech:

There would be no need for divorce, he suggested, "if couples went to Communion and followed the laws of the church."

The archbishop's unprecedented snub of the minister of justice fanned the fires of a heated debate over Spain's controversial divorce legislation, which came up for a vote in parliament a few days later. Rifts between conservatives and liberals within the fragile governing Central Democratic

Conviviality *is on tap at the Aurelio Restaurant, during a lunch hour that typically stretches for two or three. Olives from groves surrounding this capital of Toledo Province star in a dish of tapas, or hors d'oeuvres.*

Union Party (UCD) opened so wide that some observers feared new elections would be called.

At one time the wealth and power of the archbishops of Toledo rivaled the kings'. They led armies, built hospitals, and fostered the arts and sciences. Don Marcelo reminds Spain of how powerful they still are.

"I remember a day a few years ago," said Toledo Mayor Juan Ignacio de Mesa Ruiz, "when the Socialists called a meeting and 83 people showed up. The Communists met and 22 people came. Something was going on in the cultural center that 65 people attended. But Don Marcelo called for a day of prayer—and 5,000 Toledans poured into Ayuntamiento Square."

After the feast of Corpus Christi, Zocodover Square returned to normal. Normal is a 9 a.m. to 9 p.m. snarl of taxis, cars, and tourist buses. Zocodover comes from the Arab word for cattle market, Suq al-Dawabb, or "market of the beasts." Some Toledans would say the city's main square is still aptly named—the beasts of the 20th century being traffic and tourists.

TOLEDO has become the drawing room of Spain, and as many as 10,000 tourists a day visit it in the summer. Because it is just 43 miles from Madrid, visitors come for the day, seldom developing a relationship with the city or its people. Toledo's 55,000 residents welcome the business, but are not particularly friendly to tourists. Other Spaniards call Toledans *secos*, or "dry" people.

One afternoon I was having a quick lunch at an outdoor café in Zocodover Square with a Spanish friend from Madrid. My friend called the waiter over and said, "We would both like the number eight sandwich—but without the fried egg on top."

"That can't be done," said the waiter.

"Why not?"

The waiter shook his head.

"Just leave the eggs off. . . ."

"Impossible."

"A plain ham and cheese sandwich?" queried my friend.

"All right," said the waiter, annoyed, "but I'm not going to give you more cheese."

"Fine!"

The people and the city are difficult to get to know. Toledo is a labyrinth of twisted streets and covered passageways and rows of austere, almost windowless buildings that have turned their backs to the streets. Of all Spanish cities, Toledo has remained the most faithful to its Arab layout and never

lost its Eastern atmosphere of mystery. In time, however, one can find ways to enter the hidden courtyards and explore the inner life of the city.

The sound of hammering led me down a narrow cobblestone street to the forge of Mariano Zamorano, a sword maker, just off the Plaza del Ayuntamiento. On an anvil he was straightening the steel blade of a fencing sword. His face was blackened with soot from the hot coal fire.

"The final quenching—in oil, water, or both—is the most important," said Señor Zamorano, resting his arms. "Oil is a slower process; it makes the blades less stiff, more flexible. Water is faster, and makes them stronger. You see this. . . ." He picked up a discarded blade and thrust it against the wall. It bent out of shape like a coat hanger. "Too weak. I've been doing this for 42 years, and still I sometimes make mistakes."

The meticulousness of Toledan craftsmen was well known in the Renaissance, and their swords, particularly, were highly praised. Sword making has been famous along the Tagus since Roman times. The art had nearly died out, however, when in 1780 the National Arms Factory was founded in Toledo. Today the factory produces ammunition and light arms for the Spanish Army, and other Toledan sword makers supply the U. S. Marines, Navy, and Coast Guard with some of their ceremonial swords.

NOT FAR from Zamorano's, on the Plaza de las Fuentes, is a narrow 16th-century town house with shuttered windows and a large, bolted wooden door. It looks like many old Toledan houses—cold, not particularly inviting. I had passed it many times without noticing it, until I happened to meet the owners, Gloria Martínez and her husband, Richard López, who invited me to tea.

"Most of my work is in Madrid," said Richard, 39, a free-lance photographer. "But neither of us could bear to live in one of those new high-rise apartments there. They are not human. We bought this house in 1976 for 500,000 pesetas [$7,300] and spent three years fixing it up."

He led me through the door and into a small courtyard that was completely open to the sky. Around it, in quite typical Toledan fashion, were the modest living quarters spread out on three levels. All the rooms had large windows facing the courtyard. For their painstaking efforts to restore the original character of the house, the couple had received an award from the city.

"Toledo has its problems," said Gloria, 35, a teacher of French. "The traffic, the pollution of the Tagus. Sometimes we miss the cultural life of Madrid. But Toledo is such a beautiful city, such a peaceful city. We feel the quality of life is better here."

Although the entire city was declared a national monument in 1941, young couples like Richard and Gloria prevent Toledo from becoming a dead museum. There is also a budding colony of artists, centered in the Tolmo Gallery and Toledo's School of Applied Art, who draw inspiration from the city where El Greco lived and worked.

Toledo's artistic heritage is rooted in surrounding Toledo Province, where fine handicraft traditions have flourished for centuries. Surprisingly, in this rugged agricultural and hunting area dotted with medieval castles from the days of the reconquest, some of the most delicate laces and embroideries in Europe are made. Young girls from the village of Lagartera, west of Toledo, are taught to embroider at the age of five, and, years before they meet their husbands, they work on linens for their weddings.

Pottery making from the fine sands and red clays along the Tagus Valley goes back to Neolithic times. Stark, utilitarian pottery is produced today in La Mancha, at the eastern edge of the province, where the legendary Don Quixote tilted at windmills. And in the towns of Talavera de la Reina and El Puente del Arzobispo in the western part of the province, the pottery is lavishly decorated with hunting scenes.

Off the usual tourists' paths in a northern barrio of the city are many of Toledo's 46 convents and monasteries. With the help of Dr. Fernando Marías of the Universidad Autónoma de Madrid, I was granted access to the cloistered Convent of Santo Domingo el Antiguo. In the convent church are magnificent altarpieces designed by El Greco. Of the nine original canvases, only three remain in place. The others have been replaced by copies.

Here is where *(Continued on page 745)*

Flanked by foils, *17-year-old Fernando López Luengos, Spain's 1981 National Junior Fencing Champion, prepares to practice at the Toledo Fencing Club. Handmade swords, famed for their strength and flexibility, have been forged in Toledo since Roman times. Moorish artisans decorated such metalware with damascene work—gold and silver wire inlaid in complex designs. Some 400 years of Muslim rule bequeathed the city its labyrinthine layout, its geometrically intricate Mudejar architecture, and its nearly windowless buildings that snub the streets.*

The Genius of EL GRECO

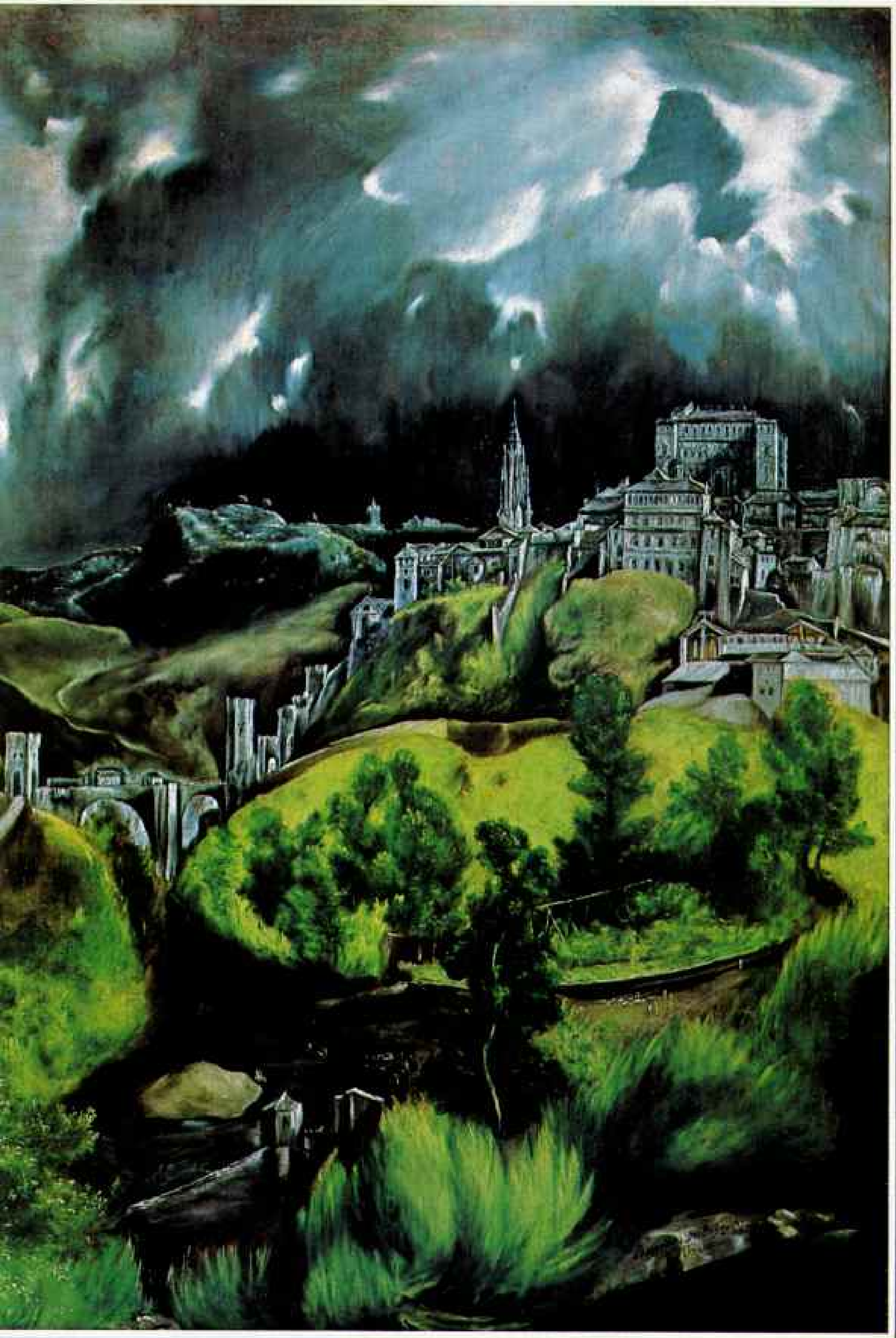
By J. CARTER BROWN
DIRECTOR, NATIONAL GALLERY OF ART, WASHINGTON, D. C.

FOR SOME 250 YEARS after his death, Domenikos Theotokopoulos (El Greco) was regarded as an extravagant, even mad, painter who deserved little more than a footnote in history. In 1724 the Spanish artist Antonio Palomino dismissed El Greco's late work as "contemptible and ridiculous, as much for the disjointed drawing as for the unpleasant color."

Not until the mid-19th century did anyone take a second look at the "disjointed" work. In El Greco's daring perspective, distortions, and audacious use of light and color, artists and critics found reinforcement for their own artistic ideas. For European Romantics and Expressionists, and for us today, El Greco is one of the great prophets of modern art. He was one of the first artists with whose work I fell in love.

Many have grappled to understand the complexities of El Greco's work, creating theories that have persisted to this day but that have little basis in fact. Some have seen him as a mystic or believe his distorted figures are due to faulty vision. Still others claim he used the inmates of insane asylums as models.

HAUNTING TRIBUTE to his adopted city, El Greco's "View of Toledo" (circa 1600) raises the question: Why here, in this unfamiliar setting, did the struggling Greek artist suddenly unleash the full power of his creative genius?



METROPOLITAN MUSEUM OF ART, NEW YORK CITY

A central purpose of the first major international exhibition of El Greco's work, which will open in the United States next month at the National Gallery of Art, is to unravel some of these myths.* The exhibition will present a new interpretation of the artist based on extensive research, conducted by Jonathan Brown of the Institute of Fine Arts, New York University, and Richard L. Kagan of the Johns Hopkins University, into the historical and cultural climate in which El Greco lived. They reveal him to be not a crazed mystic but an intellectual very much in tune with his times.

Professors Brown and Kagan paint a picture of Toledo in the time of El Greco as a proud city, no longer the seat of the Spanish monarchy but nonetheless determined to retain its prominence among Spanish cities. El Greco's moving "View of Toledo," with its dramatic but manipulated topography, communicates to us the artist's feeling for his adopted city.

Toledo remained the seat of the Roman Catholic Church in Spain, which in the late 16th century was engaged in a fierce struggle against Protestantism. Many of El Greco's works are thus conscious, passionate sermons for the Counter-Reformation.

In a time when the major purpose for commissioning art was to inspire prayer and instruct people in the tenets of Catholicism, El Greco clearly struggled for more. In sketchy notes he wrote in the margins of a 16th-century architectural publication, discovered by scholars Fernando Marías and Agustín Bustamante in 1977, we gain an insight into the mind of this great artist. El Greco wrote that painting was central to human experience, a form of thought. To him, painters were philosophers who shaped ideas and communicated knowledge through their art. In his penetrating portraits of noblemen and priests of his time, El Greco tried to tell us something about the nature of all men. And, in his religious art, he painted different levels of reality and strove for an understanding of the world beyond our perceptions. To distinguish between the real and the supernatural, he distorted proportions and made figures appear to radiate with an inner light. Always his goal was to achieve "*grazia* [a lyric grace] that gives sign and splendor to the beauty of the mind."

El Greco was a man of the 16th century, but he was a man who desired to reach out to people of all ages. And he has. * * *

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*The exhibition was organized by the Toledo (Ohio) Museum of Art and supported with grants from the American Express Foundation and the National Endowments for the Arts and Humanities. It was scheduled to open in April at the Prado Museum in Madrid and to travel to the National Gallery of Art in Washington, D. C. (July 2-Sept. 6), the Toledo Museum (Sept. 26-Nov. 21), and the Dallas Museum of Fine Arts (Dec. 12-Feb. 6).

STANLEY MOSS AND COMPANY, NEW YORK CITY

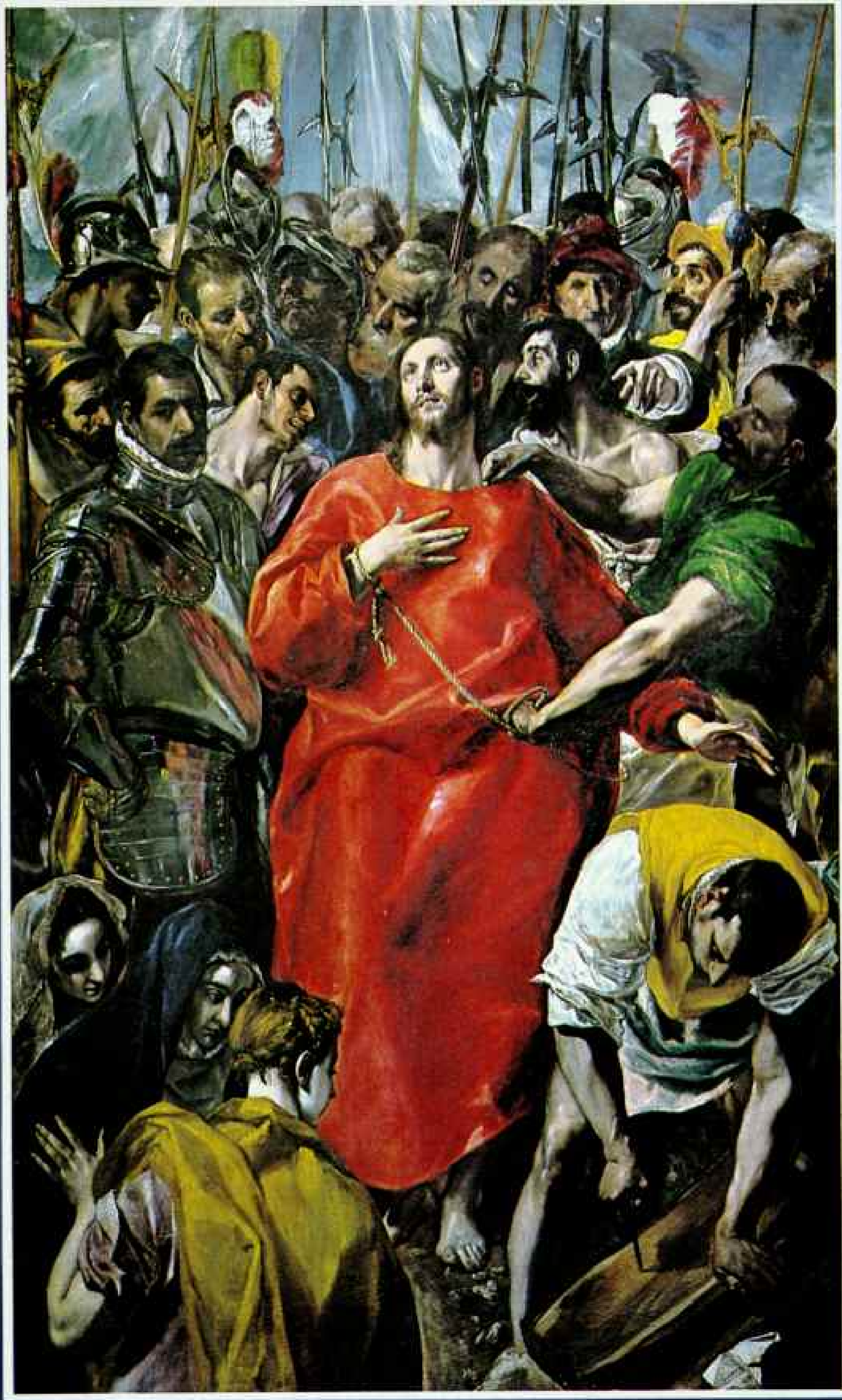
"FABLE" (circa 1570-75), done when El Greco enjoyed the favor of Alessandro Cardinal Farnese in Rome, shows the young artist's early interest in dramatic light. The painting is based on a literary description of a lost masterpiece by Antiphilus of Alexandria, although the reason for El Greco's addition of a monkey in the scene is disputed.

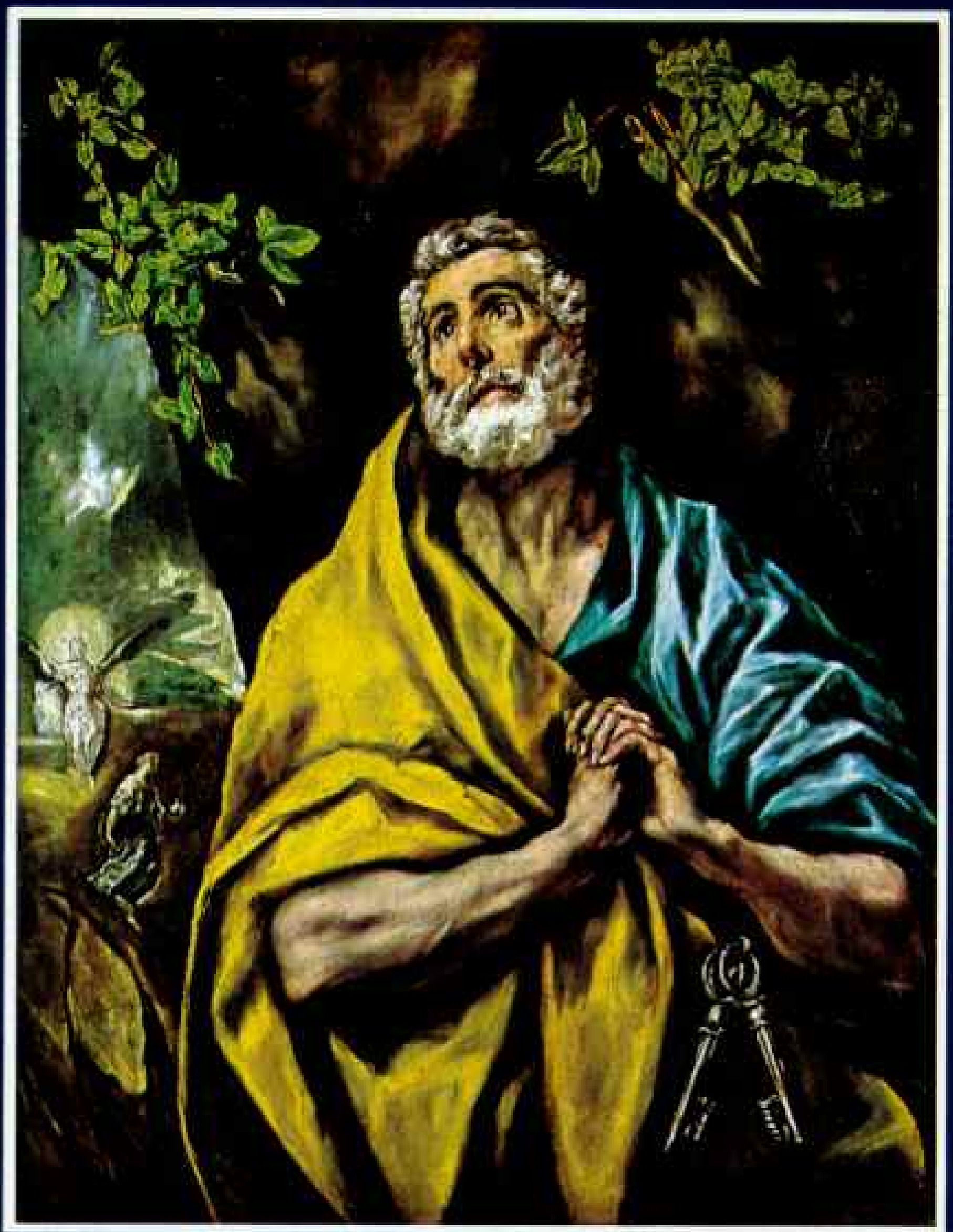
Born Domenikos Theotokopoulos in Candia, Crete, in 1541 and probably trained as an icon painter, the man who came to be known as El Greco (The Greek) journeyed to Venice and Rome as a young man to study the work of the great Renaissance masters and became a disciple of Titian.

Although critical of the great Michelangelo, the arrogant El Greco imitated the Italian's muscular, massive treatment of figures in his early paintings.

"Michelangelo did not know how to paint portraits. . . ," the artist once wrote. "And as for imitating colors as they appear to the eye, it cannot be denied that this was a fault with him."

Important commissions eluded the talented El Greco during his Italian years. This frustration may have contributed to his decision around 1577, when he was in his mid-30s, to depart for Spain and seek work at the court of Philip II, then the most powerful monarch in Europe.





SACRISTY, TOLEDO CATHEDRAL (LEFT), AND NATIONAL GALLERY, OSLO, NORWAY

WITHIN SIX YEARS of his arrival in Spain, El Greco managed to exclude himself from two important sources of patronage. He failed to win the king's favor, and partly because of theological "errors" in the "Disrobing of Christ" (circa 1577-79) (left), El Greco received no more commissions from the Toledo Cathedral. Nevertheless, this painting helped establish his reputation.

Perhaps because he lacked this patronage, El Greco was free to develop his unique style, which anticipated 20th-century Expressionists. With loose brushstrokes and sharp contrasts in light and shadow, El Greco re-creates in "St. Peter in Tears" (circa 1610-1614) the moment when Peter realizes he has betrayed Christ (above).

SANTO TOMÉ CHURCH, TOLEDO (ABOVE), AND NATIONAL GALLERY OF ART, WASHINGTON, D. C.

PORTRAIT OF A MIRACLE, *El Greco's "Burial of the Count of Orgaz" (1586-88) (above) depicts the scene in 1323 when, tradition says, St. Stephen and St. Augustine lowered the philanthropic Toledo nobleman into his tomb. The young page, lower left, is El Greco's son. With its dramatic juxtaposition of heaven and earth and the exquisite portraits of the mourners, the work is considered El Greco's masterpiece.*

In "St. Martin and the Beggar" (circa 1597-99), El Greco paints the fourth-century saint giving up half his cloak to a tattered beggar. The legendary act of charity is placed in 16th-century Toledo, perhaps to show the timelessness of Christian virtues. By 1585 El Greco was prospering in Toledo. Clients commissioned copies of his well-known paintings from small-scale replicas. Prices varied depending on whether the work was done by the master or an assistant.

MUSEUM OF FINE ARTS, BOSTON

THE SECRET of El Greco's success had more to do with men like scholar Fray Hortensio Félix Paravicino, whom he painted about 1609, than with mysticism. Toledo's influential group of intellectuals appreciated El Greco's complex style and supported him. Of the artist, the friar wrote: "Crete gave him life and the painter's craft, Toledo a better homeland, where through Death he began to achieve eternal life."

(Continued from page 734) El Greco's life in Toledo began—and ended. The promise of this important commission probably influenced his decision to come to Spain. Clearly El Greco also hoped to work for Philip II on the monastery at the Escorial, near Madrid. When El Greco's "Martyrdom of St. Maurice" (circa 1580-82) failed to win King Philip's patronage, the artist settled down in Toledo.

"In a time when paintings were supposed to inspire prayer and teach theological tenets, El Greco sometimes did not faithfully follow the Scriptures," said Dr. Marías. "In the 'Disrobing of Christ' he painted the three Marys, though there is no justification in the Bible for their being there [page 740]. He put Roman soldiers in 16th-century armor and set biblical scenes in Toledo."

In the last decades of his life El Greco's patrons were private chapels and smaller religious institutions in Toledo and the surrounding province. "I believe that these patrons, less concerned about theological indiscretions, allowed the artist to do some of his best work," Dr. Marías said. And if El Greco had received the patronage of the Spanish king, would he have found the freedom he needed to develop his unique style? It is doubtful.

El Greco died in 1614 and was buried in Santo Domingo el Antiguo under the large "Adoration of the Shepherds" (1612-14), which he had painted as a memorial to himself. The brushstrokes are loose, the figures fluid, and the colors brilliant—hallmarks of El Greco's late style.

In 1619, because of a dispute with the nuns, El Greco's son, Jorge Manuel Theotokopoulos, moved the family vault to San Torcuato in Toledo. The church was destroyed in the last century, and El Greco's tomb has been lost.

UNLIKE TITIAN, El Greco had no contemporary biographers. The artist's own theoretical writings have never been found. It was therefore with great excitement that Dr. Marías and his colleague Dr. Agustín Bustamante in 1977 discovered El Greco's handwritten notes in the margin of a 16th-century edition of Vitruvius's treatise *On Architecture*. Dr. Marías believes the notes, in El Greco's mix of Italian, Spanish, and Greek, negate the two prevalent theories about his elongated figures: that the distortions were due to astigmatism or to the artist's mysticism.

"El Greco clearly rejected the Renaissance concepts of perspective and proportion," said Dr. Marías. "He called an artist who followed them pretentious, 'a donkey covered with a lion's skin.' He wrote that the ladies of Toledo who elongated their figures with *chapines* [high-heeled shoes] knew more about beauty than contemporary artists who painted with mathematical formulas. For El Greco, only two things were important in painting: light and color."

WHEREAS TRACES of Toledo's Arab past are everywhere—in the Oriental gardens and tiled patios, in Toledans' taste for rich almond pastries, and even in the Castilian language sprinkled with Arabic words—footprints of Jewish Toledo are faint.

No one knows who founded Toledo, but one of the theories is that it was first settled by members of the tribes of Israel fleeing the Holy Land in the sixth century B.C. The Jews called it Toledoth, their "city of generations." Toledo became one of the most important Jewish centers in Spain, with about 200 families in A.D. 1300.

During more than 300 years of Muslim occupation and the first centuries of Christian reconquest, Toledo experienced a period of religious toleration rare in Western history. Muslims, Christians, and Jews lived relatively peacefully together, all allowed to practice their own religions and live by their own laws. The arts and sciences flourished. Alfonso X (the Wise) supported a school of translators in the 13th century that helped to bring Aristotelian philosophy and classical scientific texts to the West. The cross-fertilization of cultures also produced the distinctive Mudejar style of brickwork and sculptured plaster that still dominates Toledo's architecture.

In the mid-14th century, however, during a time of economic hardship and religious revival in Castile, intolerance flared. As sweet as the flowering of mixed cultures had been, bitter was the repression. Toledo is above all a city of contradictions.

Jews were forbidden to carry on trade

Faith parades *in splendor during the feast of Corpus Christi, when the 16th-century silver-and-gold monstrance by Enrique de Arfe is carried along a two-mile flower-and-thyme-strewn route (**above**). The focus of religious life in the city, Toledo Cathedral (**right,** at left) forms one side of Ayuntamiento Square. Part of the cupola was designed by El Greco's son. In the 15th century Toledo's archbishop, described by an observer as "more like a pope than a prelate," presided over an archdiocese that incorporated most of central Spain. Today's archbishop remains the primate of Spain's Roman Catholic Church.*

with Christians, carry arms, or hold public office. The Jewish quarter, or Judería, was sacked and burned in 1391. Some years later, after a fiery sermon in Santiago del Arrabal, Vincent Ferrer led a bloody massacre in Toledo's oldest synagogue, which then became a Catholic church, Santa María la Blanca. The tribunal of the Spanish Inquisition to deal with false Christian converts was established in 1485 in Toledo, and within 40 years Catholic monarchs expelled all unconverted Jews and Muslims from Spain.

THE MEMORY of those times still haunts the Street of the Bitter Well in Toledo, where people believe they can still hear the weeping of Raquel, the beautiful daughter of Levi, who lived there. According to legend, Levi killed his daughter's Christian lover as he stole into the Jew's garden one night to meet Raquel. She wept for many nights, and finally, in her despair, threw herself into the well at which the lovers had kept their secret trysts. The waters were said to have turned bitter with Raquel's tears.

There is some speculation that Doña Jerónima de las Cuevas, El Greco's mistress for 37 years and mother of his son, Toledan architect Jorge Manuel, was related to Jewish *conversos*, or converts, by marriage. She is believed to be the beautiful and mysterious woman in El Greco's portrait "Lady in a Fur Wrap." What is certain is that El Greco and his mistress lived in Toledo's Judería.

They made their home not in the small reconstructed 16th-century house now called the Casa del Greco, but in a 24-room apartment in a palace of the Marqués de Villena overlooking the gorge of the Tagus. The palace was torn down early in this century, and the site is now part of a park, the Paseo del Tránsito, where mothers bring small children on summer afternoons.

In the park or the Judería's small family-run shops and cafés that open onto the street, everyone seems to know everyone else. The neighborhood is like a small town within Toledo. There is the smell of sweet melons and apricots in the fruit stands, as well as contented-looking tomatoes that have grown fat in the sun. Rows of delicate marzipan confections fill the windows of Santo Tomé bakery. And quiet restaurants offer gazpacho, partridge, and the mellow La Mancha wines of Toledo Province.

Sometimes, as I walked this lovely district, I wondered if there were any Jewish families still living in Toledo.

"Ah, the Jews left Toledo centuries ago," said Rufino Miranda, owner of a newsstand on the Calle del Comercio. Little goes on in Toledo without his knowledge.

He spoke in Spanish to my friend Elvira Huelbes and eyed me suspiciously. We lingered in the store, and within an hour whatever mistrust there was in the air vanished. He turned to me.

"Outside the city walls there was a Jewish cemetery," he said in English. "In the 17th century a man came from Salonika and found the tombstones tossed about. He wrote down the inscriptions on them and the names of 72 Jews buried there. Decades later the list was published in a book, *Avne Zikaron* [*Stones of Memorial*].

"In the 1920s the book suddenly appeared

in Toledo and people began to look for the tombstones. Some were found in convents. The large, carved-out pieces of stone had been turned upside down and used by the nuns as washbasins. The tombstones began to make some people curious about their Jewish ancestry."

And then, said Rufino, several years ago Toledo became the sister city of Zefat in the Holy Land, and a friendship forest of small trees was planted outside Toledo. A cantor from Israel blessed the ground and recited prayers. To the surprise of everyone, more than 200 families from Toledo and Madrid attended the ceremony.

About the same time, a Moroccan-born Jew of Spanish descent, Albert Elmalem Chocron, opened the Sinai, a kosher restaurant, on the Street of the Catholic Kings in Toledo. It is now the favorite lunch spot of neighborhood priests, who have acquired a taste for chicken-liver latkes with applesauce. For the past few years Señor Elmalem has invited both Christians and Jews to celebrate the Passover feast at the restaurant with lamb shanks and haroseth and kosher wines imported from France and the U. S.

"The first year 20 people came to Passover," said Señor Elmalem, a talkative man in his 60s, who had at one time worked in the secondhand-clothing business in New York City. "The next year we had 40, and last year 275 showed up. The restaurant couldn't hold any more.

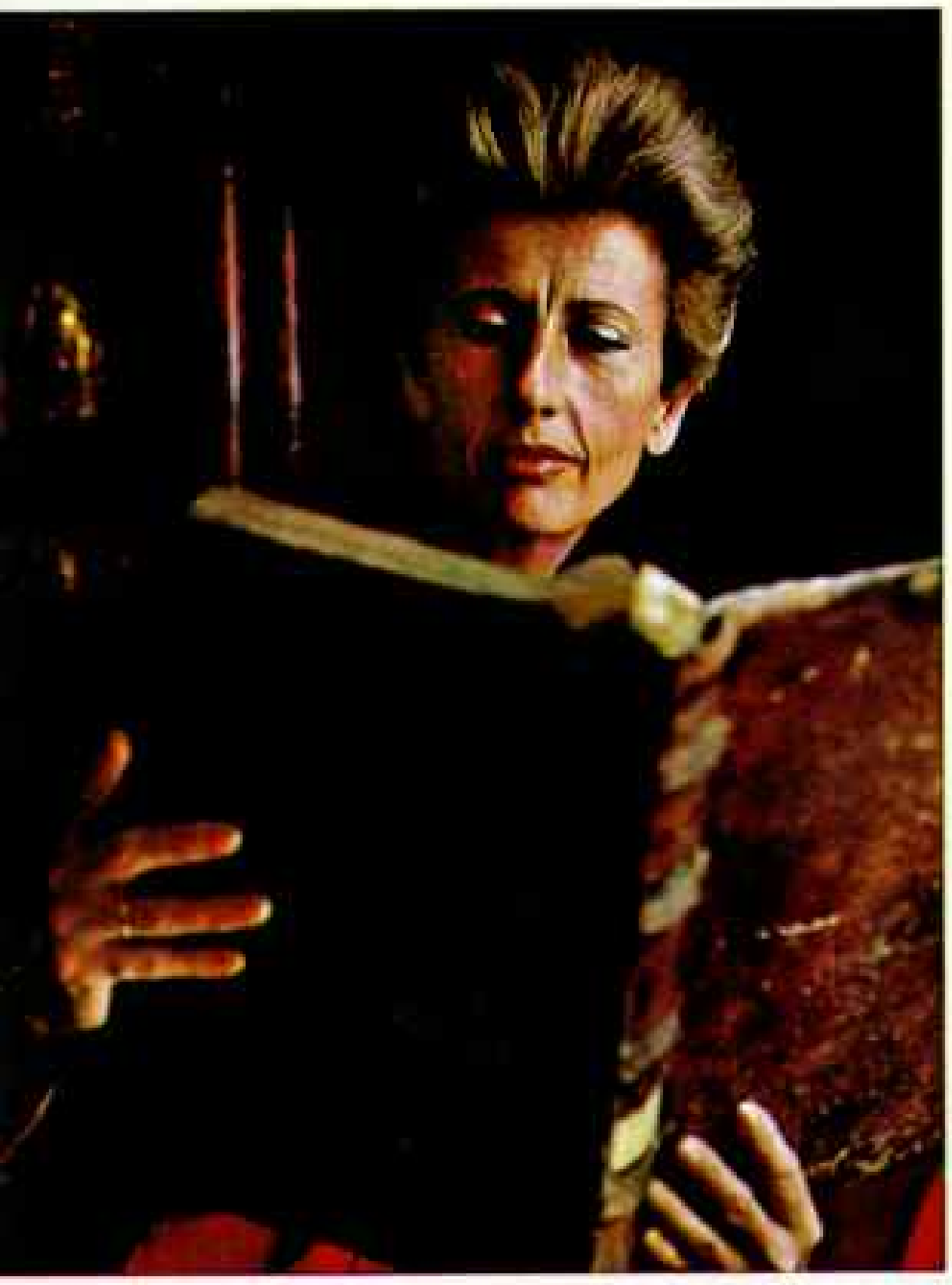
"I have a friend. I won't tell you his name. He is Catholic and goes to Mass every Sunday. But, for some reason, his father and grandfather told him not to eat pork, and every Friday in his house he lights a Sabbath candle. He doesn't say any prayer. He just lights the candle."

Señor Elmalem said it is his dream to restore the old synagogue of Santa María la Blanca and, perhaps, someday to hold religious services there again.

To escape the summer heat, Muslims

The durability *of handcrafted tradition is reaffirmed by artisans like Pedro de la Cal* ***(left)****, a potter taught by his father. Clays from the Tagus River Valley have been used in pottery since Neolithic times. Nuns of the Convent of Jésus y María make marzipan, an Arabic legacy, from sugar and almonds* ***(above)****.*

Pages of history *fill the 16th-century family Bible of Victoria San Martín de Esteban-Infantes, a descendant of Toledo's early Christians (**below**). In 1411, during the dark chapters of repression, the city's oldest synagogue (**right**) was converted into the church of Santa María la Blanca. Muslims, Jews, and Christians had coexisted for 700 years until intolerance flamed; unconverted Jews were expelled from Spain in 1492.*



built houses outside Toledo by the banks of the Tagus or high in the surrounding hills. There they enjoyed lush gardens of roses, white lilies, wild irises, jasmines, and pomegranates; fountains of cool running water; and orchards of apricot, orange, and almond trees. Through the years these retreats came to be called *cigarrales*, perhaps from Arabic words meaning "place of trees," or perhaps because the hills are full of droning *cigarras* (cicadas) on summer evenings.

The oldest of Toledo's extant cigarrales is the Palacio de Galiana. Some say it is named for the beautiful Moorish princess Galiana, the legendary ladylove of Charlemagne.

It was here that St. Casilda, born the daughter of an Arab ruler, was supposed to have brought bread and other gifts in her skirt to her father's Christian prisoners. One night her father caught the young woman and demanded to know what she had hidden in her dress.

"Roses," she replied. And, when she let down her skirt, roses miraculously tumbled to the ground.

At the end of the 16th century, when Spain was the most powerful nation in Europe with its vast empires abroad, the cigarrales were the meeting places of the intellectuals, the literary salons of their day.

As the Spanish dramatist Tirso de Molina described in *Los Cigarrales de Toledo*, the owners of the cigarrales and their guests amused themselves by writing romantic, sentimental dramas, which they performed on lazy summer afternoons.

El Greco was believed to be a frequent visitor to Buena Vista, the handsome cigarral of Cardinal Sandoval y Rojas, Miguel de Cervantes' patron. There El Greco surely conversed with his friends Antonio de Covarrubias, son of the famous Toledan architect, scholar Fray Hortensio Félix Paravicino, and the poet Góngora. He may also have met Father Pedro de Ribadeneira —biographer of Ignatius of Loyola—and Cervantes, and Lope de Vega, who lived and worked for many years in Toledo.

A highly learned man himself with an impressive library of Greek, Latin, Italian, and Spanish texts, El Greco would have felt comfortable in such illustrious company.

"HE WAS A GREAT philosopher, penetrating in his observations," noted the Sevillian painter Francisco Pacheco, who visited El Greco in 1611, "and he wrote on painting, sculpture, and architecture."

Buena Vista was acquired in the 1920s by

Windmills tilt at the skies *in the historic region of La Mancha, southeast of Toledo, where ventured Miguel de Cervantes' legendary knight, Don*

the late Alvaro Figueroa Conde de Romanones, Prime Minister of Spain, when it became fashionable for wealthy Madrid families to weekend in Toledo and shoot partridges in the province. Today his granddaughter, Teresa Duquesa de Andria, presides over convivial dinners here. "I never know how many people are coming, so I always have plenty of food," she told me.

The petite, energetic duchess heads the Society of Three Cultures in Toledo. One spring evening she held a small dinner for flutist Ginka Gerova Ortega and musician-composer Gregorio Paniagua after their concert in Toledo, which she had sponsored. A cook served braised rabbit shot on the grounds. In an exuberant mood, Gregorio, a tall, flamboyant Spaniard, picked laurel from the garden and fashioned a wreath with which he crowned his patroness.

After dinner the musicians took up their instruments and improvised an impromptu concert on the terrace. The sky was ablaze with stars, and breezes moved the tall cypresses in the shadows. A three-quarter moon rose, glowing with an eerie inner light that turned the sky from black to deep blue and framed the hills in a silver halo. The night, like many I had experienced in Toledo, was awake, expectant.

WHEN Spaniards speak of *una noche Toledana*, they mean a bad omen. What their language cannot forget is the apocryphal night in A.D. 803 when Arab Governor Amru-ben-Yusef

Quixote. Cervantes, El Greco, and dramatist Lope de Vega lived in Toledo, adding their art to a city where East and West fused and flourished.

sought vengeance for his murdered son and invited 400 of Toledo's noblemen to a sumptuous banquet. As the guests passed an honor guard in a narrow passageway of the palace, each was decapitated with the swift stroke of a scimitar. In the morning a horrified Toledo woke up to the sight of noblemen's heads on display.

From the cigarrales high above the gorge of the Tagus, the city can be contemplated as a whole. The discordant sounds fade into the distance. I remember one particular visit to the beautiful Cigarral de Menores, owned by banker Gregorio Marañón, grandson of a well-known physician and writer. Guests gathered on the terrace to watch the city glow in the fiery orange light of the sunset. Suspended on its rock above the plains, Toledo appeared to float between earth and sky. The uneven profile of the rooftops reminded me of the jagged outline of restless humanity in El Greco's "Burial of the Count of Orgaz," similarly caught between heaven and earth. And so it seemed at this moment that here, in this timeless city, the visible world meets the world beyond our senses.

The sky had now turned a deep purple. Most of the guests had gone inside. An Andalusian, whom I had just met, brought me a glass of sangria.

"I have a feeling you will never leave Toledo," he said.

I was startled. "What do you mean?"

"It is just a feeling. . . ."

I am an ocean away from Spain. But, he was right. One can never leave Toledo. □

Namibia
Nearly a Nation?

By BRYAN HODGSON
NATIONAL GEOGRAPHIC SENIOR STAFF
Photographs by JIM BRANDENBURG

ALL NIGHT the Bushmen warriors have danced by firelight, their small, yellow-skinned bodies leaping like human flames amid a din of drums and the strident syncopations of the women. It is a joyous revel of a vanishing culture, challenging the spirits ancient and malign that dwell in darkness on the harsh bushveld of Namibia.

Once these Bushmen possessed most of southwestern Africa. They were displaced by powerful black tribes migrating from the north between 300 and 500 years ago. Only anthropologists still celebrate their gentle ways and phenomenal hunting skills.

For scientists, tonight's festivities might provide a discordant note. Few of the dancers wear traditional beads and breechclouts. Many sport the trim combat fatigue uniforms of the South African Defense Force. All are members of an elite hunter-killer unit called 31 Battalion, and they have turned their ancient skills against the black guerrilla soldiers of SWAPO—the South-West Africa People's Organization—who are fighting to end South Africa's control of Namibia, also known as South-West Africa.

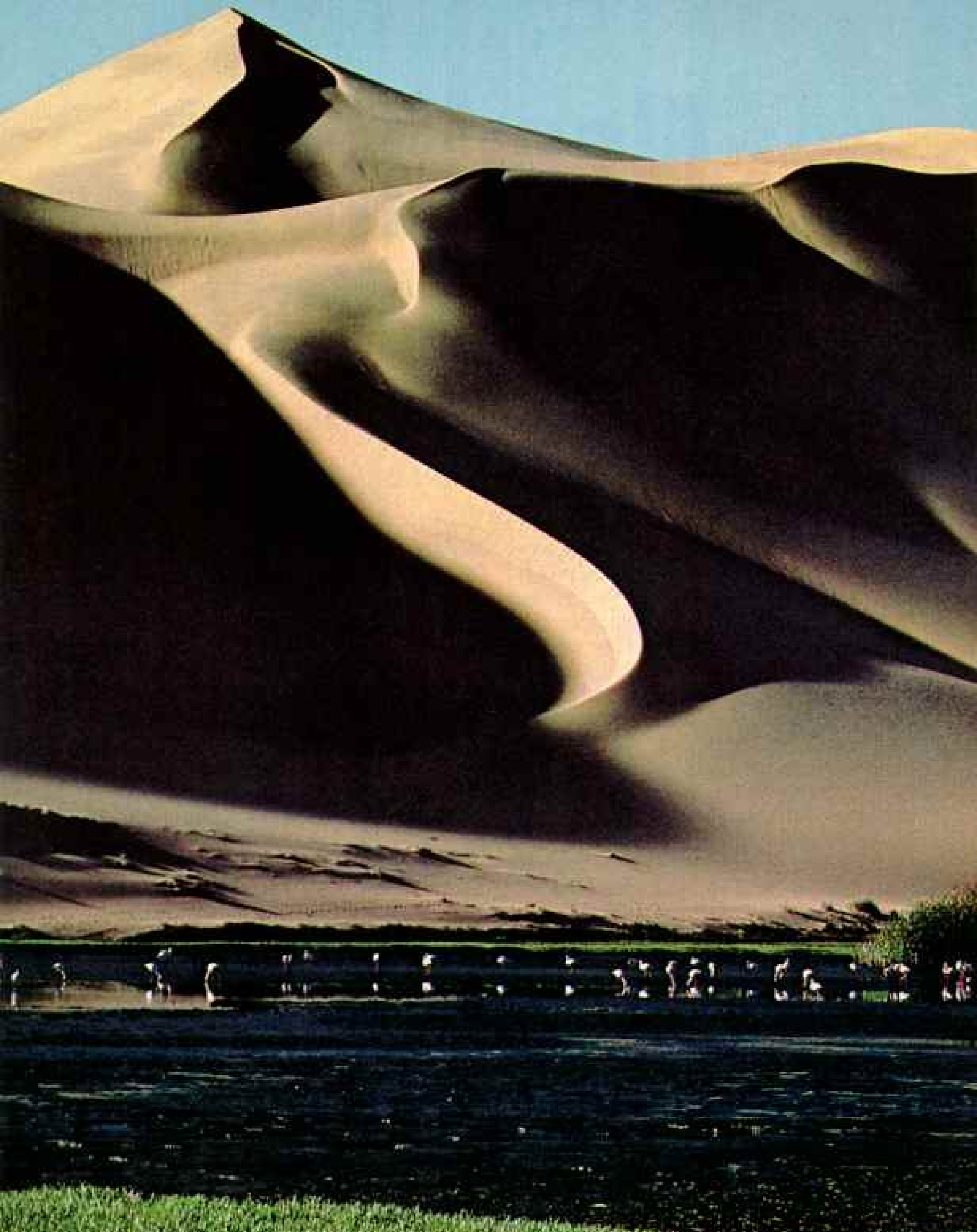
"The Bushmen are incredibly effective against the SWAPO terrorists," says Lt. Ben Wolfe, one of the unit's white combat leaders. "They can track a man for days, figure his destination, and be waiting in ambush when he arrives. And they're quite ruthless. Bushmen have reason to hate blacks."

It's only partly true. Most of SWAPO's troops are Ovambo tribesmen. Not so long ago, Bushmen (or San, as they should be called) served as household executioners in the kraals of Ovambo chiefs. In Namibia, as elsewhere, historical generalizations can serve a variety of needs.

To Lieutenant Wolfe, and some 25,000 South African troops stationed along Namibia's 1,554-kilometer (966-mile) northern border, SWAPO and terrorist are interchangeable terms. To the United Nations, SWAPO is the "sole and authentic representative of the Namibian people." Nonwhite ethnic groups compose 90 percent of the 1.2 million population. South Africa has ruled the 824,269-square-kilometer (318,252-square-mile) territory since Allied forces captured it from Germany in World War I.

I had arrived at the height of a bitter border war, marked by massive South African raids into *(Continued on page 762)*

The wait goes on: *Independence lies in the future for Namibia, a desert country also known as South-West Africa, whose shape and wildlife emblazon the dress of a Herero woman. Of ten nonwhite ethnic groups here, her people have been among the most vigorous in opposing a colonial rule that began with Germany in 1884 and continued after 1920 under neighboring South Africa.*

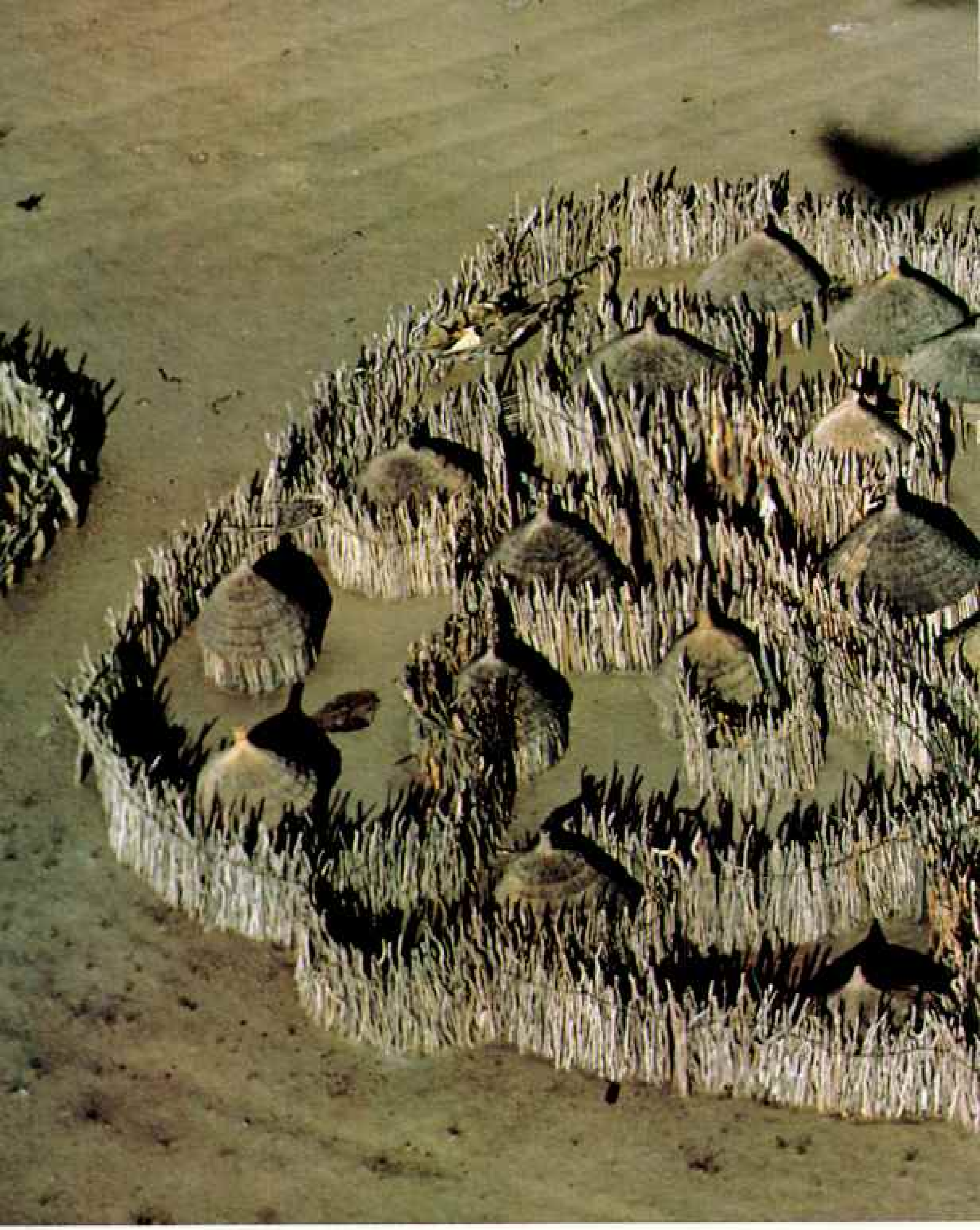


Eden on the edge of hell, *a lagoon at Sandwich Harbour nurtures colonies of flamingos. Beyond, like massive ocean waves, the foreboding dunes of the Namib Desert extend far inland, the work of prevailing southwesterlies. Such hostile vistas and scarce anchorages along the 1,600-kilometer (1,000-mile) coast repelled most*

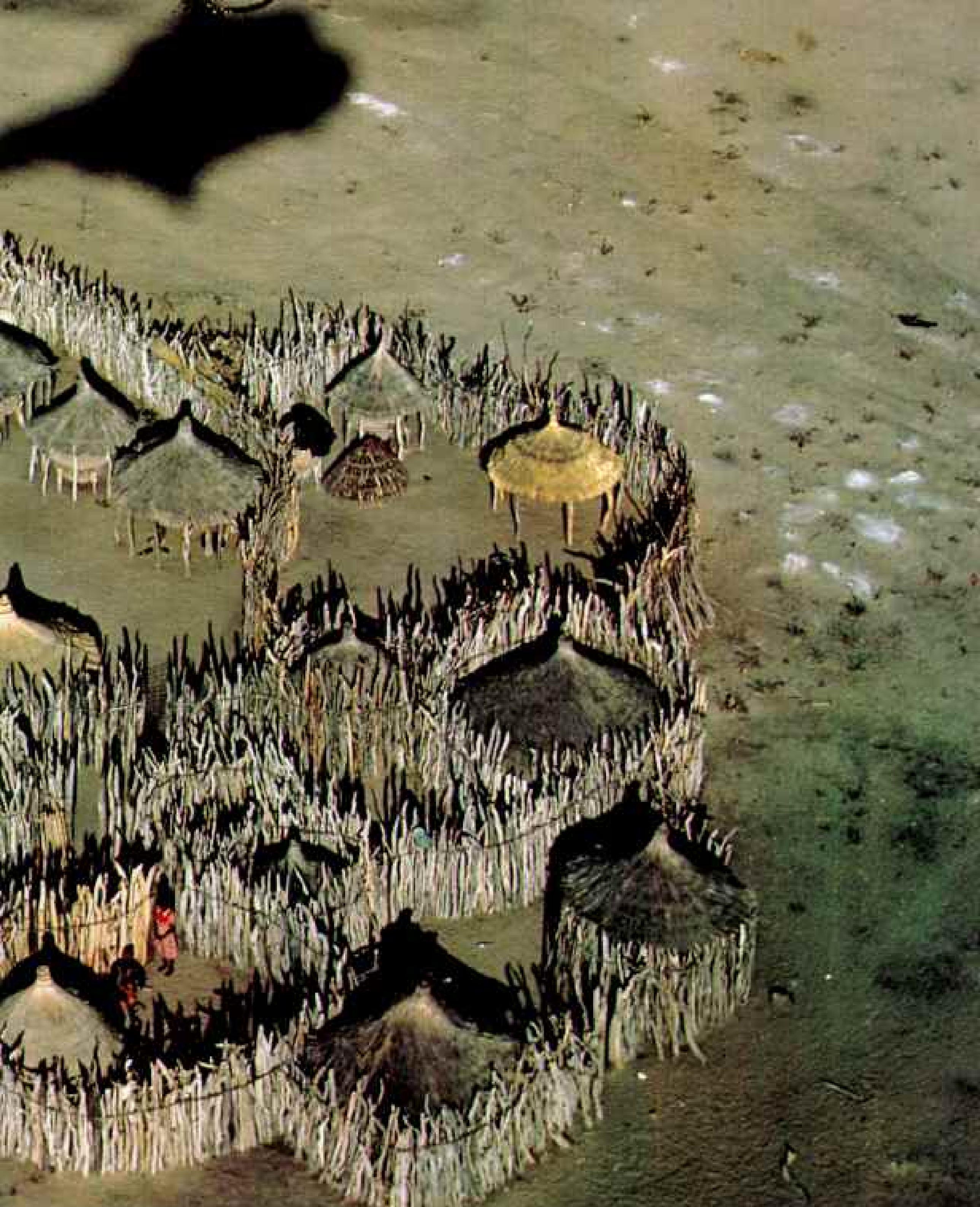
early mariners. In the 19th century the British from neighboring Cape Colony annexed coastal isles and the major harbor, Walvis Bay, while Germans settled the port of Lüderitz and extended their control into the interior. There they found a diversity of tribes, a wealth of wildlife, and a bonanza of minerals.

From the wave-dashed desolation *of the Sperrgebiet—the forbidden region—come nearly one-fifth of the world's gem diamonds. Millennia ago the precious stones formed in South Africa's interior, then washed to the Orange River Delta. Ocean currents spread them north to ancient beaches long since buried. Sixty-two years ago Ernest Oppenheimer's Consolidated Diamond Mines (CDM) won an*

exclusive concession in Namibia. Now, in one of the largest earth-moving operations anywhere, machines work round the clock 20 meters below sea level, scooping down to bedrock. Treatment plants screen the diamond-laden gravel, spewing great hills of tailings. In 1980 CDM sifted 57 million tons to recover 1.56 million carats. Company payments constitute 40 percent of Namibian revenues.



Home is a labyrinth *for the Ovambos, who can move the stick walls of their compounds to change passageways leading to the headman's hut, a way of deceiving raiders during early tribal conflicts. The sturdy shelters are built on high ground, safe from floods of the October-to-April rains. The largest group in Namibia, with half its population, the Ovambos herd cattle and grow millet as they have for*



*centuries along what is now the Namibia-Angola border. Warfare racks the area, for Ovambos predominate in the guerrilla forces of the South-West Africa People's Organization—*SWAPO*—in its fight for an immediate end to South African rule. Based in Angola, the Soviet-backed guerrillas conduct raids against South African troops, white administrators, and the headmen who cooperate with the whites.*

(Continued from page 755) Angola, where SWAPO's forces are based. And I had expected to find a country under siege. In the north that was true. But I also found a magnificent desert empire, twice the size of California, which was wealthy beyond measure with diamonds, uranium, coal, copper, and other strategic minerals. It teemed with the magical wildlife of Africa, which found nourishment on the Kalahari Desert in the east, and in the terrifying splendor of the Namib Desert, which barricades a thousand miles of desolate Atlantic coast.

Namib means "place of no people," but Namibia is hardly that. It is the home of distinctive tribes—Ovambos and Hereros, Namas and San, Damaras and Kavangos, Caprivians and Tswanas—each with its own culture and history.

I found white tribes as well, descendants of German, Afrikaner, and English settlers. There were people of mixed descent known as Coloureds—among them an aloof and vigorous community at Rehoboth who proudly call themselves Bastaards.

It was a land that defied generalizations. "We speak 27 different languages and dialects in Namibia," an anthropologist told me in Windhoek, the thriving and modern capital. "You shouldn't expect us to speak with a single voice."

Ballot Box Offers Crucial Test

In a year or so—if international negotiations succeed—Namibia's many voices will speak in a United Nations-supervised constitutional election leading to independence. It will be the first real political test of SWAPO against a coalition of tribal and splinter parties known as the Democratic Turnhalle Alliance (DTA). Since 1978 the DTA has controlled a quasi-independent national assembly under the supervision of the South African government. Beneath this assembly lies a cumbersome system of "second tier" legislatures governing 11 ethnic groups.

The United Nations has dismissed the DTA as a puppet party designed to foster tribal rivalries and preserve the power of a mere 105,000 whites.

After two months in Namibia I found such generalizations difficult to make. I met tribal leaders who actively supported South Africa—and white men who vowed her day was done. I talked with dedicated SWAPO

*"**We're fighting** for OUR homeland," say South African soldiers, camouflaged for night patrol against SWAPO guerrillas. At the cost of a million dollars a day, 25,000 soldiers oppose a SWAPO victory that, South Africa contends, would spread Soviet influence to its border.*

revolutionaries—and with veteran liberation fighters who had returned from exile to ply the art of politics at home. If there were puppets, it was hard to trace the strings.

To confuse things further, South Africa's notorious apartheid laws had been abolished—a fact that was immediately apparent when I joined a multicolored, many-throated throng on Kaiserstrasse, Windhoek's immaculate main street.

Around me I heard a colonial symphony of languages. The unique click dialects of San and Namas blended with the murmurous Bantu dialects of blacks and the sharper overtones of Europe. Statuesque Herero women in vivid Victorian-style gowns sailed graciously into old-fashioned German shops. In sparkling office towers, dark-skinned office workers shared paperwork and pleasantries with whites.

ANGOLA: In 1975 the Popular Movement for the Liberation of Angola (MPLA) took power from Portuguese colonial rulers. South Africa invaded, but retreated in the face of MPLA and Cuban troops. The MPLA says that Cubans will leave when Namibia is independent. Meanwhile, anti-MPLA rebels—members of the National Union for the Total Independence of Angola (UNITA), based in the southeast—are supported by South Africa.

Skeleton Coast

Kunene

SKELETON COAST PARK RESTRICTED WILDERNESS AREA

Cape Fria

Sarusas

KAOKOLAND

Hoarusib

Möwe Bay

Omboalantu

Oshikati

Ongwediva

Ondangwa

OVAMBOLAND

Okavango

Rundu

Shitemo

KAVANGO

Etosha Pan

ETOSHA NATIONAL PARK

Halali

Namutoni

COPPER LEAD ZINC

Okaukuejo

Tsumeb

Grootfontein

BUSHMANLAND

Hoanib

SKELETON COAST PARK

DAMARALAND

Outjo

WATERBERG PLATEAU PARK

HERERO LAND WEST

Otjiwarongo

Omuramba Omatako

HERERO LAND EAST

KALAHARI DESERT

Atlantic Ocean

NAMIB DESERT

Kalkfeld

Ugab

TIN

Brandberg 2,606 m 8,550 ft

Omaruru

NATIONAL WEST COAST TOURIST RECREATION AREA

OMARURU RIVER GAME PARK

GROSS-BARMEN HOT SPRINGS

Okahandja

Swakop R.

Arandis

ROSSING URANIUM MINE

SALT

DAAN VILJOEN GAME PARK

COPPER

Gobabis

Swakopmund

Windhoek

6,070 ft

COPPER

Walvis Bay (SOUTH AFRICA)

Khuiseb

NAMIB-NAUKLUFT PARK

Rehoboth

REHOBOTH

KALAHARI DESERT

HERERO LAND EAST

Sandwich Harbour

Solitaire

Aranos

Nossob

HAKOS RECREATION RESORT

Sossus Vlei

Mariental

Maltahöhe

Auob

NAMALAND

RESTRICTED DIAMOND AREA

1,578 m 6,450 ft

Fish

Keetmanshoop

Lüderitz

Aus

3,300 m 11,334 ft

Abandoned mining sites and equipment remain throughout the 54,861-square-kilometer Restricted Diamond Area, though present mining only takes place near Oranjemund.

LEAD ZINC

FISH RIVER CANYON PARK

Karasburg

DIAMONDS

AI-AIS HOT SPRINGS

TANTALITE

Oranjemund

Orange

BOTSWANA

SOUTH AFRICA

WALVIS BAY
Annexed by the British in 1878 and later transferred to Cape Colony, the best port on this coast became part of the Union of South Africa in 1910. South Africa has steadfastly rejected UN pleas to surrender control of Walvis Bay to Namibia. Offshore, the cool Benguela Current nurtured a fishery rich in pilchards and anchovies until overfishing in the 1970s destroyed the industry.

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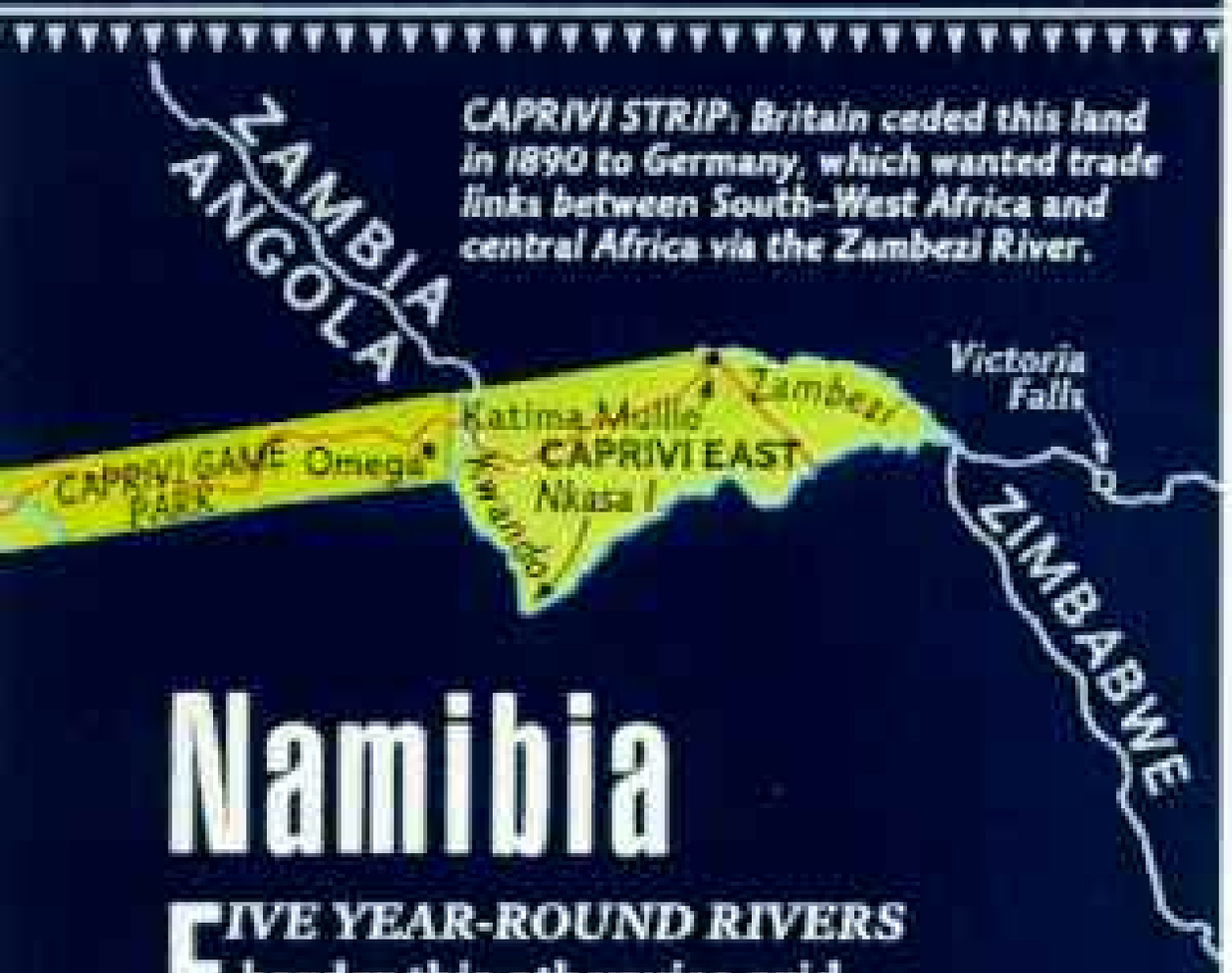
DRAWN BY JAMES E. MCCLELLAND
COMPILED BY JOHN R. TREIBER
NATIONAL GEOGRAPHIC ART DIVISION



Namibia

***FIVE YEAR-ROUND RIVERS** border this otherwise arid land. Temporary watercourses and man-made boreholes enabled settlers and livestock to spread through the interior plateau. The rivers hold potential for irrigating and electrifying part of a country that is twice the size of California, yet has only 1/23 its population. AREA: 824,269 sq km (318,252 sq mi). POPULATION: 1,024,000; half are Ovambos who live in the north (map inset at right); 10 percent are of European descent; the rest, blacks and Coloureds, were assigned by Germany and then South Africa to regions that have been treated until recently somewhat like the segregated homelands of South Africa. CAPITAL: Windhoek, pop. 89,000. Metropolitan area includes the black suburb of Katutura and the Coloured district of Khomasdal. GOVERNMENT: Despite repeated petitioning to the United Nations by African leaders, South Africa continues to control defense, police, foreign policy, trade, and passports. The railroad connects to the South African system. South Africa's promises of independence have strings. It supports the Democratic Turnhalle Alliance, which bases representation on ethnic affiliation. SWAPO, with UN support, opposes that system and insists on majority rule. LANGUAGE: Afrikaans, English (both official), German, African languages. (SWAPO would make English the state language.) RELIGION: Christian, traditional. LITERACY: 38 percent. LIFE EXPECTANCY: 51 years. ECONOMY: Diamonds, uranium, base metals, karakul pelts are exported. Raising livestock is the major occupation.*

"Yes, by law blacks can travel and shop and live where they please—or where they can afford," said Mr. Solomon Mifima, an Ovambo politician whom I had met by chance in a city park. "It's a beginning. Europeans have learned that the skies don't fall when the Whites Only signs come down. But the real apartheid still exists. Blacks and Coloureds are underpaid, ill-educated, badly housed. That won't really change until we have independence, with leaders chosen by majority vote."

Mr. Mifima was imprisoned not long ago for his democratic beliefs—ironically, not by South Africa but by his brothers in revolt. As a high-ranking member of SWAPO's government-in-exile, he joined Andreas Shipanga, a co-founder of the group, in demanding that long-overdue party elections be held. With hundreds of supporters, they were promptly jailed in Zambia at the request of SWAPO President Sam Nujoma. European civil rights activists won their release, and now they head a party called SWAPO-D (for Democrats), with headquarters in Windhoek.

THE SMALL POPULATION (1.2 persons per square kilometer) is concentrated on arable and grazing lands.

We had dined in the elegant rooftop restaurant of the Kalahari Sands Hotel, sipping fine South African wine with slabs of justly famous Namibian beef. Beyond the elegance I could see the lights of Katutura, home to most of Windhoek's blacks. In the Herero tongue, Katutura means "We have no permanent place," and though that irony might have escaped the city fathers who built it in 1958, the name described precisely what they had in mind. Blacks had been forced from their old location in Windhoek, which many considered a permanent home, to the new suburb's tightly controlled rental quarters. On December 10, 1959—as it happened, Human Rights Day—police opened fire on a crowd of unarmed protesters, killing 13.

Readying for independence, *Windhoek welcomes construction of 15-story* CDM *headquarters, which moved to the capital in 1977 from Kimberley, South Africa. It towers over older buildings of German and Cape Dutch design. After years of apartheid, similar to South Africa's, an elected assembly has outlawed some discrimination, opening to blacks landownership in white areas, travel, and public accommodations in such complexes as the French Bank Centre (**right**). But in Windhoek local option prevails, with library, pool, hospital, and schools for whites only.*

The shooting galvanized a lethargic United Nations into a long and bitter legal battle to end a hegemony that began in 1920 when the League of Nations granted South Africa the right to govern for the "material and moral well-being and the social progress of the inhabitants. . . ."

If there is a memorial to the victims, it might be the new Katutura hospital with its chain of outpatient clinics, which gleam amid a sprawl of shabby, overcrowded homes. Built by the white administration and staffed largely by black and Coloured

professionals, it has dramatically reduced infant mortality and tuberculosis in the overcrowded suburb.

But modern medicine has no cure for the complaint of a young Herero worker I met while venturing along one of Katutura's dusty streets. With four other adults and ten children, he shares—illegally—a three-room cinder-block house that rents for $40 a month. He earns $280 a month at his white-collar job in Windhoek—about half that of his white co-workers.

"They say I do not need more money because my rent is cheap," he says. "But it means I cannot afford to live anywhere else. To see my family, I must go 250 miles east, to Hereroland."

Hereroland wasn't always east. The tribe had come from the north—now Angola—centuries before, and battled for generations with the Nama tribe before Germany acquired South-West Africa as a colony in 1884. After years of skirmishes, the Hereros rose against German settlers in 1904. By 1907 the kaiser's avenging army had exterminated an estimated 65,000 Hereros. Only

15,000 survived, wandering brokenly in the Kalahari Desert. Many thousands of Namas and Damaras perished in the same war, which bottled up Namibia's major tribes in the lands they occupy today.

Today the Hereros are only 70,000 strong, but they claim the bitter honor of being Namibia's first freedom fighters, and their traditional leaders first carried the battle to the United Nations in the 1950s. Now they are the strongest supporters of the DTA.

The powerful Ovambo tribes were unscathed by the German war. Today their 600,000 members far outnumber all other tribes combined, and their homeland is a battleground.

Flying Low Thwarts Rocket Squads

To see it, I flew northward with photographer Jim Brandenburg on a week-long journey that started fast and low—at 100 feet and 200 miles per hour, to be exact.

"Tactical flying," said pilot Rowan Miles. "Always the chance of a SWAPO rocket in the operational zone. We won't be there for a while, but this will give you a good look at the country."

At first there was little to see except drought-stricken brushland, and I wondered that this arid ground had cost so much in tragedy and blood.

Then on the horizon I saw what looked like a gray, mist-shrouded ocean. As we sped toward it, the ocean became an infinity of arid clay, and the mist was dust hurled high by searing winds. This was the Etosha Pan. In times of rain, I knew, it was a shallow, 6,000-square-kilometer lake teeming with birds, fish, and other wildlife. Now the fabulous herds of elephant, giraffe, wildebeest, and springbok were hidden in the surrounding bush. We soared high to avoid the dust, and I looked down on a maze of game trails linking empty watercourses whose salty red crusts made them look like rivers of dried blood. It seemed incredible that any living thing—animal or vegetable or human—could survive in this furnace box of a land.

Yet survive they do, seeking hidden water holes and protein-rich grasses nourished by infrequent rains. North of the pan, we flew low again, whipping over the scattered kraals of the Ovambos, catching glimpses of upturned black faces, of families gathered around cooking fires, of long-horned cattle that are the Ovambos' wealth, of grain fields that have made them strong and stable for centuries.

Night Life in a Battle Zone

Our light Cessna landed gnatlike amid the jets, helicopters, and giant transport planes at the huge, dusty military airfield at Ondangwa.

"We must hurry—curfew is at six o'clock," said Beytell Erasmus, a government information officer, as we piled into his small white van and sped along a newly blacktopped highway toward Oshakati, headquarters of the scores of whites who still form the backbone of Ovamboland's civil service. The setting sun silhouetted 40-millimeter cannon on tall platforms as we passed through fortified gates into a tidy ranch-style suburb. Oshakati is only 40 kilometers from the Angolan border, and a favorite target of SWAPO guerrillas. Most blacks are excluded after dark. Whites stay home and watch videotape programs, or gather at the bar of the Oshakati Motel to exchange gossip and rumors of war.

It is a curious town meeting, conducted to the rock 'n' roll thunder of a jukebox. An agronomist tells me of plans to improve maize crops—and lectures me on the evils of American soft drinks, which have displaced the nutritious native beer. A forester sketches hopes to create a gum tree lumber industry. In one corner a former Rhodesian soldier spews beery hatred against black rule. In another corner a young schoolteacher explains the Ovambos' desire for English-language instruction: "Afrikaans binds them to South Africa. They want an international tongue."

At one point automatic cannon fire thuds above the din.

"Itchy trigger fingers on the watchtowers," says a construction foreman. "They've got night scopes. Only terrorists and bloody fools go out after curfew. We killed six of 'em last night. But maybe we're the bloody fools for being here at all. I'm building a school 20 minutes from here, but I can't drive to work in the morning until the army clears the dirt roads of SWAPO land mines. That's the favorite terrorist weapon, and the hell of it is

they kill their own people as often as not."

In many ways such intramural killing echoes history. There are seven Ovambo tribes. United, they were strong enough to deter aggressors. But they made frequent war among themselves. The kraals of their chiefs were citadels. Secret gateways pierced their wooden palisades, and a labyrinth of inner passageways was designed to confuse invaders (pages 760-61). At the heart of these fortresses burned the holy fire—*omulilo gwoshilongo*—a smoldering log of *mopani* wood that symbolized the life of the chief and the welfare of his tribe.

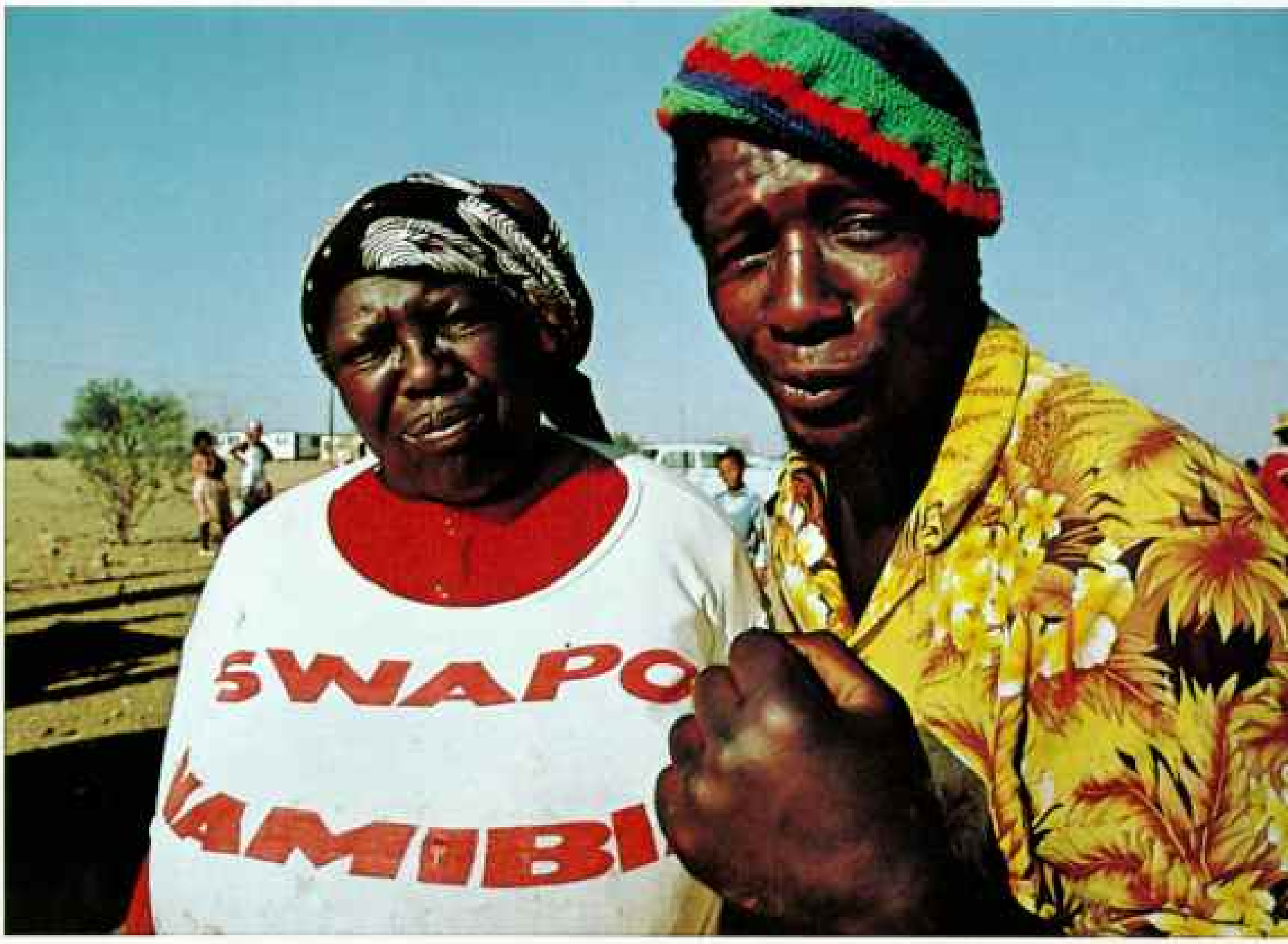
Keeping the Old Ways Alive

"To let the fire die was once *oshithila*—forbidden—meaning disaster for our land and for our people," Chief Josia Shikongo Taapopi told me when I visited his huge kraal some 130 kilometers west of Oshakati.

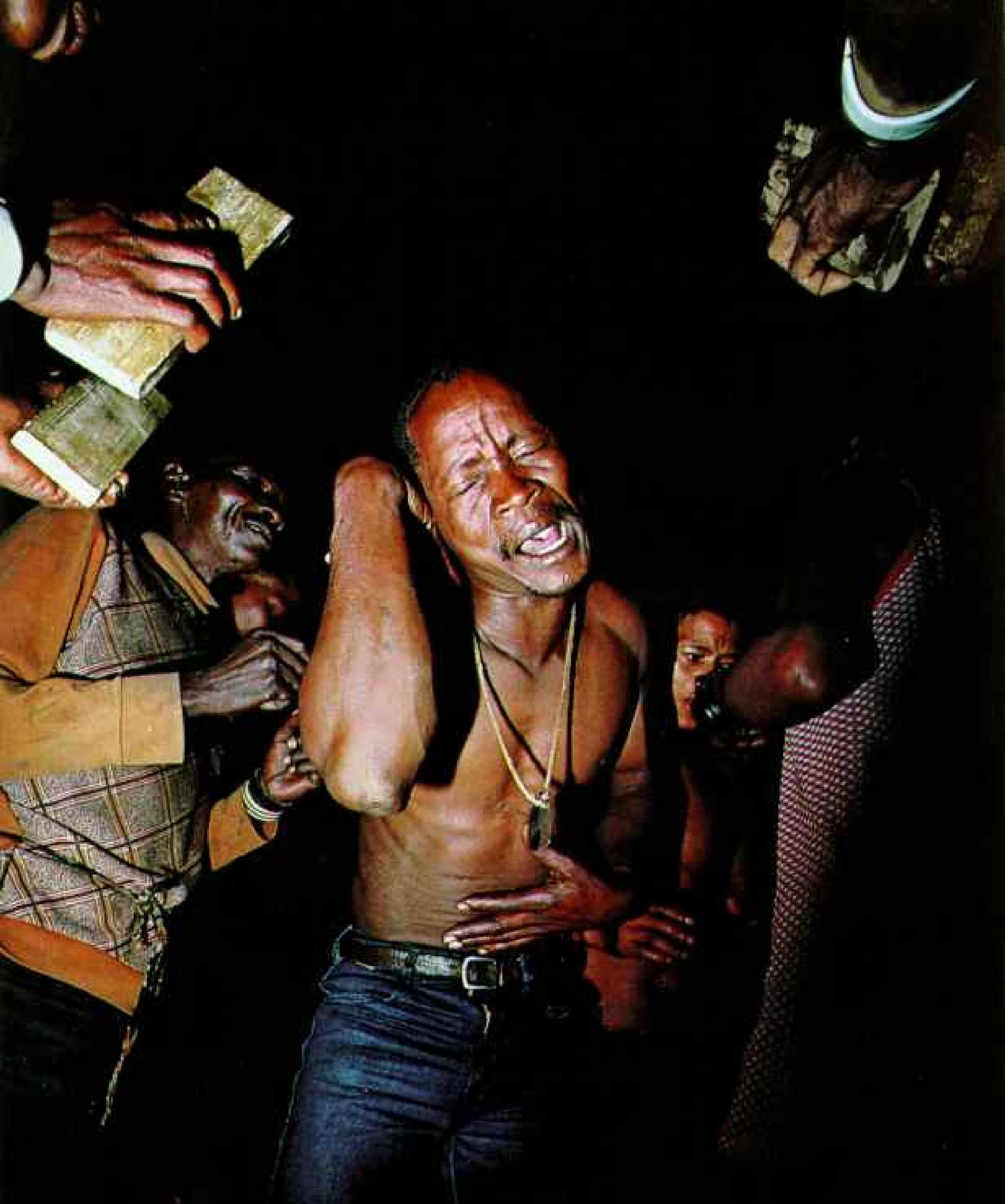
Chief Taapopi heads the Kwaluudhi Ovambos, and scrupulously guards traditional ways. Inside the walls, huge baskets bulged with grain, and women plied heavy poles to pound their daily allotment into porridge meal. Their elaborate face and body scars were not ornament, I learned, but the handiwork of witch doctors to extract the evil spirits of sickness. Heavily armed tribal militia in camouflage uniforms provided a discordant note. The chief is still well prepared for enemies among his kin.

"Ovambos are the real victims of this war," he said. "The terrorists intimidate our people, cut the throats of those who refuse them food. They abduct our children to Angola, and send them back as Communists with guns."

An estimated *(Continued on page 775)*



SWAPO colors in his cap, *its name on her shirt, a couple at a rally in Mariental hears speakers trying to broaden the party's appeal outside Ovamboland.* SWAPO *boycotted the last election and in future ones must face the South African-sponsored Democratic Turnhalle Alliance that now dominates the legislature.*



Men who once hunted *game with poisoned arrows, the Kung now raise automatic weapons against SWAPO guerrillas. A few of the people, known to settlers as Bushmen, still live in small nomadic hunting bands on the Kalahari Desert. Some 7,000 have drifted into a South African military camp called Omega. The men volunteer for training* ***(right)****, as here with a Soviet RPG-7 rocket launcher captured from guerrillas. The Kung fight for wages and prestige. Superior trackers, they join South Africans on six-week patrols that resemble old-time hunting parties, except the quarry is human.*

At Omega, the Kung keep some semblance of their traditional culture. Family life is precious, with constant physical contact requisite ***(lower right)****, as this mother shows by touching her husband's foot even as she relaxes by a tape deck. The women, who have set up a needlework factory and trained as nurse's aides, still join in Kung dances beside the evening campfire. With blocks of wood they clap a syncopated rhythm as the men dance* ***(left)****. The future for the Kung seems precarious, although SWAPO leaders promise to protect the rights of minorities in an independent Namibia.*

On the misty river that echoes their name, *the Kavangos have for generations fished in the dangerous company of hippopotamus and crocodile. They also grow*

grain on the rich floodplain that extends into Angola in the north and Namibia in the south. Many Kavangos, like Ovambos, migrate south to work part of the year.

(Continued from page 769) 70,000 Namibian refugees live in Angola and Zambia, supported by grants from the United Nations and international church groups. Among them is the chief's 18-year-old son, Frans, who vanished after a SWAPO visit to a Catholic mission school at Ombalantu.

"I have not heard from him since 1977," he says. "I hope he will not return to make war on his own people."

To many in Ovamboland, Chief Taapopi represents not tradition but the bad old days when tribal leaders preserved their power by serving colonial masters. In 1967 he welcomed South Africa's plan to make his homeland a self-governing Bantustan. Today he ardently supports the Democratic Turnhalle Alliance government, which, to its enemies, is an assemblage of Bantustans by another name.

The most forceful critics of DTA are leaders of the Christian denominations to which an estimated 80 percent of Ovambos belong. The largest is the Evangelical Lutheran Ovambokavango Church (ELOC), founded by Finnish missionaries in 1870. It was instrumental in halting tribal wars and earned the enmity of tribal chiefs who saw their sway diminishing as Christianity flourished.

Since World War II, ELOC leaders have opposed South African policies, including the system of contract labor in which Ovambos were allowed to work in the south—for room and board plus salaries ranging from $10 to $70 a month—only by signing up for a year-long absence from home and family. Church opposition helped spark nationwide strikes. In 1971 and 1972 violence flared in Ovamboland as workers attacked tribal leaders who endorsed the contract system. Police and troops arrived in force, prompting a mass exodus to Angola that enlarged SWAPO's army. Labor policies were reformed in 1977.

"We are accused of supporting SWAPO," a churchman told me. "But most of our members accept both Christ's word and SWAPO's goals. Where do you draw the line?"

The Reverend Peter Kalangula has drawn it down the middle of a difficult political road. When I met him, he was president of the DTA and a leading candidate against SWAPO leader Sam Nujoma in the forthcoming elections. Later, he resigned from DTA, condemning its ethnic policies as unworkable, and now is attempting to form his own coalition party.

"If the war and intimidation stop, I think we will win," he said at Ongwediva, where he was chairman of the executive committee of the Ovamboland legislative assembly.

"The DTA has brought enormous changes. Our biggest problem today is the ultraconservative white element—a minority within a minority. They are slowing us down."

Urgency Marks Education Drive

He was describing the cause of a bitter setback of his own. He resigned as minister for education in 1980, when the white second-tier administration refused to admit blacks and Coloureds to the elaborate new Teachers Training College in Windhoek. Planned for a student body of 1,600, it opened in 1979 with only 110 white students.

"Education is our critical need," the Reverend Kalangula said. "Without it our future will be like our past."

Today Ovamboland has 430 schools and 2,750 teachers, financed by central-government grants of 30 million dollars a year. But 95 percent of the 115,000 students are still in primary grades. Only 5 percent attend secondary grades, and a mere 600 receive advanced training. Meanwhile, leaders struggling to change the curriculum from Afrikaans to English are severely limited by a lack of qualified teachers.

"When you go home," the Reverend Kalangula said, "please mention that we would welcome American volunteers."

East of Ovamboland lie the districts of Kavango and Caprivi, where two groups of tribes live in a world that seems oddly detached from the rest of Namibia. It is a gentler land, (Continued on page 780)

Hairstyles convey meaning *among the Himbas, a cattle-raising people of the isolated, drought-stricken northwest, who live much as the Hereros did a century ago. At puberty women shave the front of their scalps and braid remaining strands with plant fibers. At marriage they add locks of hair from their brothers and grooms.*

Farming makes strange bedfellows *in a land that sets wild and domesticated animals in startling juxtaposition. Most wildlife—from the caracal lynx* ***(left)*** *to the black-masked gemsbok* ***(right)****—roams the immense cattle and sheep ranches that cover the country's grazing land. In 1967 the government granted farmers an ownership in the game, permitting limited harvesting for meat, trophies, or sale. The practice reflects a revolutionary idea of game management: Farmers guard against poaching, while culling to prevent devastating overpopulation. Game farmer Jan Oelofse fitted these gemsboks awaiting sale with rubber-hose horn guards.*

Sheep ranchers have developed the karakul breed, brought first from Bukhara by way of Germany in 1907. Three-year-old Frans Maritz ***(below)*** *helps gather the newborn at Solitaire. The pelts of day-old lambs, destined for luxury coats, are an important export. First Germany, then South Africa encouraged the settlement of white farmers, offering loans and land after displacing blacks to reserves. Now blacks are beginning to buy back.*

Elephant jam near a water hole *sends tourist vehicles into rapid turnaround; the pachyderms outweigh subcompact cars about three to one. Such crowds of females with calves are a favorite sight in Etosha National Park. One of Africa's most splendid sanctuaries, it covers an area larger than the state of Massachusetts. At its heart lies the Etosha Pan, a flat efflorescent salt basin that is dead much of the year. Then after rivers to the north flood, the runoff reaches the basin, and a rebirth*

occurs, drawing marabou storks, flamingos, pelicans, and a galaxy of other migratory birds. Water trapped in a great subterranean depression seeps out elsewhere in artesian wells, full of nourishing trace minerals. The park boasts 50,000 large animals from giraffe to impala. But overpopulation threatens, a condition monitored at an ecological institute at Okaukuejo. Tourists find comfortable rest camps there, at Namutoni—a renovated German fort—and Halali.

Children suffer *the brunt of war in Ovamboland as guerrillas strike terror by planting mines in the dirt roads. Bused to school in Oshakati by military convoy, sons of administrators* ***(facing page)*** *travel in an armored, mine-proof vehicle. In Ongwediva a youngster* ***(below)*** *lost both arms treating a live grenade like a handball. He now lives in a school for the disabled.*

made so by clear-running rivers like the Okavango, which marks the Angola-Namibia border for 355 kilometers before plunging south into the Okavango Swamps of Botswana. Farther east is the Kwando River, which nourishes a wildlife paradise called Nkasa, destined to become one of Africa's most unusual national parks. And at last there is the Zambezi River, whose timeless torrent flows across the point where Namibia, Botswana, Zambia, and Zimbabwe converge (map, pages 764-5).

On our flight from Ondangwa we skimmed the Okavango joyfully, banking sharply around marshy bends where crocodiles lurked. Clouds of startled water birds took flight behind us. Well-cultivated fields and tidy villages spangled the stream's southern bank. On the Angola side I saw no sign of life.

"We estimate that about 20,000 Kavangos have moved to our side of the river," said Col. Leon Martins, the district's military commander, when we landed at Rundu, the Kavango capital. "There is almost zero guerrilla activity at the moment. Our biggest job is drilling water wells and opening new farm areas to relieve overcrowding along the river."

The refugees had fled a different war. For years a black guerrilla movement called UNITA has held southeastern Angola against that country's Marxist rulers. UNITA and SWAPO once cooperated. Later, Angola allowed the Namibian group to establish bases near Ovamboland. Today UNITA and South Africa have teamed to squeeze SWAPO westward, leaving the eastern sectors largely at peace.

That night, after an excellent steak dinner at the new Rundu Motel, I wandered to the river and gazed across to Angola at the shuttered shops and shacks of Calai, a few hundred feet and a war and a world away. Mist swirled above the water, and somewhere a nocturnal animal grunted and splashed and was gone.

Food for the Future

Next day, when the sun had burned away the midwinter frost, we drove east along the river through a placid land. In roadside kraals, women dressed their daughters' hair, while men and boys directed herds of sleek black cattle to pasture. Beyond the villages I could see broad cornfields shining like Iowa in August. These were part of a new agricultural scheme begun three years ago by the government-financed First National Development Corporation (called ENOK for its Afrikaans initials).

"With proper fertilizing and irrigation, we have tripled production," said Piet Mudge, who manages a 500-hectare (1,235-acre) peanut and maize plantation at Shitemo. "This is a business operation. We

export the peanuts. Our maize is reducing imports from South Africa. And we provide jobs. But our main purpose is to teach local farmers how to improve their own production—not just to feed themselves but to produce a cash crop as well."

ENOK's efforts have been criticized by some as a tactic to keep blacks in their place. But improved small-scale farming may be the wave of the future in southern Africa, where massive attempts at industrialization and mechanized agriculture have produced rural unemployment, slum-shrouded cities, and disastrous food deficits.

"We should thank God for the lessons of other African countries," said Felix Lutambo, the Caprivian minister of agriculture, whom I met at Katima Mulilo on the bank of the Zambezi River. "Already, people are asking to form cooperatives. Next year, if we get rain, we may be able to export maize."

Navigation Scheme Contains a Flaw

The 350-kilometer Caprivi Strip is a piece of geopolitical whimsy, created in 1890 when Great Britain ceded it to Germany to help provide a link with German East Africa (now Tanzania) via the Zambezi. Somehow the empire builders overlooked Victoria Falls, which made the stream unnavigable. The strip slumbered until 1964, when an independence movement called the Caprivi African National Union (CANU) was organized. Its leader, A. M. Muyongo, merged his forces with SWAPO, and he became vice president.

The combined groups staged a deadly artillery and mortar bombardment of Katima Mulilo from Zambia in 1978. But in 1980 SWAPO expelled Muyongo and his staff for complaining of Ovambo discrimination against Caprivians.

Among scores of exiles who returned under amnesty was Boniface Ntesa, 31, formerly an accountant with SWAPO's treasury department.

"They called us primitives, so we left," he told me. "But now the United Nations will not hear us. If we are not free to criticize, how can we be free men?"

There is little primitive about Caprivi's 35,000 citizens. Their long association with British colonial neighbors has made English their second language, and with it has come a wider view than Afrikaans allows. Its spokesmen in Windhoek are among the most faithful and forceful watchdogs of the DTA, pressing for greater freedom from South African supervision.

But their geographic isolation has preserved a natural heritage beyond compare, hidden through centuries in the lush marshland to the south.

"Nkasa Island has one of the most incredible concentrations of rare animals in

Chain of office *distinguishes the mayor of Swakopmund, Graham Louw, who stands with his wife, Yvonne, before the home he built himself. His parents in 1928 discovered uranium nearby, and he helped develop the gigantic mine at Rössing.*

Africa," said Manie Grobler, a biologist with Namibia's Department of Agriculture and Nature Conservation. "With any luck it will soon become a national park."

We were flying low in an army Puma helicopter across what seemed to me a dubious wilderness of brush and sand. But suddenly I saw dark water channels and tall reeds, and in them a small herd of lechwe antelopes galloping gracefully away. Then, within minutes, we counted 15 hippos browsing around a pool, and half a dozen sassabies, one of the rarest antelopes of all. Giraffes nibbled reflectively on tall branches. Lions yawned beneath graceful palms in clearings, their glossy coats unmarred by desert thorns. Huge crocodiles by the score lay waiting for incautious reedbuck, sable antelope, and Cape buffalo, and pairs of wattled cranes flew escort as we circled.

"That's only a small part of it," Manie told me. "To see it properly, you must go on safari by boat. We have plans for campsites, with a maximum of 4,000 visitors a year —enough to make good business for local people without destroying the habitat. No hunting, of course. But anglers would find our tiger fish one of the strongest fighters they've tackled."

Harvesting Game Adds Revenue

In tiny Edens like Nkasa, or in huge ones like Etosha National Park, Namibia's conservation experts use classic methods to offset the effects of poaching and population growth that threaten to extinguish much of southern Africa's wildlife.

But they have also launched a more pragmatic effort—offensive to some animal lovers—that makes game management a paying proposition. About two-thirds of the country's wildlife ranges on private land, sharing grazing with the cattle and karakul sheep that have been the farmers' mainstay since German times. In 1967 the Department of Agriculture and Nature Conservation granted farmers an ownership right in the game for trophy hunting and harvesting.

"We call it game utilization," said Dr. Eugene Joubert, assistant director for research. "It's become a ten-million-dollar-a-year business, and game is now treated as a renewable resource."

Keys to the program's success are mobile abattoirs and teams of mechanized hunters who spotlight herds at night. During the April-to-September cropping season, they can kill and process as many as 600 springbok and kudu in one hunt, and ship the refrigerated carcasses next day to the dining tables of Germany and France.

"Adrenaline tests show the animals are far less alarmed at night. They don't scatter, and hunters get a good cross section of male and female, young and old, so that the population structure remains constant," said Dr. Joubert.

Trophy hunting may become an even bigger business. In 1981, 1,537 foreign visitors spent six million dollars in Namibia, a luxury trade that delights tourist officials because it boosts revenues without the affliction of trampling tourist hordes.

Advocate of Giraffe Steaks

An aggressive leader in that business is Jan Oelofse, a tough and energetic former park ranger who has converted his 16,000-hectare ranch at Kalkfeld into a commercial game farm that he considers a model for the future conservation of Africa's wildlife (pages 794-5).

"I have 42 species here—perhaps 3,000 animals in all, including white rhino, giraffe, leopard, and cheetah," he said, as we sat in the ranch's luxurious guest quarters. "We bring in 18 to 20 hunters a year, which earns about $150,000. We capture and sell about $50,000 worth of animals each season to other game ranches. That keeps the population in balance. It's much more humane than mass slaughter. This is not a park or a zoo—I'd have to be a multimillionaire to afford that, and I'd *still* have to cull!"

Like all wildlife specialists Mr. Oelofse is aware that indigenous species are far more efficient than cattle in utilizing the natural habitat, but does not think that fact will change the cultural prejudices of blacks, who look on cattle as a symbol of wealth, or whites who look on them as the source of it. But he does have a pragmatic idea.

"Giraffes provide the best game meat you can get," he said. "They browse on trees. You could double the meat production on a cattle ranch with no grazing competition, and have a much nobler animal to look at as well."

How noble—how fantastically durable—Namibia's wildlife can be, I learned on a five-day safari to Kaokoland and the Skeleton Coast to the northwest. In an arid world of dunes and stony volcanic plains I saw giraffes and ostriches, lions and stately gemsboks, wandering like mythical figures in a primordial mirage.

"They seem to live on air and sand," said my guide, Ernst Karlowa. "But even after years of drought, water seeps underground in the riverbeds to keep trees alive and create a few water holes. The animals trek miles across the desert from one river to the next. And ten millimeters of rain can make this country as green as Germany."

Learning to Be Sand-Happy

Mr. Karlowa is something of a mythical figure himself. Namibian-born, he was a German bomber pilot in World War II. Since then he has become master and slave to a lonely and mysterious desert world, first as diamond prospector and mining engineer and now as principal nature conservator of Skeleton Coast Park.

"People say I may be a little sand-happy," he said as he led our two-truck convoy north along the beach from park headquarters at Möwe Bay.

Within hours I was as addicted as he. We floated at 80 kilometers an hour over crystalline dunes, inched our way through soggy quicksands in a wind-whipped froth of surf. Bleached whale bones lay in windrows, memorials to the slaughter wrought by whalers a century ago. Here and there the beaches were cloaked with scarlet sands, and through a magnifying glass I saw a miniature king's ransom of garnets, a sign that diamonds might lie buried somewhere near.

"Diamonds and garnets have nearly the same specific gravity," Mr. Karlowa said. "They're formed by volcanic action and washed to the sea by river floods. The garnets fracture more easily and drift with the sand. The diamonds move with the heavier rocks. They are probably somewhere in the marine terraces a few hundred feet inland."

At the mouth of the Hoanib River he pointed out an abandoned campsite surrounded by carefully sorted stones.

"We found three skeletons here in 1963, lying side by side, each with a pickax hole in the skull. Obviously they had dug loads of diamond-bearing gravel and brought them here to sift out the gems. And obviously there was a fourth member of the party who wanted the wealth for himself, and murdered his friends as they slept. But the big mystery to me is where they got the gravel. In 20 years I haven't seen that particular type on this coast."

Wealth of another kind awaited us at a huddle of huts called Sarusas, once an amethyst mine and now a base for prospecting by the Dimacor Diamond Mining Company. "Pretty routine, really," said Robin Nichol, the company's field engineer. "Personally, I would rather see them reopen the amethyst operation." He opened an old storage shed to show me a frozen purple cataract of gems glittering on the floor. "These are just rejects," he said. "But I'll take them over diamonds any day. People love amethysts—but they won't kill you for them."

Also visiting Sarusas was a young Cape Town archaeologist named Christine Sievers, who was studying an ancient nomad encampment nearby. We walked at sunset in a bitter wind through a cluster of stone circles that once were tented cozily with reeds or animal skins and glowed with campfires.

"It wasn't a permanent home," Ms. Sievers said. "The inland peoples came here during the proper season for shellfish."

Early white explorers had seen the nomads from their ships and believed them to be half animal, half man. And to sailors who believed the world was flat, this desolate coast might have looked like the end of it. For many, it was.

"Nobody knows how many ships have been wrecked here," Mr. Karlowa told me next day as we headed across treacherous,

Eerie figurehead from a long-lost vessel *recalls that howling storms, sea fog, treacherous currents, and uncharted reefs have for centuries claimed galleons, clippers, and merchantmen along the aptly named Skeleton Coast. Shifting sands alternately cover and uncover wreckage—together with human bones.*

thin-crusted salt pans toward Cape Fria. "I found a carved figurehead here in 1975. It was carbon-dated at between 400 and 500 years old. Every time I come here there is some piece of old wreckage uncovered by the sea or the wind."

Wreckage Recalls Valiant Rescue

For us there were massive spars and timbers of an old square-rigger, hard by the rusty hull of a Japanese trawler that drove full speed ashore one night in 1978, its crew lulled by radar that was blind to the vast, flat beach. Farther north we found the fragments of the British *Dunedin Star*, a World War II munitions carrier that went aground in 1942 with 106 passengers and crew. All were rescued in a legendary, two-week operation by sea, air, and a land convoy that struggled for 11 days to reach them from Windhoek.

"I can make the same trip in 18 hours," Mr. Karlowa said. "But it took me a good many years to learn the way."

For three of those years he lived in almost total isolation at Cape Fria, making surveys for a proposed 1.6-kilometer-square harbor to be excavated in a 135-meter-deep salt pan just beyond the high-tide line. The harbor would have enabled export by sea of Kaokoland's huge iron ore reserves—and would also have re-created the sheltered anchorage known to Portuguese mariners five centuries ago.

As German as Bremen, *the rocky port of Lüderitz has fallen on hard times. At the turn of the century, after German merchant Adolf Lüderitz took possession with Chancellor Bismarck's promise of protection, the port attracted white settlers,*

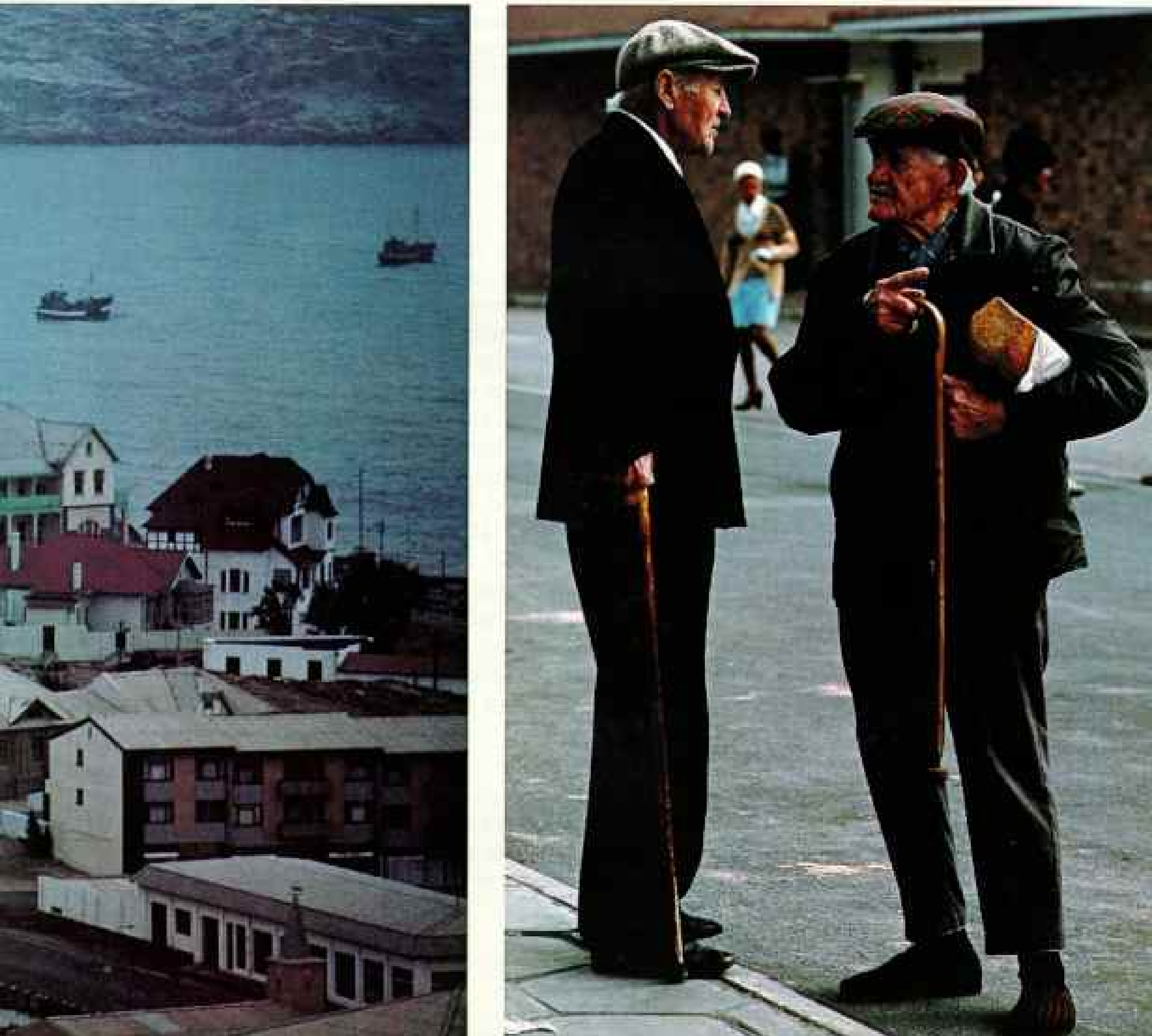
"We believe the bay was cut off by shifting sands, allowing the salt to build up," Ernst said. "If it is ever excavated, I'm convinced we'll find an archaeological treasure of wrecked and abandoned ships."

Sea Mists Slake Desert Thirsts

From the desolate shore we turned east through the barren mountains and stony plains of Kaokoland. Where I saw only sun-withered wilderness, Mr. Karlowa saw abundant signs of life. He showed me lichens that snapped open like springs to a single drop of water. On sighing sand dunes, beetles stood on their heads to gather moisture from sea mists that shroud the desert each evening and dined on windblown eddies of grass seed that would sprout like green magic with the rain. We slept dustily beneath unblinking stars and a blinding moon and wakened in dew-soaked sleeping bags. Giraffes, I learned, would get their morning drink while browsing leaves equally as wet.

The Kaokoland is home to a nomadic tribe of cattle herders called the Himbas. For two days we found only their abandoned huts, but at last, in the valley of the Hoarusib River, human tracks led us to a miraculous trickle of water. Here, about 200 Himbas had found a last desperate refuge from the drought, balanced uneasily between modern turmoil and the ordered structure of the past.

diamond prospectors, and rock lobster fishermen. Now only a few boats go out, and few freighters call. The white population has shrunk to 700, largely German, while nonwhites have decreased to 3,500. The potential for tourism is being explored.



On one bank, women in traditional costume of leather, shells, and beads busied themselves in new huts made of tamarisk branches. Their cattle had been driven off to survive or die on a denuded land, so there was no dung to seal the huts, no milk for children, no butterfat for the red ocher body ointment that is their special vanity and their protection against the savage sun. Instead they tended irrigation ditches in small patches of maize that was weeks from ripeness. They greeted us with dignity and candid smiles.

Hungry People Wrestle Despair

Farther downstream most of the men gathered around the camp of their leader, Captain Isaac. Dressed in rough Western clothes and miners' coveralls, they seemed downcast as we approached. One spoke some English, another Afrikaans, and in a confused smattering of tongues the captain described their plight.

"We have done all we can for ourselves," he said. "The government gives some maize. We have some goats. But there is no work for our men. Schools are far away. Even if rain comes, I do not think we can go back to the old ways. It is hard to think of the future when you are hungry today."

The Himbas, I learned, are cousins to the Hereros and speak the same language. Other black tribes have scorned them for their primitive ways. Nominally, they fall under the Herero tribal government. So far they have seen little benefit. Children who make it to boarding schools may be taught in Herero, Damara, or Afrikaans. Most are illiterate and can only look with envy to the south, where more sophisticated Damaras, Ovambos, Hereros, and Coloureds average $400 a month in wages, plus subsidized housing and other benefits at Rössing, the largest—and possibly most controversial—uranium mine in the world.

"We employ 2,300 blacks and Coloureds—mostly unskilled and semiskilled —and 870 whites," said management spokesman Tony Gibb, when I visited the huge open pit 70 kilometers northeast of Swakopmund. "They produce 5,000 tons of uranium oxide a year and have to move 60 million tons of rock to get it."

Rössing's output is worth about 350 million dollars at current world prices. South Africa owns 13 percent of the company. Britain's Rio-Tinto Zinc Corporation, with 46 percent, provides the British government with a secure source of uranium.

Opened in 1976 at a cost of 350 million dollars, the mine was denounced by the United Nations as an illegal exploitation of Namibia's resources and workers. Suave silence shrouds the company's finances, but Rössing's managers bristle at allegations about workers' plight.

"We spend three million dollars a year on training programs with a staff of 56 full-time instructors," Mr. Gibb said as we drove cautiously amid gargantuan dump trucks hauling 160-ton loads.

"That includes everything from basic literacy classes to apprenticeships for mechanics and refinery technicians. You simply can't run a sophisticated, highly mechanized operation otherwise."

Most blacks live in Arandis, a bright new town financed largely by Rössing, where three- and four-bedroom houses and bachelor apartments surround schools, shops, and a modern 41-bed hospital. Medical care is free for the people of Arandis, and the workers are tested regularly for any signs of radiation exposure.

With all its corporate civility, Rössing has not fully disarmed its neighbors.

"All in all we have benefited," said Mr. Jörg Henrichsen, vice-mayor of Swakopmund. "But one of the negative sides is that the mine uses 23,000 cubic meters of water a day, which will deplete reserves in a decade or two. We have already built a pilot plant to desalinate sea water."

But the town's major complaint is that

Squatters in black tie, *jackass penguins moved in to nest in this abandoned stationmaster's house on Halifax Island off Lüderitz. For hundreds of years seabirds have inhabited such coastal isles, cooled by the Benguela Current, and have left rich fertilizer many meters deep. South Africa owns the islands and regulates recovery of thousands of tons of guano a year.*

Silent witnesses to dead dreams, *shovels hefted by diamond miners lie preserved by the shifting sands at a German camp near Lüderitz, abandoned during World War I.*

Farther south at the present CDM *field* ***(below)*** *men move in after machines shovel out crevices of bedrock and sweep every cranny in the final search for diamonds. They bring any finds to supervisor Mandanda Manjera, who determines the bonus earned by the size of the stone, which he fits through a graduated hole in the lockbox. Manjera, like most miners, is an Ovambo working on contract.*

Just a few hours' take, *1,200 carats of diamonds, including pink and chartreuse fancies sometimes as valuable as the blue-whites, lie on a karakul skin at* CDM *in Oranjemund, a company town.* CDM *still searches for diamonds, even with offshore prospecting vessels, and also conducts a mineral survey of the entire country.*

Rössing's taxes go mainly to the first- and second-tier governments, with little left over to help the town cope with increased population pressures.

"We have received only 5 percent of what we need for fiscal 1981-82," Mr. Henrichsen said. "As a municipality, we are third-tier—the end of the line."

Mr. Henrichsen is one of an estimated 30,000 German-speaking Namibians, many of them descended from settlers who came to the territory when Kaiser Wilhelm annexed it. Swakopmund is a living memorial to their unfinished empire. Wedding-cake 19th-century architecture graces its streets. The museum contains detailed dioramas of the Herero war. A waterfront monument salutes Swakopmunders who died for the fatherland in two World Wars, and, by implication, commemorates the hundreds of men who were interned by South Africa as Nazi sympathizers between 1939 and 1945.

The German connection is deep. Many of today's German speakers stem from a wave of immigrants who arrived after World War II. They cast a European eye on Namibia's complex politics.

"We simply can't promote the myth of 11 separate administrations in Namibia," Mr. Henrichsen says. "The DTA might find itself divided and ineffective against a unified SWAPO vote. And if SWAPO wins, they won't

bring in Russians or Cubans—they'll bring in *East* Germans!"

South of Swakopmund lies the diamond coast, whose forbidding beauty has been forbidden to casual travelers since German surveyors discovered its glittering treasures almost a century ago. By helicopter we flew the 600-kilometer length of it, and discovered we had saved the most exquisite scenery in Namibia until last.

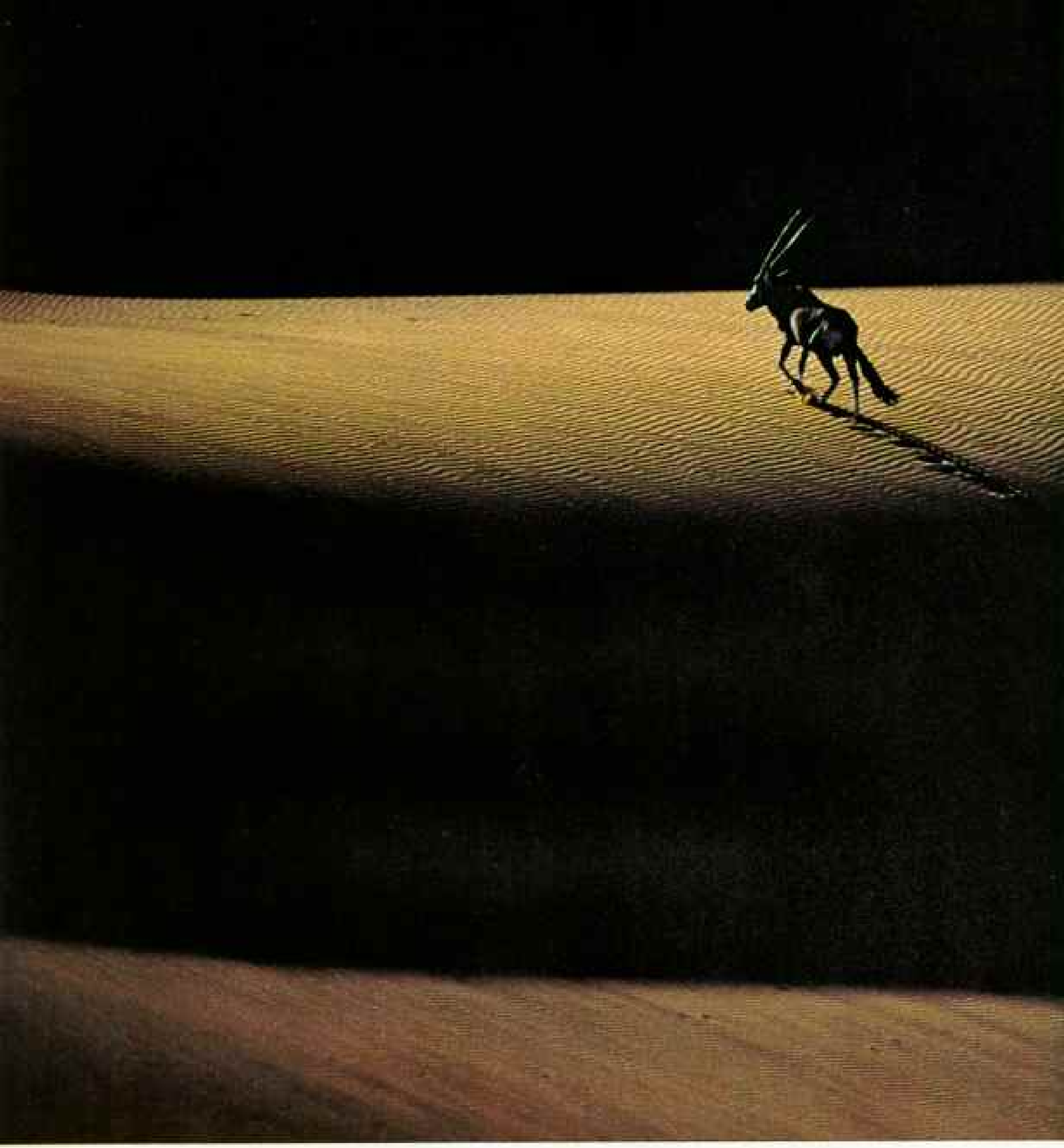
First there was Sandwich Harbour, protected from the Atlantic by an arm of land, where starkly sculptured sand dunes towered behind vivid green reeds and translucent waters where scores of sharks called *Sandfische* lay. Through the mist a myriad of flamingos took flight like fragments of a dream. Near Sossus Vlei, in Namib-Naukluft Park, the dunes themselves seemed to take flight. Plumes of wind-flung sand curled from their 350-meter summits, highest of any in the world.

"Sometimes I wonder if I'm flying on the right planet," said pilot Jacques Migeotte, a former French Foreign Legionnaire who has come to know the diamond coast more intimately than any man alive.

Along the shore he showed us abandoned German diamond workings, where rusting machinery in impeccable array awaits masters who never returned. At dusk we reached Lüderitz, the place where Germany's African adventure began. Sedate church steeples gazed over rocky fjords and a tidy town and seaport that have seen better days. Most of the harbor traffic has disappeared to the South African-owned enclave of Walvis Bay. Hopes for a share of the incredibly rich pilchard fishery spawned by the nutrient-rich Benguela Current were thwarted when the republic granted lucrative fishing licenses to South African-based consortiums. In one of the world's greatest marine tragedies of the century, that fishery has been almost destroyed by foreign and local fleets, with catches dwindling from

Enigmatic hunters *stride across a granite cave wall in Brandberg mountain, pursuing painted giraffes, elephants, and elands. For thousands of years a succession of early peoples roamed the solitary massif in the Namib Desert.*

Catch a cheetah *by the tail and you can control him, says Jan Oelofse, who runs a 16,000-hectare (40,000-acre) game ranch at Kalkfeld. After his dogs distract a cheetah, he makes a grab (***right***) and quickly wrestles the 45-kilogram (100-pound) animal to his truck (***below***). The caged cat will lure its family into captivity for shipment abroad. Imperiled elsewhere, the cheetahs have a stable population in Namibia, where they are considered vermin that prey on livestock. Oelofse oversees 3,000 animals of 42 species and leads trophy safaris to control populations. A former park ranger from South Africa, he believes, "If we can make money from game, cattle pastures will be converted to game ranches and wildlife habitats may be reclaimed."*



Like a mirage, a lone gemsbok wanders the Namib Desert. Fog rolling in

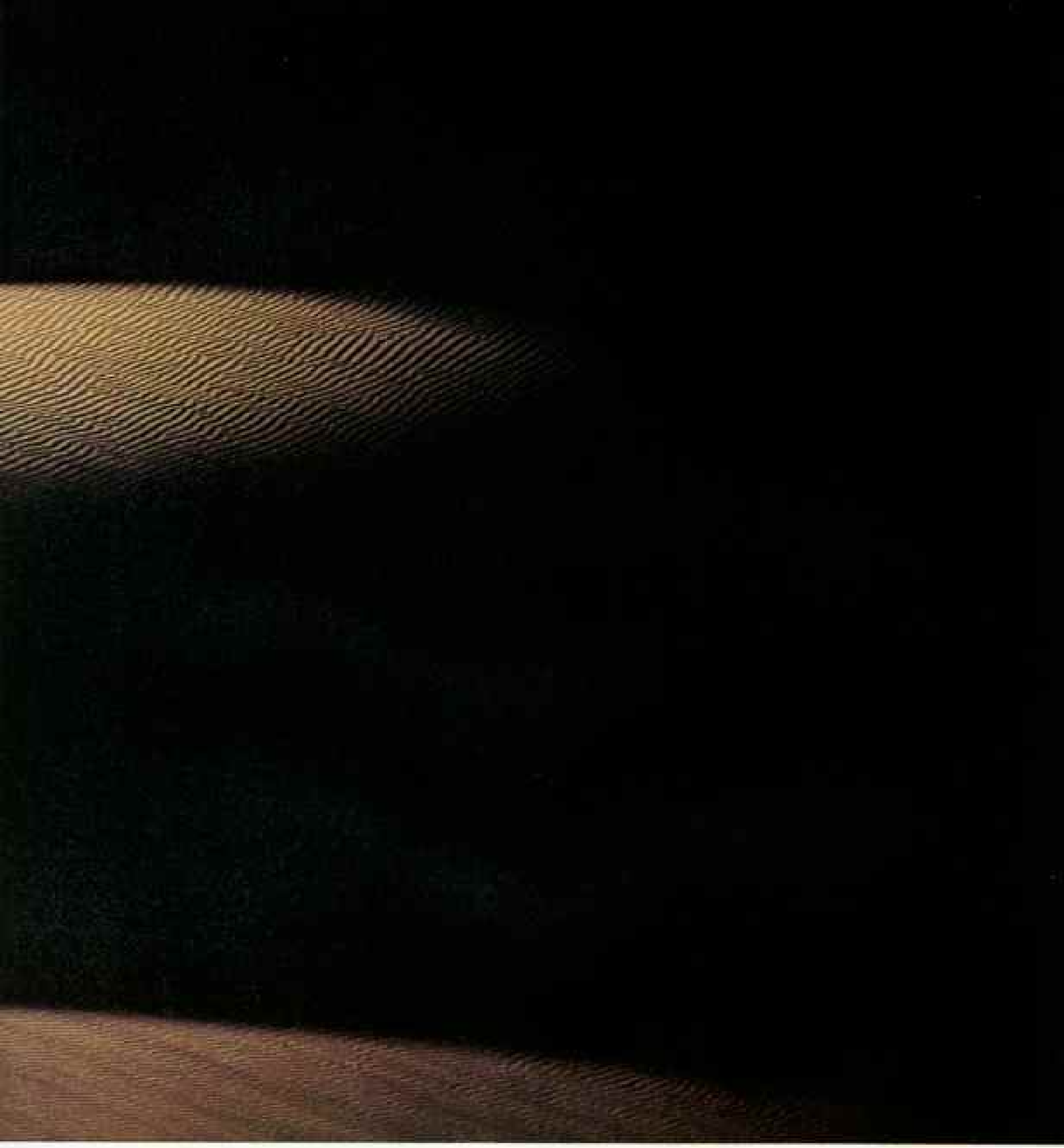
1,500,000 tons in 1968 to almost zero in 1980.

Today, Lüderitz survives on a small rock-lobster fishery, and on hopes that a new whitefish processing industry will succeed. There are other hopes.

With improved harbor facilities and a short rail link, the city could become an export center for rich coal deposits at Aranos and in nearby Botswana. Such investments are unlikely until Namibia's status is resolved, according to Werner Gühring, for many years the city's mayor.

"I look to independence, when our resources can be developed and Lüderitz can live again."

South 250 kilometers again is Oranjemund, the site of a gigantic sand-moving operation that recovers a daily million-dollar pocketful of gems for CDM (Consolidated Diamond Mines), a wholly owned



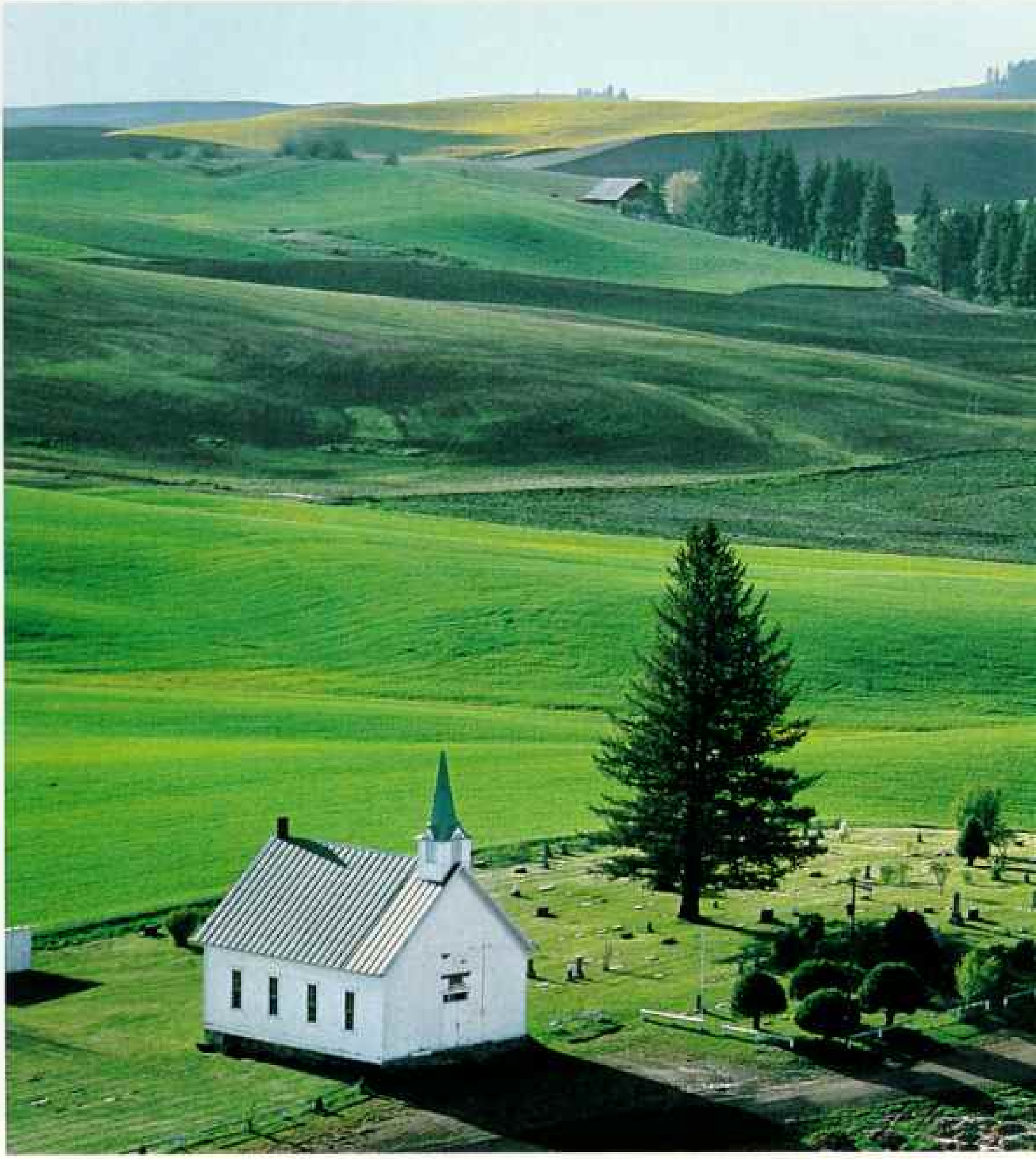
from the coast brings moisture that supports a unique chain of life.

subsidiary of South Africa's De Beers company. Somehow the glittering stones seemed anticlimactic to eyes that had been dazzled by the Southern Cross.

Back in Windhoek, I reentered the real world. Newspapers in many languages spoke of international negotiations that might some day make Namibia the 52nd independent state of Africa. They spoke also of white men who drew racial lines, and others who had read the new handwriting of humanity on a crumbling colonial wall. Black men argued vehemently about old tribal prejudices and new power.

A German newspaper editor summed it up for me on my final night, and his words seemed almost an anthem for a land that stands between twilight and the dawn.

"If you love this country," he said, "you must be very confused." □



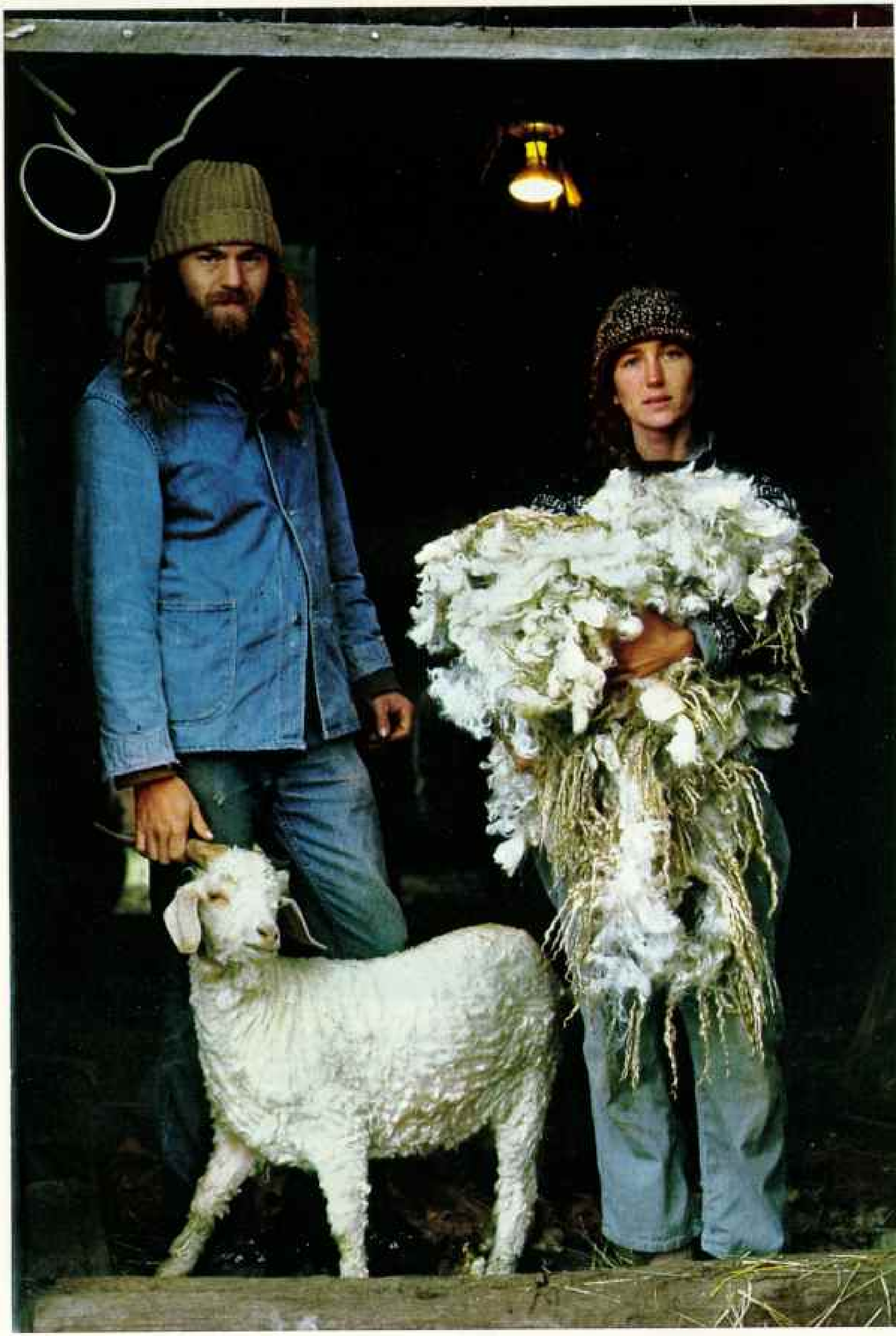
Stark simplicity *of a country church near Potlatch, Idaho, seems akin to the rolling hills of the Palouse. Sprawling across the Idaho-Washington border, the 4,000-square-mile region embraces uncommonly rich*

A Paradise Called

farmland. With its often steep and hard-to-plow hills, the country challenged the settlers of a century ago. Today, Palousers maintain the initiative, resourcefulness, and down-to-earth character of their forebears.

the Palouse

By BARBARA AUSTIN Photographs by PHIL SCHOFIELD



I THOUGHT that the best way to feel the Palouse would be to hitch a plane ride with Pete Fountain, crop duster. He was in the Palouse and yet above it, riding so near it he could smell the changing seasons, and yet he could pull away from it a thousand feet or more. From up there he could see the expanse of this unique 4,000 square miles of Idaho and Washington—some of the steepest farmland in the country, but a gentle and soothing place too, where at twilight the shadows and the deer come out and lie down together in the deep blue draws.

I had been driving up and down rolling wheat and lentil fields all day, watching houses and red barns suddenly pop out of nowhere, only to disappear. Once I saw a rider on a leopard-patterned Appaloosa jump up at the edge of a bright green lentil field, but when I quickly turned my head, horse and rider were gone, and so was the hill of lentils. From the ground the Palouse was a land that revealed and concealed itself within oceanlike swells. I was too close to see it whole. I needed to feel it all in one swoop, as Pete did every day.

How was I to know that feeling the Palouse meant weightlessness, for those hills are so steep that when you fly them five feet off the ground at 60 miles an hour, the plane's path creates a temporary lessening of gravity and your stomach won't stay put.

"That's enough!" I yelled when I saw my notebook actually float up next to me.

"But I was going to take you under a power line!" Instead, Pete took me up high and leveled off to regain my stomach.

The fertile Palouse country that lay beneath in a plaid of brown fallow and pea green is an unusual oasis of farmland straddling the border between southeastern Washington and Idaho (map, page 803). It is not your ordinary hilly farmland either; rather, it is a land where, on the steepest slopes, 30-degree farming goes on.

Jack Morse, whose farm is adjacent to Pete Fountain's airport, told me, "There are some hills I've used my combine on that I almost can't walk up. They're nearly as steep as a barn roof."

Yet Palousers actually till those hills, producing some of the highest wheat yields in the country. Whitman County in Washington has averaged 40 bushels of wheat per acre since 1934, compared to the average U. S. yield in those same years of 20 bushels. In good years, with the average 15 to 25 inches of rain or better, parts of the Palouse yield 100 bushels and as much as 150 in isolated draws. And there has never been a crop failure in its history.

Even fears of crop failure after the eruption of Washington's Mount St. Helens in May 1980 proved unfounded.* At Gary Morris's high-technology Gold Creek Ranch, about 260 miles from the volcano, I saw my boots covered with the fine gray talcum of its ash.

"The first thing we noticed after the volcano blew was that the soil seemed mellower," Gary told me, "almost as if the ash had mulched it. Then we had good rains, and when I harvested—instead of 60-bushel wheat, I got 100! The ash had helped retain moisture."

Gary, in his 50s, is a former Latah County, Idaho, commissioner and school-board member, but he looked just right in his frayed bib overalls. "I consider myself a gyppo," he said as we jolted around his 5,000-acre farm in a pickup. The word comes from "gypsy," and is a lumberman's term for an independent operator. He had quilted his spread together from 35 stump farms chiseled out of forest on the fringe of the Palouse.

He drove me up to his secret place, where he comes to think—to get away from his computer, soil studies, and CB radios. From there we got a fine view of his velvety, undulating farm, Moscow Mountain, Steptoe Butte, and the Hoodoo Mountains. "I had a cattleman visit from Montana, and he stood

*The December 1981 GEOGRAPHIC carried Rowe Findley's report of Mount St. Helens' aftermath.

Young old-fashioned farmers *Jim Day and Beatrice Moore shun modern agricultural technology on a 15-acre farm near Moscow, Idaho. Beatrice uses manual cutters to shear their sheep and Angora goats, then dyes the wool with extracts of goldenrod, sumac, and other native plants to make tapestries.*

on one of my hills like this and looked down at some cows I had. 'My gosh,' he said, 'this country is so beautiful these cattle don't need nothing to eat, they can live on scenery.'"

Leaning on a lone ponderosa pine, Gary said, "The Palouse is special because of its unique farming practices. Kansas has rolling hills, but almost no one farms them."

When homesteaders first came to the region, they mostly settled and farmed in the valleys, but gradually they worked their way uphill, right to the top, as they discovered that the hills were just as fertile as valleys. Unlike midwestern hills, which have thin, easily erodible topsoil, the Palouse hills have as much as four feet of it. However, poor farming practices in the past century have led to serious erosion problems.

"In the 1890s some farmers were able to get the same yields that most of us get now, without any fertilizer or high-yield variety of wheat," Gary said. "Sixty-bushel wheat then and now. You can see why they wanted to call this area around Moscow 'Paradise.'"

He laughed. "Originally, they called Moscow 'Hog Heaven'—which it was, because pigs love all that camas root—but the ladies changed it to the more discreet Paradise." Then in the 1870s, a man named Samuel Neff settled here and probably named the place Moscow, because he had lived near a community with that name in Pennsylvania. Moscow (pronounced Mos-coh, not Ma's cow) is Idaho's Palouse capital, rivaled by Washington's Pullman eight miles away.

"All the early homesteaders needed to know was how to harvest wheat on a hill," Gary said as he drove me back down. First, stationary threshers were used. They were set on fairly level ground and the wheat was brought to them. Then in the 1930s hydraulic, self-leveling combines were developed.

PROTOTYPES of those hillside combines were tested on the Clyde Farm, nestled a few miles outside Moscow between two hills. A sign on a large white wagon wheel proclaims: "The Clyde Farm Since 1877."

Lola Clyde told me about the day Mount St. Helens blew. "It was Sunday, 2 p.m., and my whole family, four generations of Clydes, were together for a birthday party. The sky got darker and darker, and everyone got worried. Then the ash began to fall like silver rain. It made a hissing sound. I said, 'This is the way the Palouse was formed in the beginning, and it won't hurt us now.'" She laughed. "And, lovebird, I was right! The ash made a mess, but it helped increase our crops."

Eighty-one years old, the daughter of the first Presbyterian minister sent to Moscow as a missionary, Lola declared that the Palouse has a history of unusual happenings—and of eccentric people—and she has seen and met most of them.

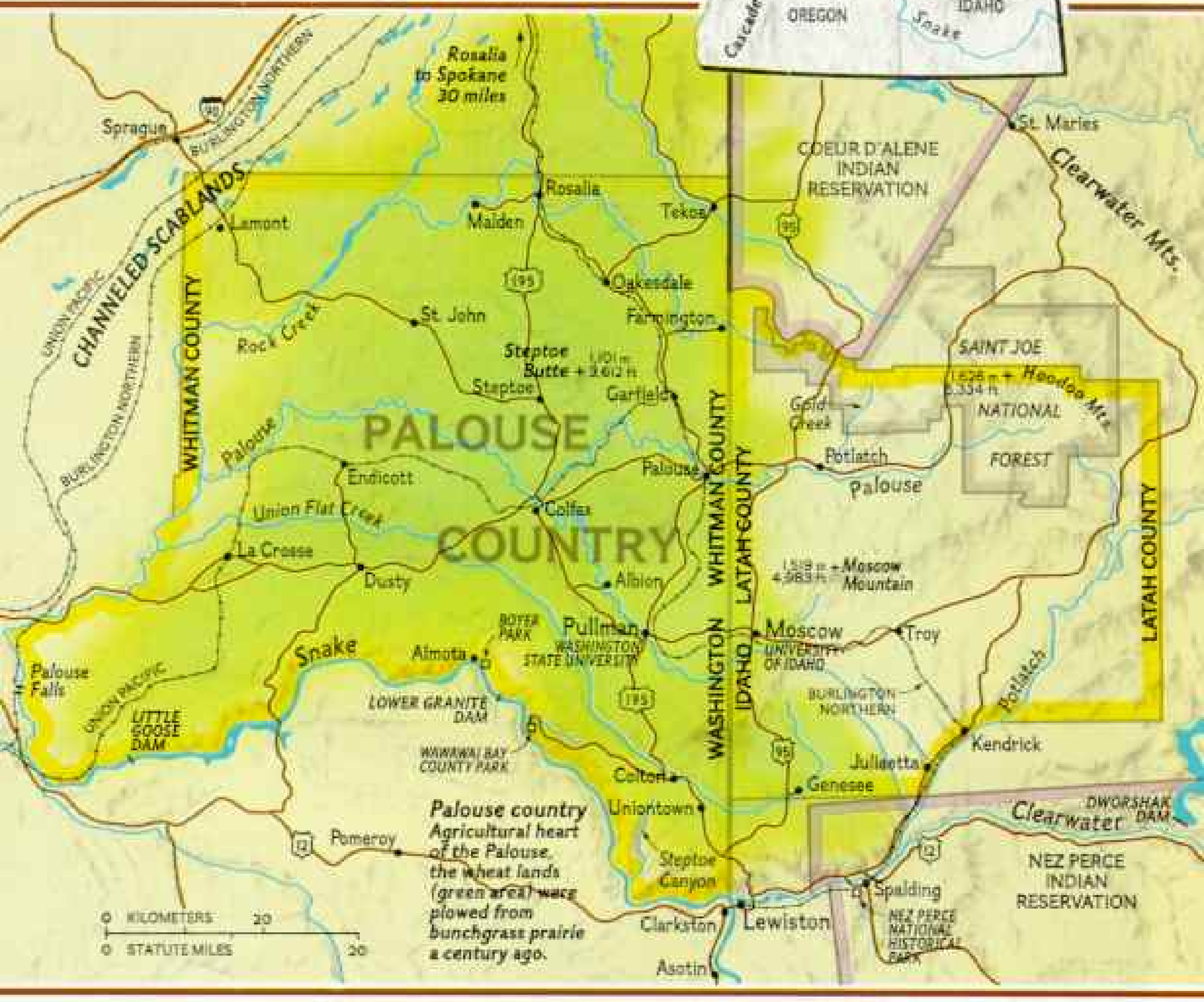
She knew Frank "Psychiana" Robinson, who advertised that he "actually and literally" talked with God. He ran a mail-order self-help religion in Moscow during the 1930s and '40s that promised health and prosperity through positive thinking. With a million sets of lessons mailed out, it may have been the largest mail-order religion in the world.

LOLA ALSO KNEW Frank Brocke, a president of the First Bank of Troy, which started in that little farming town in 1905 and now has 30 million dollars in assets. "Through all that growing, Frank never lost his sense of neighboring," Lola said. "He kept right on giving loans on the basis of a firm handshake, and most people paid them back. Once a man robbed the Bank of Troy, and after he got out of jail came to Frank for a car loan. Everyone else laughed, but Frank gave it to him, saying, 'This man has paid his dues.'"

Frank Brocke's kind of old-time Palouse neighboring is still going strong. While I was in the Palouse, a flash flood occurred in the Potlatch River area, endangering the barn and totally wiping out the pigsty, huge garden, and lawn of a recent widow. The highway department didn't feel it was their job to help her drain the water.

"Tell you what I had here before the flood," Eula Johnson, 78, said as she showed me around her flooded place. "Asparagus, rhubarbs, horseradish. And fruit? I had persimmons, I had quince. Lookee here, I had nine different kinds of grapes." She stopped in the mud and glared at me, her white hair in tight braids. "First time the land ever been bad to me. Told George—this is my Garden

A gentle land belies *its volcanic underpinnings formed by lava flows ages ago. Later the melting of a glacial dam released the waters of huge Lake Missoula, inset. The resulting flood skirted the Palouse and its undulating hills of wind-deposited silt, basis of the area's bountiful agriculture.*



DRAWN BY ISRAEL PADAY, COMPILED BY DONALD CARRICK NATIONAL GEOGRAPHIC ART DIVISION

of Eden. I can grow anything here."

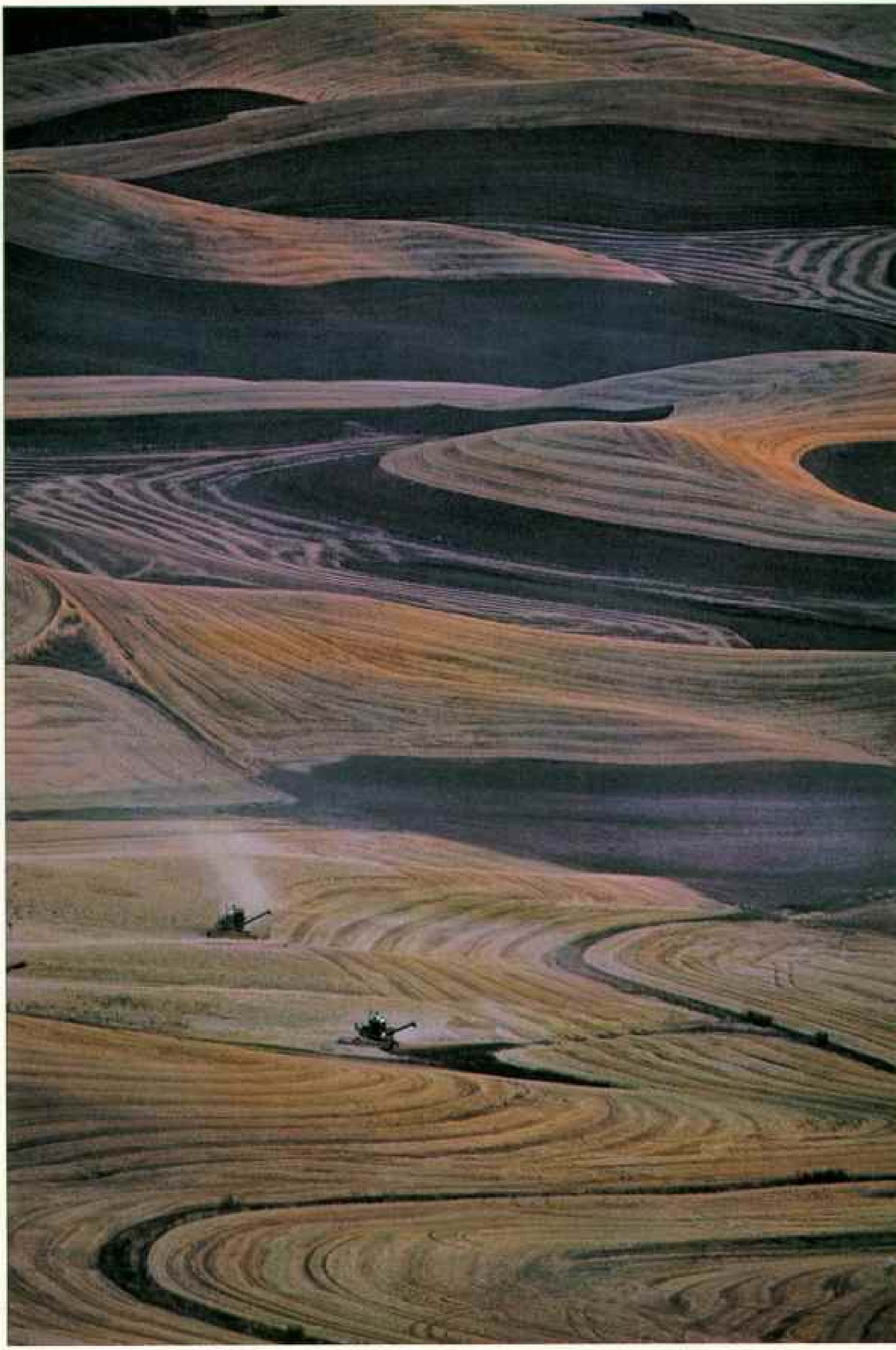
Her husband, George, had died. "I get so lonely," she said, "I stand up an ax handle and talk to it. Lawyer said I should sell. Sell? Where am I going? Where am I going? Out on a limb to sing to myself?"

As we walked back to her house, she said, "Hell, I'm not goin' to give up. I'd feel all right if I could just get someone to help out. My husband painted the barn jes' before he died. We've got to save the barn."

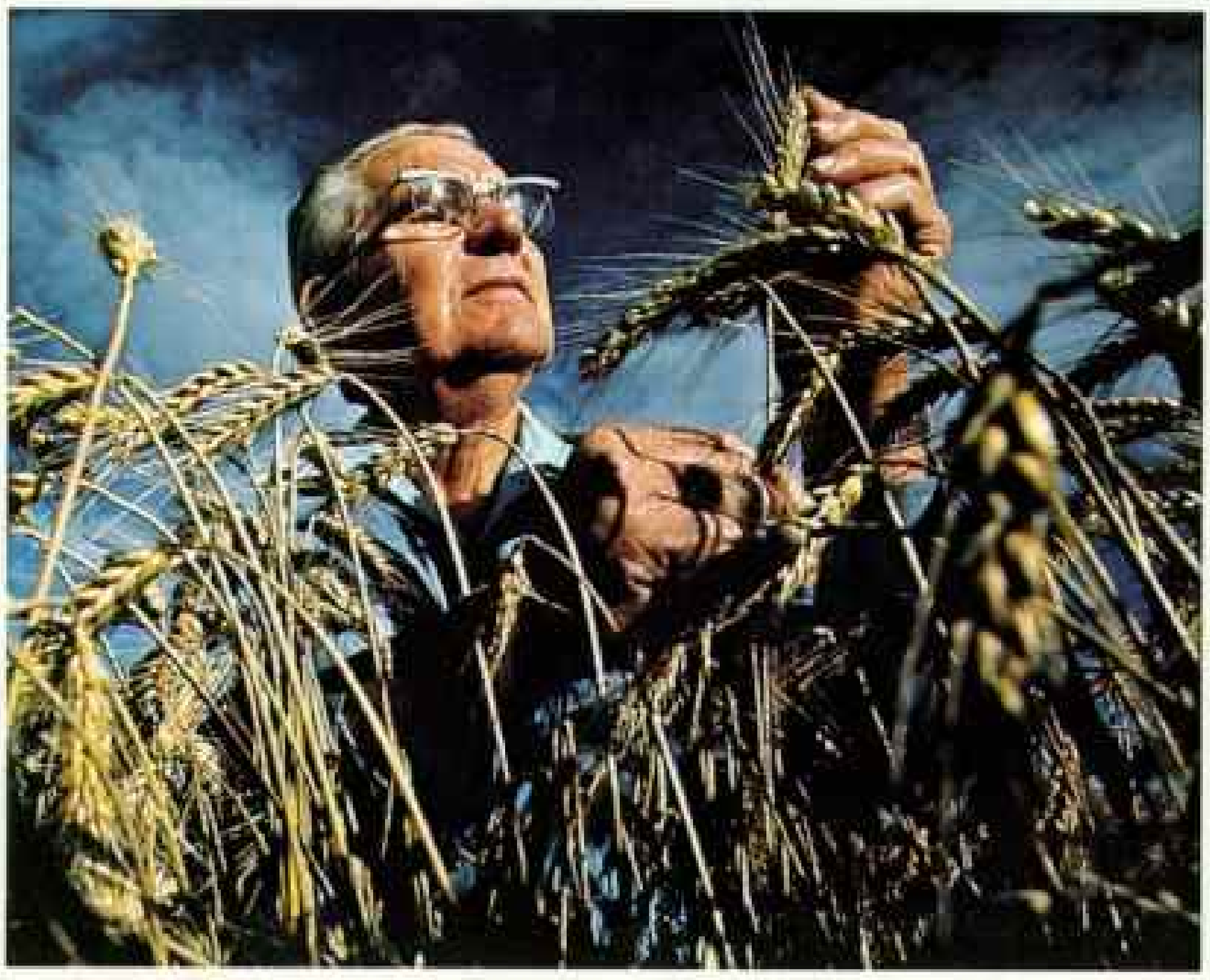
A few days later some people at the Antelope Inn in nearby Kendrick talked it over, rented a pump, and came down and saved the barn. They drained about 40,000 gallons of muddy water into a culvert and charged Eula nothing. They didn't even know her.

Recently I learned that Eula has found someone to help out. This summer she and her new husband, Mike Soto, will be working the farm together.

Eula Johnson and Lola Clyde have lived in the Palouse almost as long as it has existed as a settled area. It wasn't homesteaded until the 1870s. Some families came from the Midwest, like the Clydes, who fled the great



Combines wind their way *around the curves of wheat-laden hills* ***(left)*** *during late summer harvest below Steptoe Butte in Washington. To contend with slopes that may have grades of as much as 30 degrees, combines are equipped with self-leveling mechanisms* ***(above)****. In the fertile soil and ideal climate of the Palouse, wheat varieties that normally grow to heights of 30 inches can reach 60 inches, causing many plants to break over before harvest. Through crossbreeding, U. S. Department of Agriculture agronomist Orville A. Vogel* ***(below)****, working at Washington State University, developed high-yielding, semidwarf varieties that have produced 100 bushels per acre and better. These varieties have increased yields in the Palouse as much as 50 percent.*



grasshopper plague in Kansas. Others were backtracking. The Palouse had been passed over earlier by migrants eager to settle fertile valleys farther west. As those valleys filled up, settlers began moving back east and realized the high rolling hills could be farmed.

Until then, of course, the Palouse belonged to the Indians, a favorite summer gathering place for the Nez Perce, Palouse, and other tribes. They would dig the camas root, which they cooked and formed into cakes, and graze their lovely snowflaked horses on the lush bunchgrass. When the fur traders saw these spotted horses gallop by, according to today's breeders, they would say, "That's a Palousey!" This eventually became "Appaloosa," and that is why today Moscow is the home of the Appaloosa (not Palousey) Horse Club.

Before Indians and settlers the Palouse was long in the making, and, as Lola pointed out, volcanism played a part. It began 15 million years ago when flow upon flow of lava from a series of fissure eruptions leveled the area from the Rockies to the Cascades, creating a basalt plateau. The wind currents from the Pacific Ocean gradually carried sediment across the basalt, piling on it layers of silt, forming loess dunes. The loess is a wind-deposited mixture of silt, clay, and some volcanic ash, 40 to 60 feet deep, the basis of the rich Palouse topsoil.

BETWEEN 13,000 and 18,000 years ago some of the greatest floods known in geologic history occurred in this area. A lobe of an ice sheet dammed a river near the Idaho-Montana border, creating Lake Missoula, almost half the volume of Lake Michigan and 2,000 feet deep at the

dam. The ice dam burst, sending 500 cubic miles of water at high velocities down the drainage system of the Columbia River and out across the basalt plateau, stripping away the loess. This process was repeated several times and had happened often before.

These floods made channeled scablands out of a good deal of eastern Washington but left unscathed the higher delta-shaped area of Palouse topography. With those barren scablands to the north and west, the rimland of the Snake River to the south, and the forested foothills of the Clearwater Mountains to the east, the lush Palouse became an entity unto itself, roughly 75 miles across. Its lushness may have given it its name. One view holds that when the French-speaking fur traders came, they found it covered with so much bunchgrass that they named it the *pelouse*, the lawn. Another explanation, however, is that the name came from that of the main village of the local Indians.

Today, of course, the bunchgrass has been shouldered out by profitable crops—and not just grain. Moscow now calls itself the dry-pea and lentil capital of the world, center of an area producing virtually 100 percent of the United States' dry peas and lentils. But Moscow would rather brag on its culture than its cultivation. A bumper sticker reads, "The arts make Moscow special." And with a resident symphony orchestra and a ballet company that tours nationally, they do. The resulting atmosphere has attracted a thriving community of artists and back-to-rural-areas people.

Pullman shares the symphony orchestra with Moscow, and matches that town's University of Idaho with its Washington State University. How heavily these two towns, the economic hub of the Palouse, are invested in education and culture can be judged from the fact that in their combined 43,000 population, 25,000 are students.

JUST OUTSIDE MOSCOW I stood in a hangar talking to one of the University of Idaho's successful graduates, Ron Fountain, 36. His father, Pete, the crop duster who had shown me the Palouse for the first time, had proudly taken me to meet him. Now co-owner of a small industrial park on the edge of Moscow, Ron is still heavily involved in crop-dusting.

"I'll tell you why," Ron said. "When I was a kid, the Palouse was God's country, you could walk anywhere. It's too restricted to do that any more. But I can fly anywhere. Crop-dusting forces me to get up at dawn, the most beautiful time of day. I can see things nobody else sees."

Pete laughed. "You see the little weevils come out of the peas." Then he walked out of the hangar, got into his Super Cub, and taxied down the field to his house. "That's

Double-edged windfall, *volcanic ash clouds an alfalfa field near Palouse Falls after the 1980 Mount St. Helens eruption. Despite initial fears of crop loss and problems with clogged machinery, yields for some crops went up dramatically as the ash helped seal in soil moisture.*

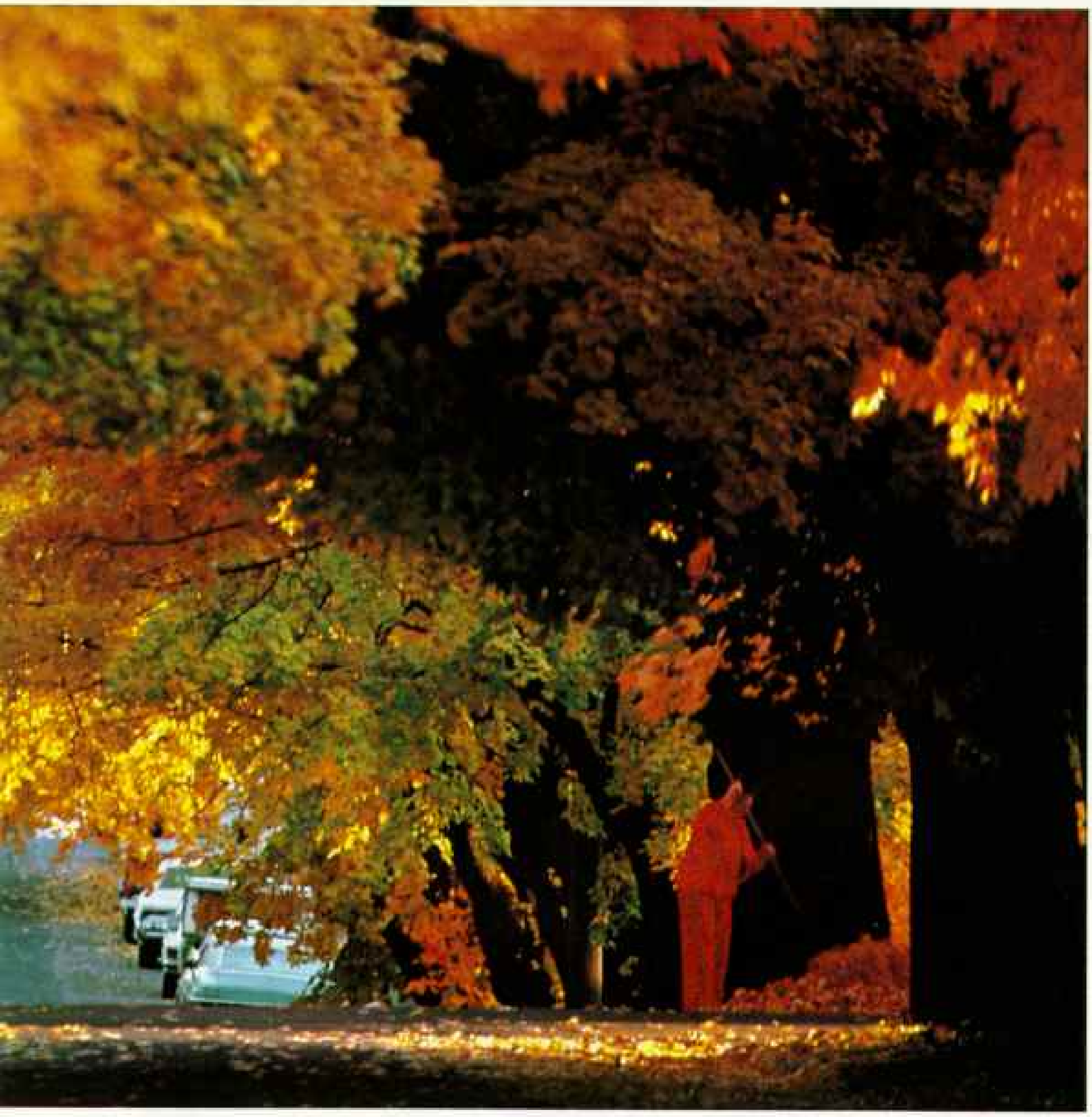
Autumn brings an explosion of orange to maples that canopy a Moscow

Dad's saddle horse," Ron said, smiling. "He's lost without it.

"After graduating from the U. of I. in the late '60s," Ron said, "I left home for a couple of years, traveled across the country, found everything to be alike, as if everyone had to copy each other—so I came back. People here have character."

We got into his truck and rode down the landing strip. He pointed out the homes of two of his brothers, Craig, 34, and Steve, 30, and the acreage that another brother, Tim, 26, farms. "It's kind of unusual for an entire family of five brothers and one sister to settle right next to their parents, and all be in business together, all happily involved in crop-dusting. With the grandchildren now, there's 22 of us."

He showed me the industrial park that he had built himself with help from his brothers and friends. "I learned independence from Dad. At my age, he wanted to make his living flying. So he came to the Palouse, bought ten acres, and single-handedly built an

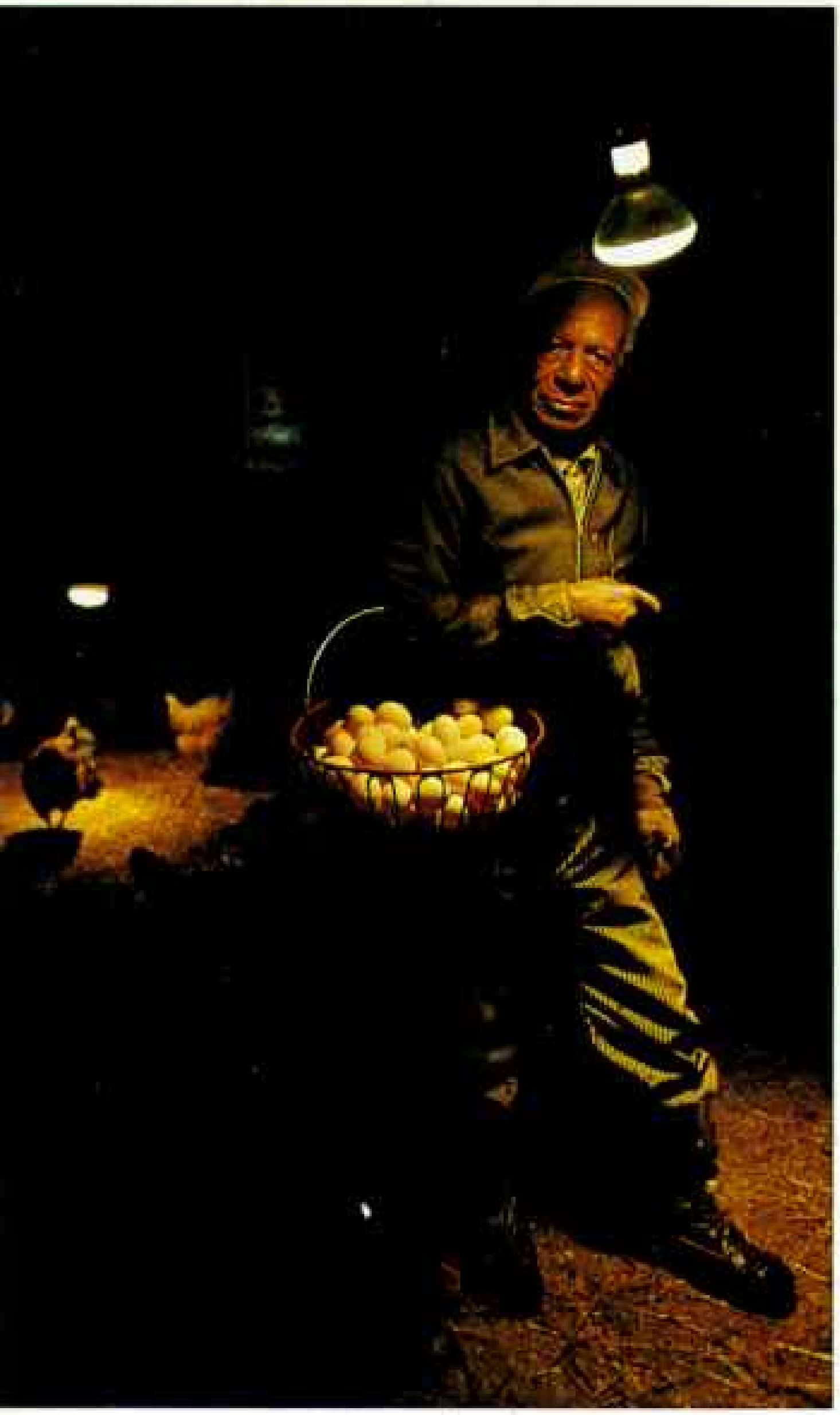


street. In the largely treeless Palouse, such an abundance is a rare sight.

airport. His attitude of 'try it and see' is really the attitude of the Palouse. Here we think big but keep it simple."

That faith in imagination and hard work I found throughout the Palouse, and it has been handed to the young. Randy Smith, 27, his wife, Jamie, 25, and their daughter live on a leased 450-acre farm near Steptoe. Their first harvest was in 1980. They didn't own any equipment when they put in their crop but borrowed a tractor from one neighbor, drills from another, and a cultivator from a third. Randy paid his neighbors back by helping with their harvest and preparing the fields for their next crops.

Some say the Smiths are trying to accomplish the impossible, beginning small farming at a time when the average farm in Whitman County is more than 1,000 acres. "There's a lot of young people would like to farm," Randy said, "but it's harder and harder for them all the time. You see, a lot of farmers in the Palouse don't retire—70 years old and still farming. Maybe 60 percent of



Deeply rooted *in the history of their land, Palousers take pride in their handiwork. Lola Clyde, 81 (**facing page**), bakes pies with apples picked from trees planted in 1878 by her husband's grandparents on the family farm near Moscow. Frank King (**left**) came to the Palouse in 1910 at the age of eight when his father homesteaded 160 acres of what was once part of the Coeur d'Alene Indian Reservation.*

*Identical twins John and Joe Norrish (**left**) attended the University of Idaho together, dressed alike, and thought alike in setting up their business of constructing custom homes in the Moscow area.*

*A town savors its heritage when volunteers pack a ton of sausage for the annual sausage and sauerkraut feed in Uniontown, settled by German immigrants. "It's like a reunion," Roy Moneymaker (**above**) says of the event, which can swell Uniontown's population from 300 to 1,800.*

the farmers are over 50 years old. Not much room for new blood. But it's a good life, and starting out in the Palouse, you don't have the chance of failure like you do in other places. In 1977 they had a drought here, and they still got 40 bushels an acre."

What worries Randy is the long haul. "Next 20 years, with fuel prices the way they are, you don't have 2,000 acres in the Palouse, it will be hard to survive."

VIC MOORE, a sculptor who lives outside Pullman, owns only four acres, situated in a draw between two Palouse farms. He thinks he'll do fine: "Acre for acre I can beat the Palouse farmers' yield." He would, however, agree with Randy that "agribiz" is creeping up on the small farmer.

A stocky man, full of energy, with two large tattoos—one of a panther, the other of an eagle—each leaping off an arm, Vic expressed himself in no uncertain terms. "Some people around here think city slickers can't stand the rigors of rural life," he said, "but that's hogwash. I've owned these four acres for 18 years, and I've proved on them that artists can make great farm boys."

He then proceeded to show me. "For instance"—he pointed to an eight-foot-deep hole in his land—"going to fill that up with topsoil." He looked slyly up at the neighboring farmer's hill. "I'm just waitin' for a nice chinook wind"—a warming wind from the west—"to come along after a freeze to turn that ground up there to mud." He grinned. "I can figure every couple of years I'm going to get a lot of soil. You betcha." Four times within the past ten years he has dug out and spread around as much as eight feet of rich runoff mud.

Erosion is a serious problem in the Palouse. The tilling methods that predominate break up the soil into tiny bits. When the rain comes, it picks up the fine particles, sweeping them downhill and creating a network of rivulets on the slopes.

A more spectacular but less common type of erosion occurs when mud forms and then slides off the steep hills—in extreme cases to the tune of 300 tons per acre. This can happen in a one- or two-month period when, as Vic pointed out, a warm spell thaws the frozen saturated soil.

Gliding along placid waters, *the women's crew of Washington State University works out along the Snake River near the Almota grain terminal. The Cougar Crew once showed its mettle by rowing 375 miles down the Snake and Columbia Rivers as part of a fund-raising drive.*

Fast on their feet, the University of Idaho women's rugby team, who call themselves the Dusty Lentils in honor of the crop that flourishes in the region, try to cut off a determined runner from the Snake River Club team.

Interstate sports rivalries are keen, especially between the two universities, separated by only eight miles.


COUGAR
CREW

***Beauty queens** and sweet treats attract folks to the annual ice-cream social in Colfax, Washington (**left**), sponsored by the county historical society. Proceeds helped finance the restoration of Perkins House, background, built by James A. Perkins, first permanent resident of Colfax.*

*An aspiring ballerina (**right**) practices in Ridenbaugh Hall at the University of Idaho in Moscow, home of the nationally recognized American Festival Ballet.*

Each year as much as a third of the ten million tons of soil lost in the deep Palouse finds its way into streams and rivers.

The topsoil of the Palouse, an irreplaceable natural resource, took thousands of years to create; an incautious farmer can lose much of it in an hour. Without careful farming, the topsoil of the Palouse could vanish in the next hundred years.

Progressive farmers like Gary Morris at Gold Creek Ranch use several methods to prevent topsoil from running off. Gary uses a "no-till drill" developed specifically for the Palouse by Mort Swanson, a local farmer whose son now markets the drill nationally. Barely disturbing the topsoil, the drill cuts narrow grooves in the ground, so that there is less loose soil for water to wash away. It also leaves last year's crop stubble, which anchors the soil and acts as a mulch. Gary bolsters the effect of the drill by designing terraces to catch water and run it around hills on a contour, so that a conduit is formed, forcing runoff to flow into areas where it won't cause an erosion problem.

OFTEN IN DRIVING around the Palouse, I felt like a human runoff, forced into conduits I didn't want to be in, run around hills, and dumped out Lord knows where. Once, when I had again become totally disoriented, a stranger I asked for directions sympathized. "The Palouse is a good place to go crazy in," he said.

All the deep Palouse looks much the same: Endless swelling hills, no trees, no mountains, no hedgerows—nothing breaks up the wave upon wave of wheat. Because fences are no longer needed (there are few animals), you cannot tell where one farm ends and another begins. Only the farmers remember.

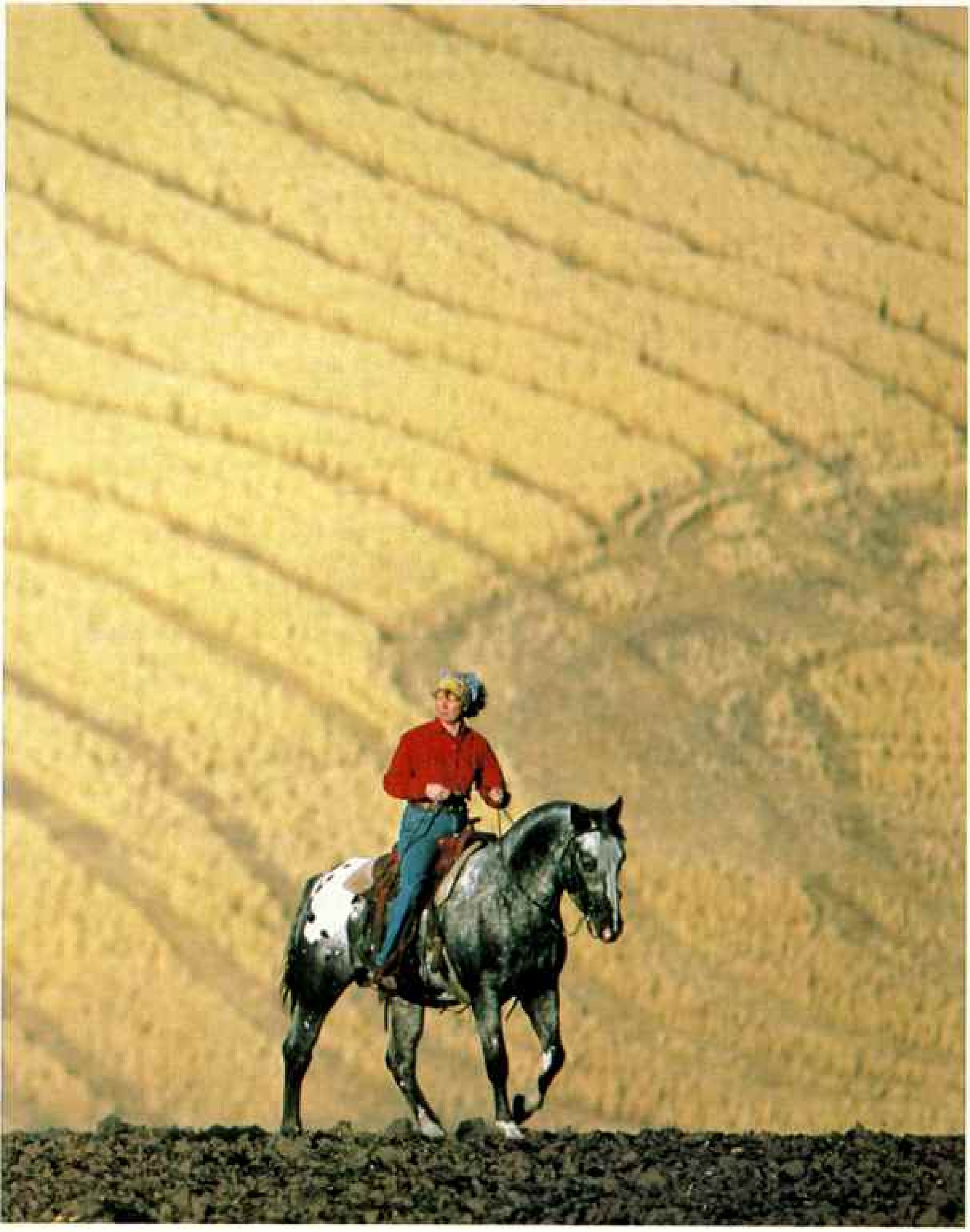
If you're driving below the crests, where most of the roads run, there often is no sun, only silence and the wind. It is an eerie experience, and you can easily lose your bearings. Through this terrain Col. Edward Steptoe led his U. S. Army troops. In 1858 they were surrounded and trapped by young warriors of the Spokane, Palouse, Coeur d'Alene, and Yakima tribes.

Steptoe was hampered by the rolling land, and had to continually maneuver to keep on high ground. Although Steptoe Butte bears his name, the battle was actually fought on a hill 15 miles away at Rosalia. Colonel Steptoe and his men finaly ran out of ammunition, left their equipment behind, and retreated at night, aided by the Nez Perces.

Helen McGreevy, 81, regards the Nez Perces with affection. Her family homesteaded by the rimland of the Snake River in the southern Palouse, and she lives nearby to this day, in the little farming town of Colton. We drove to Wawawai Bay County Park and climbed a hill to have a look at the Snake. Helen said, "When I was growing up, the Nez Perces would come along Union Flat Creek looking for camas and then camp here at Wawawai."

I looked for traces of the Indian encampment and saw instead Boyer Park and the

Sweeping contours *of fields near Dusty, Washington, provide a dramatic backdrop for Appaloosa horses ridden by Ben Krom and Kelley Marler, who run separate breeding stables. Prized for its stamina and gentle disposition,*



the breed was introduced to Mexico by the Spanish and later spread northward. Because of its use by Indians in the Palouse region, the distinctively marked horse became known as "a Palousey," from which the modern name evolved.

Lower Granite Dam. The area is now part of an inland waterway that links the Palouse to Portland and other international ports, whence Palouse wheat goes to Japan, Korea, India, and Egypt.

But Helen was seeing it as it used to be, before the valley was flooded. "The Nez Perces came here every year to graze their Appaloosas and fish for salmon in the Snake. They stayed most of the summer, fishing and smoking their catch. Came right by our farm.

"When I was five, during the harvest of 1906, a Nez Perce knocked on our door. It was 5:30 a.m.; the family had just sat down to breakfast. The Indian couldn't speak English, but he signed—kept pointing to his chest, then our cow. My father finally understood. Needed milk for the papoose—the mother was dry.

"My dad asked my mother to get the milk; then he noticed two hungry-looking little boys on the back of the squaw's horse. The Nez Perce father signed that they could wait, but my dad wouldn't give him the milk till the boys got fed. Mother gave them sandwiches and cookies.

"The next year about the same time in August, my dad found a salmon on the back stoop. He asked all the neighbors, but no one knew a thing about it. Then at the next harvest the same thing happened, and my dad understood. It was the Nez Perce. As long as we lived there, we always got a salmon at the same time each year."

LIKE HELEN, Henry Fitch, former mill worker, gyppo logger, politician, and dedicated stump farmer, had long memories, but not long enough to suit him. Henry's father bounced west from Iowa, tried several places, and finally settled here with his family when Henry was just a boy. Yet, when I met him last year, Henry maintained, "I haven't been in the Palouse long enough."

"When did you come?"

"Nineteen eleven."

At 77, Henry was still handsome, with kind eyes and smile, barely a wrinkle on his face. He showed me around his 307-acre farm, then invited me to lunch at his home, set peacefully among ponderosa pines above the Palouse River. His wife, Grace, served a delicious beef stew.

While we were eating, Murray Benjamin, Henry's 80-year-old friend from the Potlatch lumber mill, came to visit. Murray used to test samples at the mill; Henry, who started at the mill at 14, became a foreman.

"We were jes' greenhorns. Didn't know any better than to work," Murray said.

"Just pine savages from I-dee-ho," Henry agreed. "We put everything we had into it."

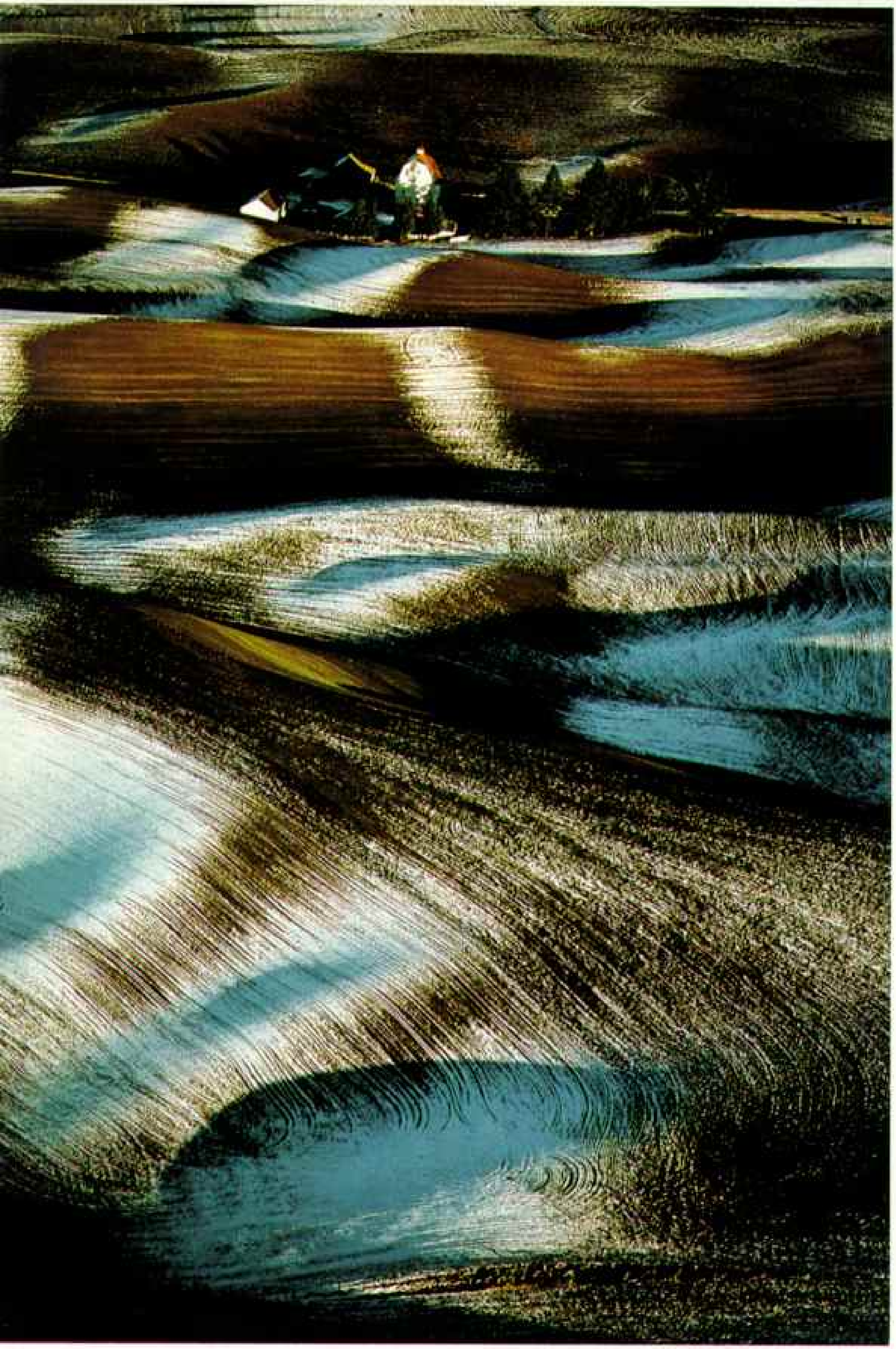
"A foreman said about the two of us, 'If I had a full crew of those two boys, I'd be out of a job.' "

I COULD HEAR the Potlatch mill whistle blow; lunchtime was over. Still I listened to two old men talking of gyppo logging, of how Henry worked 26 years and never applied for his pension from the mill: "Never would be a public nuisance."

They recalled how the Wobblies, the leftist Industrial Workers of the World, tried to organize the mill about 1917. Henry was listening to long-ago voices: " 'One more meeting and the mill will close,' the boss said. So Potlatch workers accepted another union, the Loyal Legion of Loggers and Lumbermen." Henry stared off. "I can't get over the gift of seeing into things, and how they came to be." All the while Grace stood over him slowly combing his hair with her fingers.

Henry was an understatement, like the landscape of the Palouse itself. A few months later he died. I could easily have missed meeting him. And that's true of the Palouse too. I could have missed it until I learned from Henry Fitch and his neighbors—Eula and the strangers who helped her beat the mud, Frank Brocke, who gave the very man who robbed his bank a loan—"the gift of seeing into things," which in the Palouse means neighboring. □

A thin powder of early snow *accents furrows holding the promise of a fruitful spring: seedlings of hardy winter wheat. Palouse soil—40 to 60 feet deep—absorbs the gentle rains and snows that bring an average of 20 inches of precipitation a year, a perennial blessing on a land richly endowed.*



The Astonishing Armadillo

By ELEANOR E. STORRS
Photographs by BIANCA LAVIES
NATIONAL GEOGRAPHIC PHOTOGRAPHER

OF ALL the wild animals of the Americas, few are as amazing in aspect, actions, and vulnerability to one great human affliction as the armadillos.

Travelers in the Gulf states usually see them by day scattered along the roads, where they have been killed during the night by cars and trucks. Most of these kills are not caused by wheel hits. Armadillos have a curious jump reflex when startled. When a car roars over them, they bound off the road almost vertically, hitting the underside.

Dead, they look like deflated footballs with tails. Alive, clad in armor and clumsy in gait, they could pass for pocket dinosaurs. Nocturnal in summer, they doze through the day in burrows, surfacing near dusk to dig in anthills for ants, which they lap up with sticky flicking tongues as single-mindedly as a child licking an ice-cream cone.

The nine-banded armadillo, which ranges from northern Argentina to the southern United States, and a few close armadillo cousins in South America are the only mammals known to bear identical quadruplets routinely. Sometimes embryos die, so triplets or twins are born, but the standard litter size is four pups. Derived from a single fertilized ovum, all are of the same sex and all contain identical sets of genes.

I have studied armadillos for 18 years, initially to search out the similarities and differences between genetically identical quadruplets. Since armadillos don't breed well in captivity, most of the quadruplets I raised came from pregnant animals taken in the wild. From them I learned a startling fact: While the identical quadruplets resembled each other closely, sometimes major differences occurred, much greater than would be expected if the mighty genes completely dominated inheritance.

Recently I've discovered other startling facts about armadillo reproduction, the most striking being that, due to delay in development of the embryo, the period of gestation can be as long as 20 months, instead of the eight traditionally given. This is almost as long as that of the elephant, which has the longest period among mammals.

In the wild, armadillos are healthy animals with life spans of at least ten years. In the laboratory we discovered a chink in their armor—they are highly susceptible to a few human diseases, the most grievous being leprosy. This finding was the climax of a century-long search for an animal in which to study this ancient ill, and suddenly propelled the armadillo to a position of prominence in medical science.

Long before this medical interest, the armadillo excited scientific curiosity because of the medieval-looking armor it wears. The

Jack-in-the-box lift-off *vaults an alarmed armadillo three feet into the air. The fright reflex is often fatal when the ancient mammal meets its worst modern enemy—the car—and springs against the moving chassis. But the decline of natural predators, such as wildcats and wolves, has helped the South American native make a remarkable leap in range and population across the southern United States.*

nine-banded armadillo (*Dasypus novemcinctus*), which is the only species (out of 20 in the Western Hemisphere) that inhabits the United States, is born with leathery fore and aft shields that protect its back and sides. Between these are nine movable bands—some individuals have eight or ten—that add some flexibility. The head and tail are also armored, but the underbelly is unshielded; the skin there is thick and covered sparsely with coarse hair. As the animal matures, the armor toughens.

The armadillo's armor accounts in part for its survival for 55 million years. Yet it is vulnerable to teeth of large carnivores, and the armadillo is too timid to be compared to a knight in armor, as it sometimes is.

In Mexico I've seen Indians bring in armadillos, which they hunt for food with trained dogs. Some were badly bitten through the carapace; the attacks would have been fatal had not the hunters intervened to bring them back alive and keep their dinners fresh. The nine-banded armadillo cannot, as fabled, protect itself during pursuit by rolling up into a ball; this is anatomically impossible, though the three-banded armadillos of South America are perfectly engineered to do so.

What is the advantage of armor if it is vulnerable to the teeth of large carnivores? Armadillos cannot outrun a human in the open field, much less a dog. But humans give up pursuit and dogs slow when armadillos escape into thick brush. They scurry through thickets, protected from thorns and cutting herbage by their armor. Thus the armadillo's carapace is more like a cowboy's chaps than a knight's armor.

A Delicacy to Some

More than a curiosity, the armadillo is useful to man in many ways. I have eaten armadillo meat roasted over the glowing embers of a Texas campfire. It tasted like high-quality pork. In Mexico it is considered

***Identical quadruplets**—all male or all female—are the rule for litters of the nine-banded armadillo (**below**). These genetic carbon copies prove valuable test subjects*

a great delicacy by Indians. The Aztecs sold live armadillos for cocoa beans in the Tlatelolco market of Tenochtitlan at the time of the conquistadores. Diego de Landa, burner of many of the sacred books of the Maya, noted in 1566 that armadillo meat "is very tender and good to eat." Yet in Mexico a few years ago I had no luck finding armadillo meat in the markets, though I saw hunters bringing armadillos in to feed their families.

Some consider armadillos beneficial for what they eat. They play a role in pest control, since insects are their favorite food, and they spend most waking hours rooting in the soil for beetles, ants, and grubs. A million armadillos could destroy 100,000 metric tons of insects each year.

In Louisiana and elsewhere armadillos evince a passion for fire ants. Like the Cajuns, they must like hot food. Biologist Arturo Jiménez told me that the tastes of armadillos found near Monterrey, Mexico, are even more exotic. In the stomach of one animal he found ten tarantulas, a scorpion, a small snake, and a toad.

But not everyone considers the armadillo a friend to man. Some ranchers claim that cattle break their legs by stepping into armadillo burrows. Since armadillos prefer to dig burrows close to the trunks of trees, in the steep banks of streams, or in deep brush, stepping into them there would appear unlikely. Farmers may have a better case when they charge that armadillos uproot crops while digging for insects. But the damage should be weighed against the benefits of soil aeration and pest control.

In general, armadillos are pretty well liked. They amuse people. Homely, ungainly, and not too bright, they epitomize the underdog and elicit our sympathy. Armadillo festivals, races, comic books, T-shirts, and posters have swept the South during the past decade. Texas jewelers have recently advertised gold armadillo rings, pendants, and pins.

*in medical research. Soft shells on month-old pups (**below right**) harden with age. But even the adult carapace remains pliable, a bit like human fingernails.*

Alas, armadillos make poor pets, as my husband and I found in Texas, where we captured our first animal for my biochemical research. We named her Army, an affectionate shortening of armadillo. She was easily tamed, used a litter box without training, like a cat, and never attempted to bite. However, like all armadillos, she emitted a musky odor from scent glands located near the base of her tail, which soon permeated my kitchen where she lived.

She slept peacefully most of the day, but at night bedlam broke loose. She knocked over chairs, upended wastebaskets, and slammed into anything that would make noise. Anything movable she moved, and anything breakable she broke. As my armadillo colony grew, the din became devastating. We finally exiled Army and her friends to a tool shed that, unfortunately, was located near our bedroom window. The noise they made at night banging into its metal walls made sleep almost impossible. Our night is their day and the two don't mix.

After we moved to Louisiana, I attempted to raise armadillos born in the lab. Though our animal quarters were far from ready, I was determined to go on with my work. Females were brought into the colony in late stages of pregnancy in February. Results were disastrous. The females did not nurse the young and often cannibalized them.

Finally, I separated five sets of newborn young from their mothers and housed them in plastic boxes. I used diapers for bedding and heating pads to provide gentle warmth. During the day I fed them at the lab, but at night took them home in my van and perched their boxes on a bench by my bed.

I had no formula, no schedule, nothing! I had to be guided by experience with my son, Ben, who was then a yearling. I prepared batches of formula, put them in bottle warmers, and set my alarm to ring every two

Quick-draw tongue *of the armadillo can snare dozens of insects, the staple diet. Emerging usually near dusk from individual burrows, these poor-sighted relatives of the anteater rely on a strong sense of smell to locate insect prey—then dig furiously to unearth it. But the armadillo's aid in pest control meets little thanks since it often uproots crops and lawns.*

hours. I could not feed the babies with a nipple or medicine dropper, since I could not get them to nurse and swallow. Reluctantly, I resorted to a stomach tube fitted with a hypodermic syringe to measure the liquid and gently introduce it into each tiny stomach. Then each morning, tired and red-eyed, I trundled my babies back to work with me.

Not all of them survived, and each loss was a personal one, as well as a professional defeat. When a set of quadruplets dwindles to three, the survivors are still of scientific interest; when only two remain, their value is marginal. A sole survivor is only a pet.

One complete set lived to maturity. This we named the Jet Set, because of the speed at which they streaked around their pen. Their shells were undersized and did not seem large enough to fit their bodies, looking like six-inch crusts on eight-inch pies. But the Jetters were so active and friendly that I did not have the heart to use them for experiments; in that context, my first attempt to hand-rear armadillos failed.

The next year was happier. Our animal quarters were ready, and we were able to bring pregnant animals in from the wild in early January, giving them more time to adapt. Many gave birth to young and suckled them successfully. In the spring we learned how to dig into armadillo burrows to obtain litters of quadruplet young that were old enough to eat on their own. Within four years about half my colony of 300 animals were members of quadruplet sets.

Hand-size *at three months, the "little armored one" reaches an average length of two feet. Branded "Hoover hog" in the Depression, armadillo meat finds fans today as "Texas turkey."*

Members of an Ancient Order

Though my attempts to rear armadillos suggest their vulnerability in captivity, they are actually champion survivors in the wild. Armadillos, tree sloths, and anteaters are the only living remnants of the order Xenarthra, which evolved and flourished in South America beginning about 55 million years ago. Some of the ancient xenarthrans were enormous.

Two and a half million years ago, after the Panamanian land bridge connecting the Americas rose from the seas, some of these animals migrated into what is now the U. S., where they flourished. An extinct animal resembling the nine-banded armadillo but larger *(Dasypus bellus)* was once numerous near my present home in Florida. And an even larger one *(Holmesina septentrionalis)*, about the size of a black bear, ranged as far north as Kansas and North Carolina.

"All the armadillos in the United States vanished about five to ten thousand years ago," Dr. Gordon Edmund of the Royal Ontario Museum told me. The reasons for this are still unknown. The tens of thousands of nine-banded armadillos that now exist in Florida are probably descendants of a fecund few that escaped from captivity near Cocoa, Florida, only half a century ago.

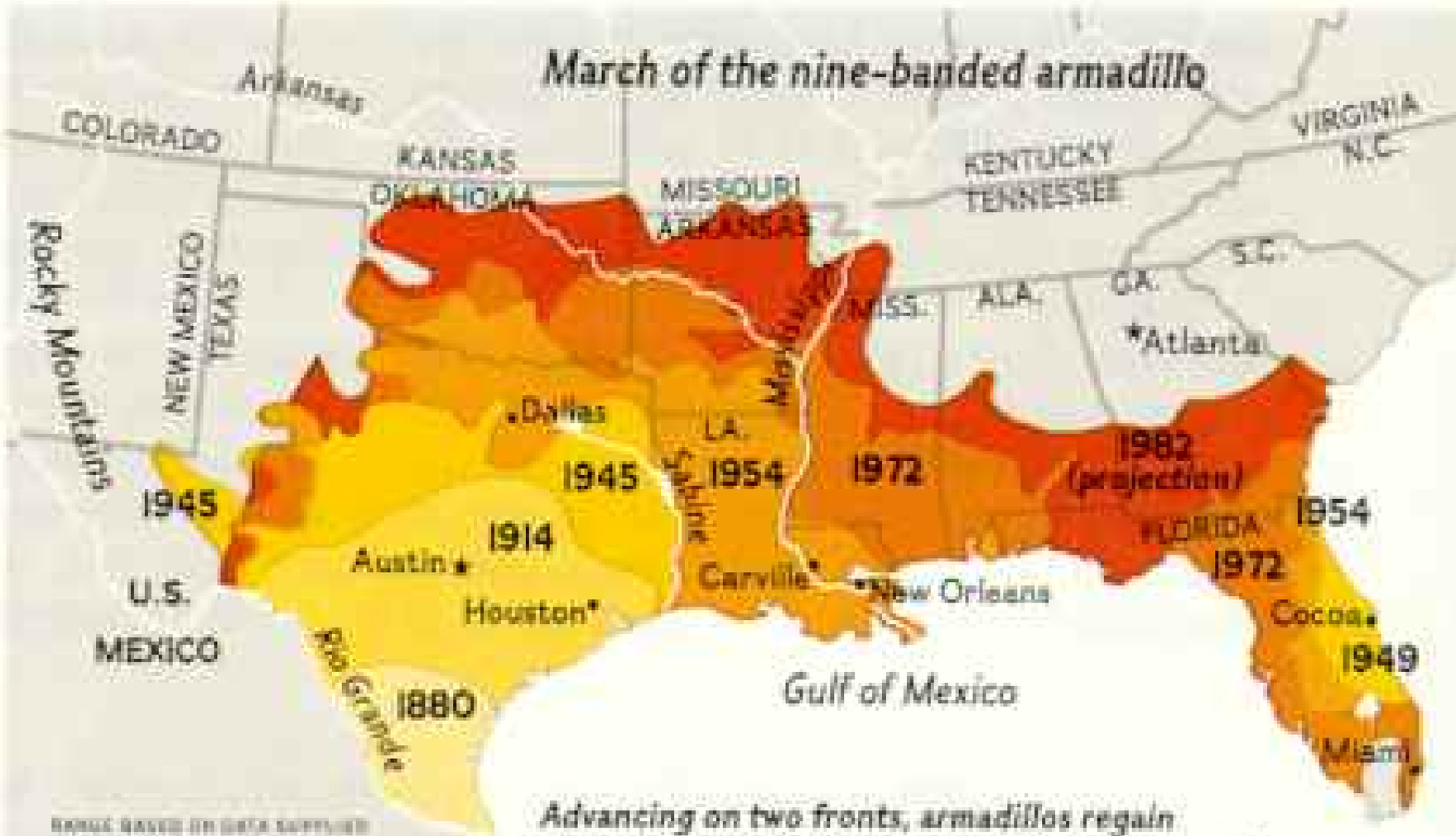
The immigrant nine-banded armadillos from South America did survive in Mexico, and from there, during the 19th century, began one of the most rapid expansions in mammalian history. They were first reported in southern Texas in 1854. Blocked by the western deserts, they spread north to Kansas and Missouri and east toward Florida.

Pioneers crossed the Mississippi in the early 1940s. Their usual method of fording

LARRY ALUFFY

Shortchanged in beauty, *grace, and intelligence, the underdog armadillo* ***(left)*** *became a winner in medicine in 1971 when it was discovered to be one of the few creatures other than man known to contract leprosy. Lack of a nonhuman test subject long hampered research on this skin and nerve disease that affects some 12 million people, perhaps 4,000 in the United States. Now a vaccine is ready for testing.*

As part of the international research effort, author Dr. Eleanor Storrs cultivates leprosy bacilli in armadillos at the Florida Institute of Technology. Outside the infectious-disease lab she checks a new arrival for evidence of infection ***(above)****. Some wild armadillos in Louisiana and a few in Texas have been found to carry leprosy. Although there is no evidence that they transmit it to man, extreme caution is taken in all research with infected animals.*



Advancing on two fronts, armadillos regain territory occupied by a larger prehistoric ancestor. Frigid winters north and arid climes west contain the march. Florida's population, introduced by man, has recently met the advance from Texas, where armadillos have become a grass-roots state mascot.

small rivers is to gulp air and inflate their stomach and intestines; then they can swim even in their heavy armor. Or, since they can hold their breath as long as six minutes, they walk on the riverbed. But the Mississippi is too deep and treacherous for these techniques. They may have floated across on driftwood or simply hitched a ferry ride.

Recently these Texas hordes, which reached the Florida Panhandle in the early 1970s, have collided with the descendants of the escaped armadillos, which moved up from peninsular Florida into the Panhandle. They are probably commingling amicably.

Unlikely Medical Assistants

For medical science this plethora of armadillos is a boon, since the animal has become an important factor in the fight against leprosy. This came about as a serendipitous surprise. I had lost my heart to armadillos, but my husband, Dr. Harry Burchfield, continued our research on curative drugs. In 1968 he answered an advertisement for someone to research a drug called dapsone, then being used in Vietnam for malaria. We were awarded a contract, but the studies were to be on leprosy, not malaria.

Before the contract award, Dr. C. C. Shepard of the Center for Disease Control in Atlanta and other members of the U. S. Leprosy Panel visited our laboratories to assess our capabilities. Seeing that we were only casually acquainted with leprosy, Dr. Shepard and his group briefed us on the problem.

Uncommon in the United States, leprosy is not as rare as most Americans imagine; it is still a great plague, a crippling, disfiguring disease that afflicts 12 to 13 million people, mostly in developing countries, many of whom are children.

Although the bacillus that causes leprosy was identified in 1873, research aimed at its control was difficult because it was not possible to grow the bacillus in a test tube. And attempts to produce advanced disease in experimental animals had failed, although Shep had been able to grow the bacillus in mouse footpads, which have a low temperature, about 30°C.

As Shep talked, I began to see a possible link between armadillos and leprosy. Leprosy attacks the cooler parts of the body such as the nose and ears. I knew that armadillo body temperatures range between 28° and 33°C, compared to 37° for humans. Shep mentioned that three years or more must elapse between infection of humans and development of active disease. Armadillos could live for 12 to 15 years in captivity, ample time to develop advanced disease.

Then Shep told me something that convinced me the armadillo could be an ideal animal model. "Some scientists," he said, "believe that susceptibility to leprosy is inherited." I knew I could answer this question with the armadillo quadruplets. If one pup in a litter of four developed leprosy after all had been inoculated, then the other three should develop leprosy about the same time, providing susceptibility is inherited.

Working with Dr. Waldemar F. Kirchheimer of the U. S. Public Health Service Hospital at Carville, Louisiana, and others, we inoculated four unrelated armadillos that had been captured in the wild. The sample of infected tissue, sent by Dr. Chapman H. Binford of the Armed Forces Institute of Pathology in Washington, D. C., contained bacilli taken from a leprosy patient in Suriname. After 17 months one of these animals died of leprosy.

Sixteen more armadillos were inoculated, none of which were known to be related. Of these 20 animals, eight developed severe leprosy. We avoided using identical quadruplets at this time, since genetically this would have reduced the sample size from twenty to five animals.

A few years later we inoculated 11 sets of quadruplets with leprosy bacilli. Six months afterward, four animals developed disease symptoms almost simultaneously. All four animals were members of the same quadruplet set. The odds of this happening by chance are extremely low.

Sink or swim: *Both tactics work for the armadillo. Able to hold its breath for as long as six minutes, an armadillo can sit underwater like a rock or stroll across the bottom. To cross a wide body of water, it swallows air to inflate the stomach and intestines and, with this added buoyancy, paddles toward a new shore.*

Now hundreds of armadillos have been inoculated and have developed leprosy in laboratories in the United States, South America, and Europe. A major weapon in the fight against leprosy has been found.

Several years after transmitting leprosy to armadillos in the laboratory, we were stunned to discover wild armadillos in Louisiana that were naturally infected with the disease. Subsequently, other scientists reported a few in Texas. Florida animals appear to be free of the disease. Despite the extremely high susceptibility of this species to leprosy, the way the disease is actually contracted is not known.

Armadillos do not develop ordinary human leprosy; their disease is usually severe and fatal. Time between infection and development of symptoms is six months to four years, compared to three to six years in humans. In our investigations, 80 percent of the armadillos inoculated developed leprosy. Presumably because of their low body temperatures, the disease affected tissues such as brain, spinal cord, and lungs—which are not affected in humans.

Infected armadillo tissues contain many times more bacilli per gram than are found in advanced human cases. One severely infected armadillo can produce enough bacilli to meet the current world demand for a substance called lepromin.

A reagent used for the prognosis of leprosy, lepromin derived from humans is scarce. Lepromin from armadillos can be highly purified, is abundant, and is as reliable in its results.

Lepromin is injected in many patients with leprosy to predict the course the disease will take. If a red lump appears on the skin at the point of injection four to five weeks later, the patient has strong resistance, and will probably develop one of the milder forms of the disease, tuberculoid leprosy. This is often self-curing, though nerve damage may cause severe crippling.

If no skin reaction is seen, the victim has poor resistance and will probably develop lepromatous leprosy. If untreated, this more severe form of the disease can result in thickening, nodules, and loss of feeling in the skin, hoarseness, loss of eyebrows, collapse of the nose, general disfigurement, and sometimes blindness.

New Vaccine Offers Hope

Leprosy has finally emerged from the shadow of medieval medicine into the mainstream of science, one of the last of the great human plagues to do so. The availability of a source of abundant leprosy bacilli, provided by the armadillo, has spurred new efforts to develop a vaccine, with the cooperation of scientists around the world.

Since 1972 I have assisted the Pan American Health Organization in establishing armadillo colonies for research on leprosy in Latin American countries where both leprosy and armadillos occur.

The World Health Organization also has an exciting project under way, in which I am involved. Begun in 1974, the Immunology of Leprosy program involves research workers in many countries. Using leprosy bacilli grown in armadillos, they have been able to undertake immunology research that was not possible before. They have developed a purified vaccine that protects mice against infection. Preliminary tests of the vaccine with humans may start this year. We believe that the bacilli needed for even a large field trial can be supplied by armadillos.

I feel certain that with the aid of this animal, leprosy will become better understood and ways of conquering it will be found. Some of these are already in sight. □

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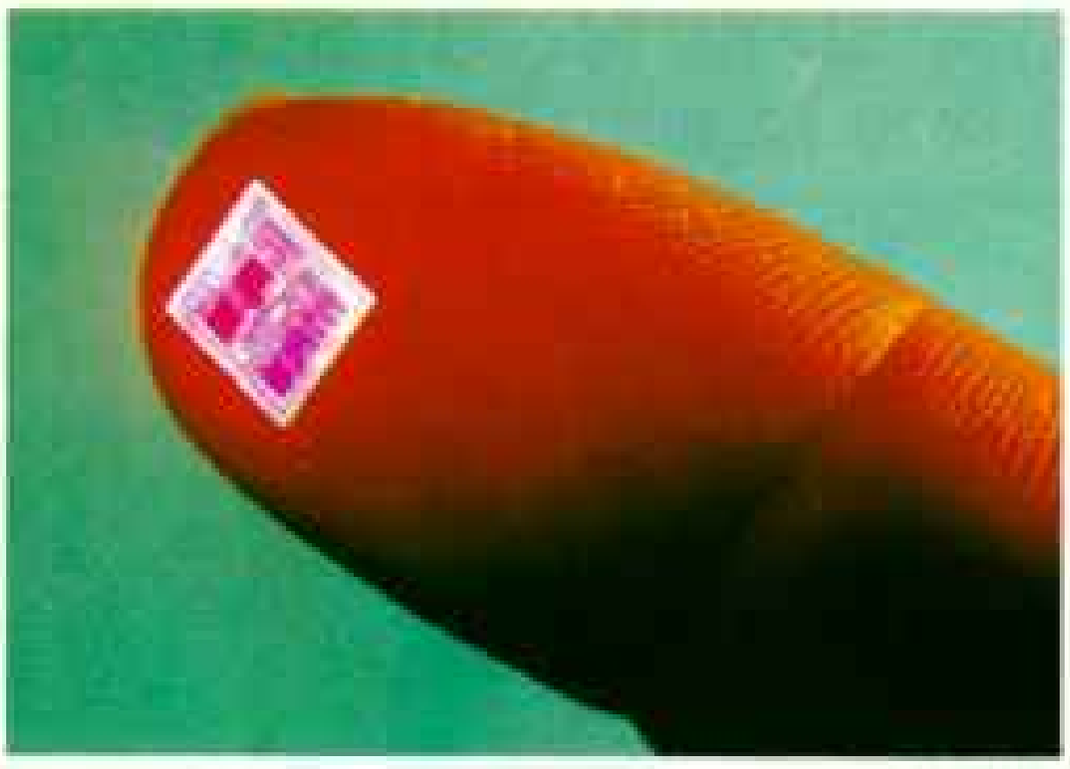

CHARLES O'REAR

MINUSCULE MARVEL of high technology, the microprocessor, or computer on a chip (**above**), rivals in performance yesterday's room-size computer. Today, the integrated circuits etched on tiny silicon flecks control car engines, industrial robots, cash registers, cardiac pacemakers, photocopiers, and household appliances.

At a computer camp in Connecticut (**right**), youngsters learn basic computer skills to prepare for a future that many experts predict will be revolutionized by microelectronics.

In a forthcoming issue, staff science writer Allen A. Boraiko will explore the impact of the chip on factories and schools, medicine and law, communications and leisure. NATIONAL GEOGRAPHIC is committed to keeping its members abreast of these developments, which augur profound changes in our daily lives. You can share that commitment with others by using the nomination form below.

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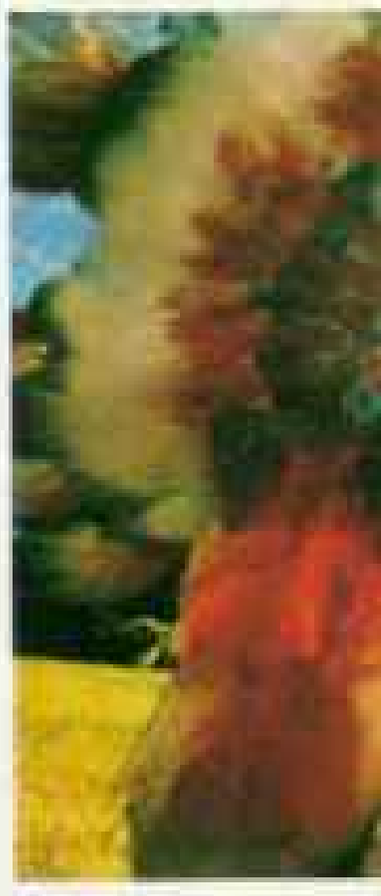

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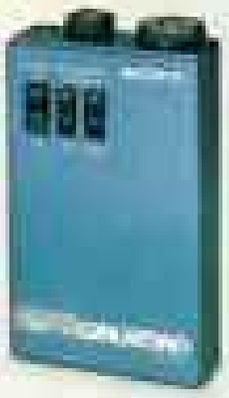

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Members Forum

SANTA FE

To a native New Mexican, the pictures of wealthy Anglos (March 1982) in their pseudo-adobe homes filled with beautiful artwork only helped my resentment grow stronger. Why wasn't there a picture of a prominent Spanish lawyer or a proud working family in their finely furnished home? The article only serves to perpetuate the myth that all Spanish people long for a low rider with a crushed-velvet interior.

Juana Hernández
Albuquerque, New Mexico

To everyone who has had a love affair with Santa Fe, your delightful article was pure joy.

Betty J. Garry
Kansas City, Missouri

Hot tubs! Kooks! Eccentrics! Rich art-gallery owners! Ultra-rich retirees! An ex-con! This is Santa Fe? No mention of four fine museums, two colleges. No mention of poverty pockets and unemployment and lack of public transportation. Makes me wonder how accurate your reports are from other parts of the world.

Wilma L. Bell
Santa Fe, New Mexico

We struggle with space constraints and selectivity in all our articles and photographs as we seek to portray a city or entire region's distinctive and unique character. Both Spanish and Indian taproots of Santa Fe were represented, as were its native artists, employment problems, the Santa Fe Opera, New Mexico School for the Deaf, and the world-renowned ancient Indian collection of the School of American Research.

PERU

As a dual national, American and Peruvian, I am often confronted by friends who wish to know more about Peru than I can tell them myself. Your article "The Two Souls of Peru" (March 1982) is just the eloquent portrayal of my country for which I have long been searching. *¡Mil felicitaciones!*

Carmela Acosta McCain
Providence, Rhode Island

Archaeological sites around the world are deteriorating at an accelerated pace, and abuses by tourists are a leading cause. How dare you solicit membership in the Society (Nomination Page) with a photograph of two staff members clambering on Machu Picchu's Inti Huatana stone! The ropes around this religious sculpture should make it clear even to an American tourist that he should keep his distance.

Clyde F. Holt
Hinesburg, Vermont

We agree that archaeological sites require protection. But in this case the entire Inti Huatana platform is open to the public; there were no ropes barring access. The stones have been walked on by Incas and modern tourists alike. Happily, there is no mark of their passing or ours.

"The Two Souls of Peru" included a statement about the Incas' lack of knowledge of the wheel and the absence of beasts of burden. I would like to suggest that the Incas constructed no wheeled vehicles because they lacked horses, donkeys, oxen, or other domesticated beasts capable of being trained to pull them. Since wheeled toys made by Mexican Indians have been unearthed by archaeologists, it is possible that the Incas also understood the principle of the wheel, but did not put the wheel to use.

James W. Whalen
Kenmore, New York

My utmost compliments on "The Two Souls of Peru." For enthusiastic explorers, a map of the Inca trail may be ordered from the South American Explorers Club, Box 3714, Lima 100, Peru. This is a map of the original Inca trail leading to Machu Picchu.

Brian R. McNamee
Bozeman, Montana

SUDAN

Your article on Sudan (March 1982) was excellent, except that most geographers claim that the word Sudan is derived from *sudd*, i.e., the swampy nature of the land, and not *Bilad as Sudan* or "land of the blacks." Also the word *khawajah* means "merchant" or "trader" and not "a white man."

Ambroz Ferrena
New York, New York

The Embassy of Sudan and scholars confirm our derivation of the name Sudan. Khawajah, according to Arabists, most accurately translates as "non-Arab" or "foreigner." In Sudan this term has come to mean "white man."

PALAU SALT LAKES

After William M. Hamner transferred *Mastigias* jellyfish from one Palau salt lake to another (February 1982), did he return them to the original lake? Though the results were interesting, didn't this approach carry a considerable risk of confounding future research by introducing foreign organisms?

Martin Webster
Charlotte, North Carolina

Dr. Hamner transferred only six Mastigias for a day's observation and then removed them to preserve as specimens.

QUEBEC HYDROPOWER

Regarding your view of the James Bay project (March 1982), I would like to suggest that this monumental engineering feat is an even greater environmental catastrophe. From the project's inception, the Quebec government has swept aside native rights along with any concern for the devastating impact on a wonderful ecosystem.

John M. Szicsak
Brantford, Ontario

Any large-scale energy project cannot help but have an impact on the land and people. We reported on both the colossal engineering feat of the James Bay project and on the status of the Cree Indians. The project has indeed altered the ecosystem of northern Quebec—fish now jump where caribou once roamed—but the province considers the economic progress worth the price.

I am not sure that the impressive before and after photographs of the flow in the Eastmain River (pages 412-13) tell an accurate story. The trees suggest that one was taken in spring and the other in fall. It seems that nature is responsible for a considerable amount of the diminished flow.

John C. Kendall
Fresno, California

Although the photographs were taken at different times of the year, the fact remains that 85 percent of the Eastmain's flow has been diverted.

GOLOGS

The author (February 1982) lost his credibility in claiming there is almost no wildlife in the Anyemaqen region. If this is true, where did the family shown on page 253 get the pile of deer antlers and the Himalayan fox that was hung on a pole?

Gee Tsang
Guelph, Ontario

The author and his party, which included zoologists particularly interested in the animal life, did see a few gazelles and deer, but not anywhere near the numbers reported in the past.

NAPOLEON

Your article on Napoleon (February 1982) says in a caption that the farmhouse of La Haye Sainte was held by British troops during the Battle of Waterloo. The actual defenders were the King's German Legion. As the Duke of Wellington himself credited the KGL as the only foreign unit of a quality equal to that of his better British units, it might have been mentioned.

John Koster
Midland Park, New Jersey

The German Legion of King George III served as part of the British army under Wellington. The forces against Napoleon at Waterloo included other German, Dutch-Belgian, and Prussian troops, the last under Blücher's command.

Does anyone know whence the saying, "Not tonight, Josephine!" originated, and what the occasion was for Napoleon to deny himself the arms of such a beautiful lady?

Andrew D. McCrindle
Victoria, British Columbia

The quote is apocryphally attributed to Napoleon but is probably an English music-hall phrase referring to the emperor. It has come to indicate refusal of amorous advances.

TAIWAN

Your February 1950 feature on Formosa unfortunately carried no photos of the "towering cliffs" of Taroko Gorge. Your January 1982 feature on Taiwan used Taroko Gorge as a lead and later described it as "awesome . . . nature's monument in granite and marble"—but still no illustrations. Your January 2014 feature on the islands of China should show the subject of these superlatives or your loyal readers may grow impatient.

Gaylord Burke
Pittsfield, Massachusetts

Our most recent article dealt mainly with the people and progress of the island; therefore, we chose photographs pertaining to those subjects. When we next publish on Taiwan, we will try for a picture of Taroko Gorge that does it full justice.

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.*

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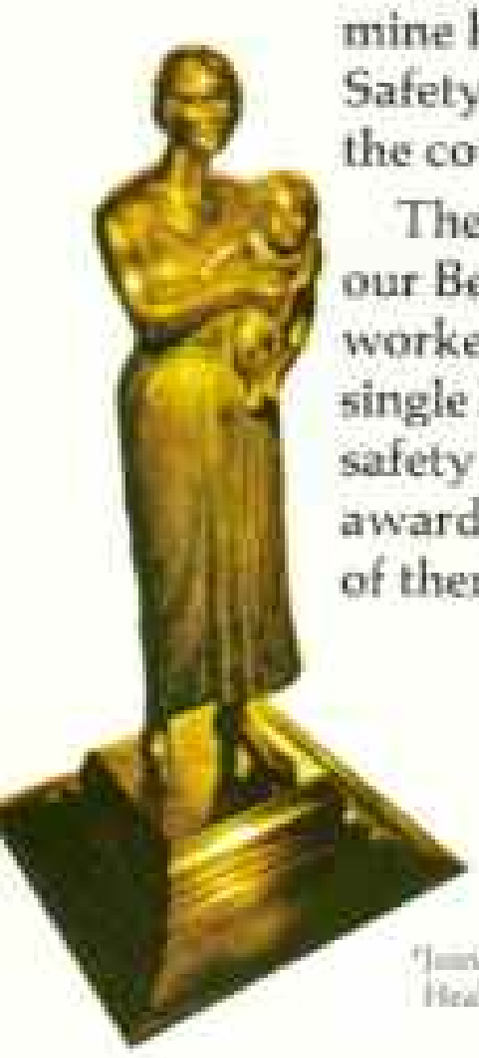

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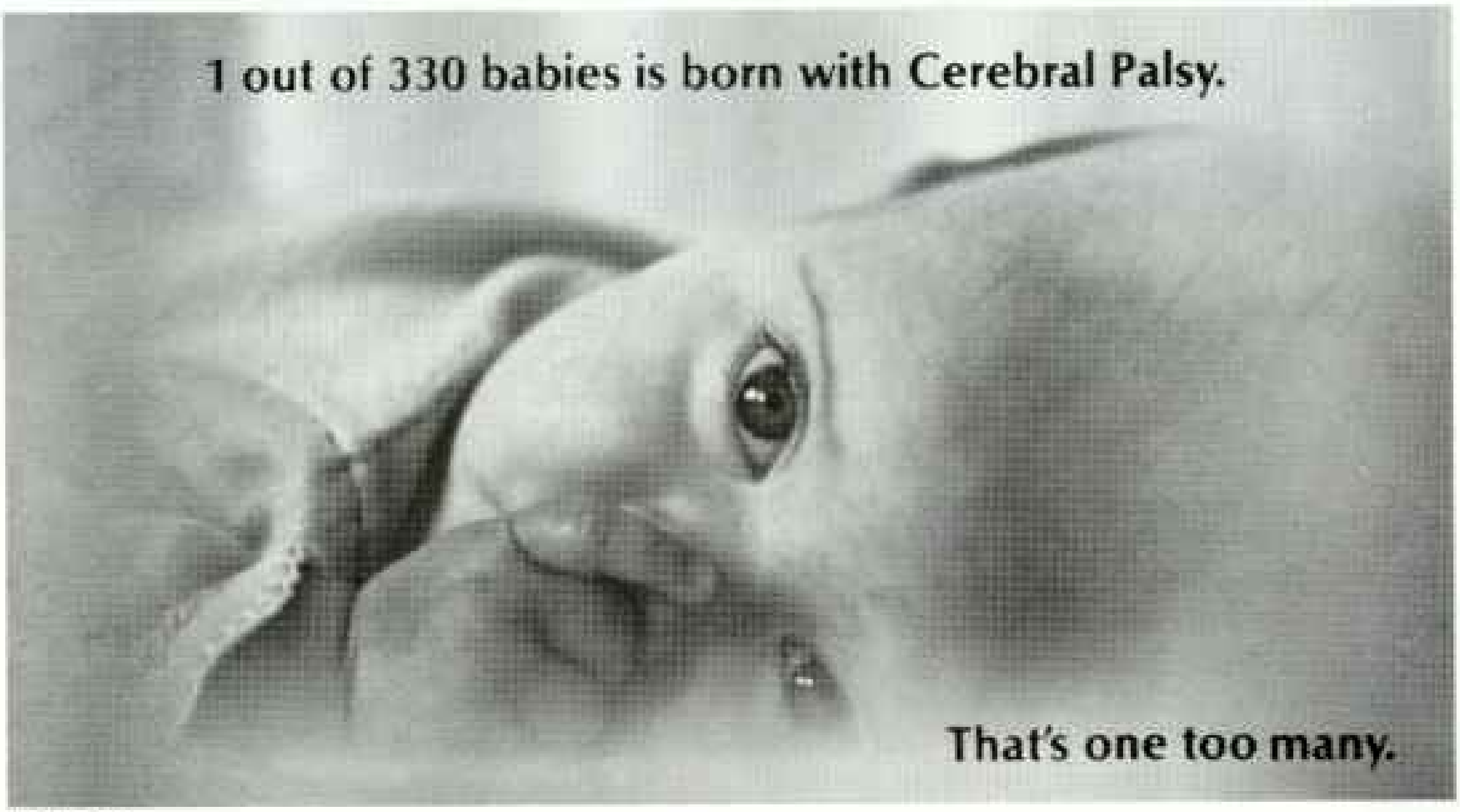
"In the past 15 years, I've had 35 driving lessons, 35 driving instructors, but only one refrigerator. A Frigidaire."

FRIGIDAIRE
HERE TODAY, HERE TOMORROW.

Frigidaire *One of the White Consolidated Industries*



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

SEE KODAK'S AMAZING NEW

KODAMATIC®

INSTANT CAMERAS AND FILM

PERFORM FEATS OF MAGIC BEFORE YOUR EYES

Any light's automatically right for beautiful pictures within the range of our uncanny electronic flash-every-time.

Hocus pocus, nothing to focus. All you do is aim and shoot.

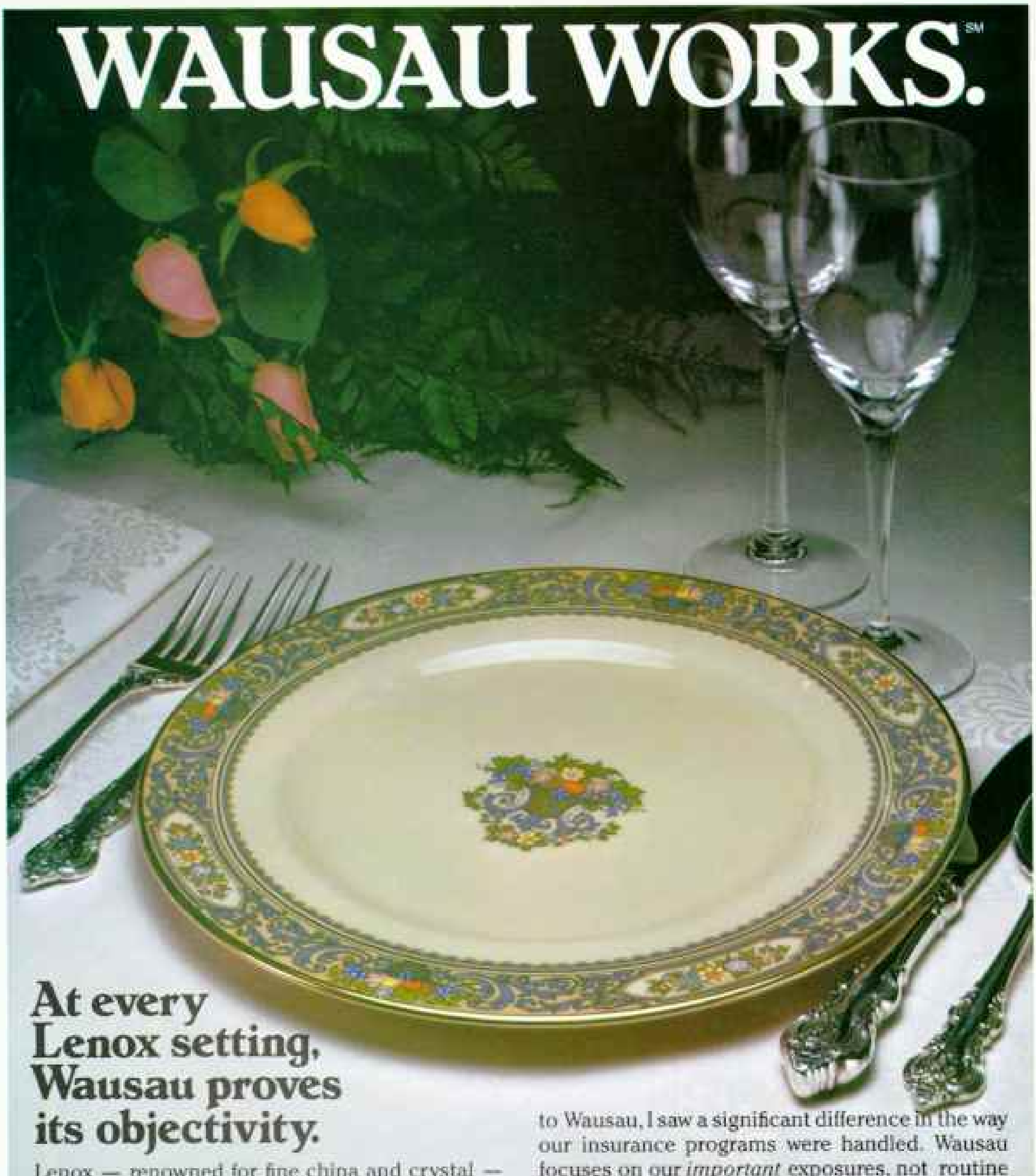
You won't miss a trick. Recharges so fast, it's ready for almost anything.

Magical warranty. The 970L is warranted for 5 full years, the 960 for 3! If, with normal use, camera malfunctions, return for free repair through a dealer in Kodak products.

KODAMATIC Instant Cameras and Film

CAPTURE ALL THE MAGIC IN AN INSTANT

WAUSAU WORKS.℠



At every Lenox setting, Wausau proves its objectivity.

Lenox — renowned for fine china and crystal — has 16 locations, from Lawrenceville, New Jersey to Austin, Texas. At each, they need an objective insurer — one that concentrates on *essential* services. And at each, the local Wausau service people have established effective day-to-day relationships with the Lenox people.

Lenox Treasurer Bill Clark notes, "As soon as we switched to Wausau, I saw a significant difference in the way our insurance programs were handled. Wausau focuses on our *important* exposures, not routine 'inspections' or fussing over trivia.

"Wausau's objectivity," says Mr. Clark, "identifies our problems and helps us eliminate them. That's what makes each plant's cost-reduction effort more productive. We're very pleased."

It's crystal clear. The partnership between Lenox and Wausau works.

WAUSAU INSURANCE COMPANIES
Wausau, Wisconsin 54401

On Assignment

JIM BRANDENBURG BY ANNIE GRIFFITHS

MENTION NAMIBIA and most people draw a blank. They don't know what it is (a former German colony administered by South Africa) or where it is (in southwestern Africa). Newspapers report on a border war there, and some observers conclude the conflict boils down to black versus white.

To get behind the headlines and preconceptions, photographer ***Jim Brandenburg*** and senior writer ***Bryan Hodgson*** crisscrossed the immense desert country for two months last year to prepare the most intensive report ever made by American journalists. "It was a real eye-opener," Brandenburg reports. Among the surprises: "Early morning fog on one of the world's great deserts—with the highest dunes anywhere . . . the majestic silence of elephants at a water hole . . . the warm reception of the drought-stricken Himbas [above], who live in the war zone and haven't seen rain for seven years. . . ."

The two men are veterans at searching out a story. A sportsman since his Minnesota childhood, Brandenburg has adapted his understanding of wilderness to a lens view of the world, from Kansas to Manchuria. Pictures of tallgrass prairie, the Canadian Rockies, and bamboo published in 1980 GEOGRAPHIC articles earned him the coveted Magazine Photographer of the Year award.

Hodgson, British-born, raised in Ireland, and a newspaperman in California, has tackled such complicated issues as the Alaska pipeline, the boom in natural gas, and the pain of Northern Ireland. "I've learned it's not what experts say that is crucial, but what's going on in the field," he says.

BRYAN HODGSON BY JIM BRANDENBURG


WHOEVER YOU ARE, WHEREVER YOU GO,
YOU HAVE A WORLD OF CHOICES WITH VISA.
VISA
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THE VISA EMBLEM — SYMBOL OF WORLDWIDE ACCEPTANCE.

Introducing a new Visa card, with preferred banking and travel services. Financial institutions around the world are introducing a new card, to give you preferred banking and travel services. Each card will feature the unique design of the financial institution and will display the Visa emblem in Gold, White and Gold — your assurance of recognition, acceptance and convenience. Worldwide.

Visa Travelers Cheques: now with an expanded refund system that reports the loss of your cards, too. The worldwide refund service protects your Visa Travelers Cheques if they are lost. If your payment cards are lost too, Visa will notify the proper institutions, at no charge, and arrange a cablegram or mailgram to any person you need to contact in the emergency.

The Blue, White and Gold card. The Blue, White and Gold Visa is the most widely used payment card in the world, accepted by over 3 million stores, hotels, airlines, car rentals and restaurants in 155 countries. It's good for cash at over 100,000 financial offices, too.

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Each Visa service available at the option of participating financial institutions.

VISA

Shoot automatic or shift for yourself.

An automatic that makes great pictures a snap.

Quick shots. Casual shots. Family shots anyone in the family can take. With your Pentax ME Super set on automatic, you just focus and fire. The ME Super's computer sets the exposure so your pictures come out right. You get better pictures than maybe your scrapbook or slide show has ever seen.

A push-button manual that helps you create.

Switch your Pentax ME Super 35mm SLR to manual and you're in control of creativity. The ME Super's exclusive push-button manual override lets you change shutter speeds, from 4 seconds to 1/2000th, without taking your eye off the picture.

You can work the light on your subject swiftly, surely. Create moods. Enhance detail. Silhouette, front light, cross light. Halo your subject with backlight. The possibilities are infinite.

Over 40 Pentax lenses for the best point of view.

Choose from four 50mm lenses for your Pentax ME Super. Or a fisheye. Or a wide-angle to a super telephoto. Or any of nine zooms. Every Pentax SMC lens is optically improved with seven layers of Super Multi Coating. For pictures with exceptional brilliance and clarity.

Other ME Super advantages? It's the lightest, full-featured 35mm SLR available. Light enough to wear all day. It's easy to load. Rugged. And so dependable, it even works when the batteries fail.

But best of all, the Pentax ME Super is more than a super camera. It's two.

One ME Super is two super cameras.

PENTAX

35 Inverness Drive East, Englewood, Colorado 80112.

*Manufacturer's suggested retail price. Dealer's actual retail price may vary. Price does not include tax, license, transportation, California emission system maintenance, optional or regionally required equipment.

THE $4998 FRONT-WHEEL-DRIVE COROLLA TERCEL. A CAR FOR ALL SEASONS.

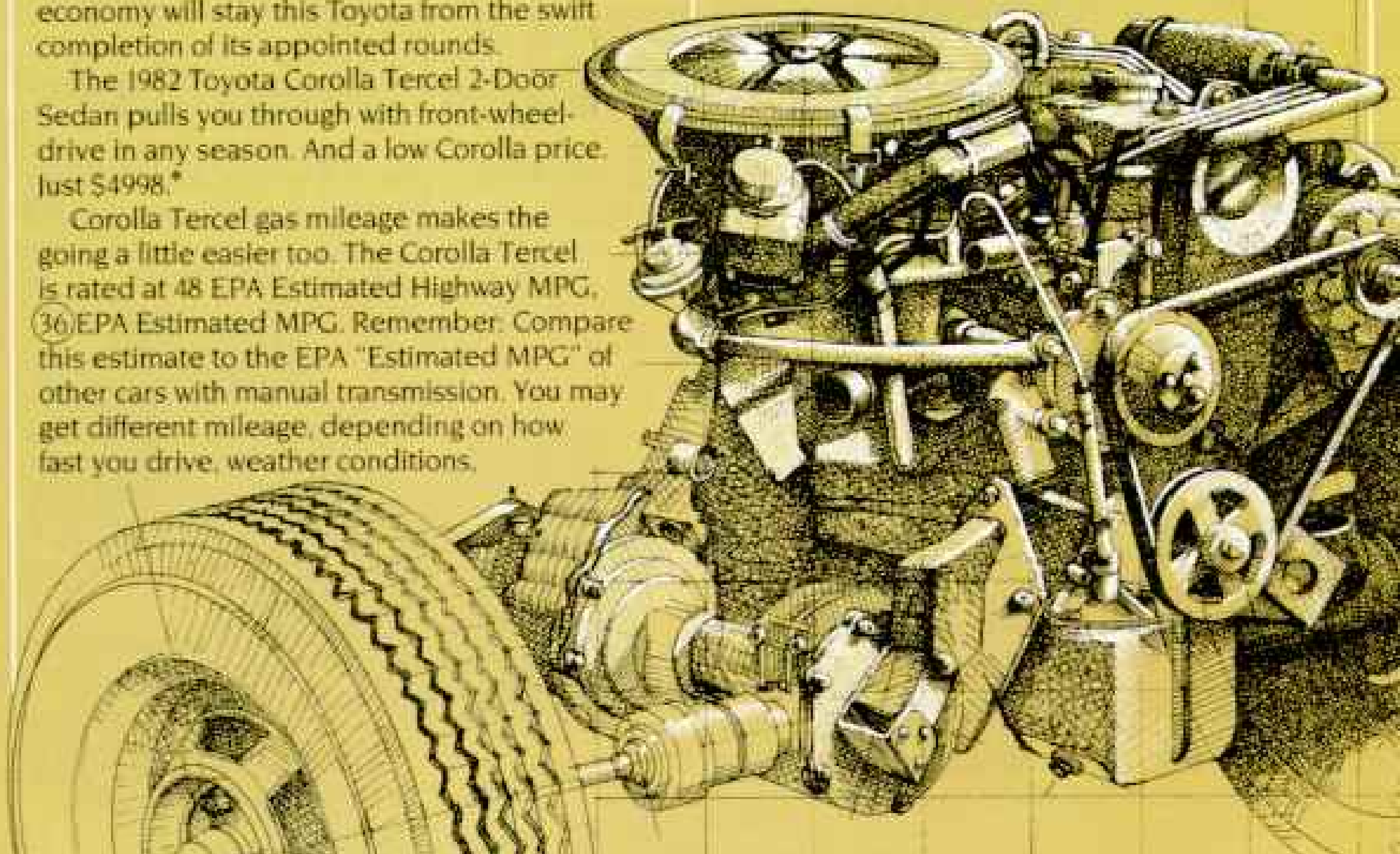
Neither rain nor sleet nor darkness of the economy will stay this Toyota from the swift completion of its appointed rounds.

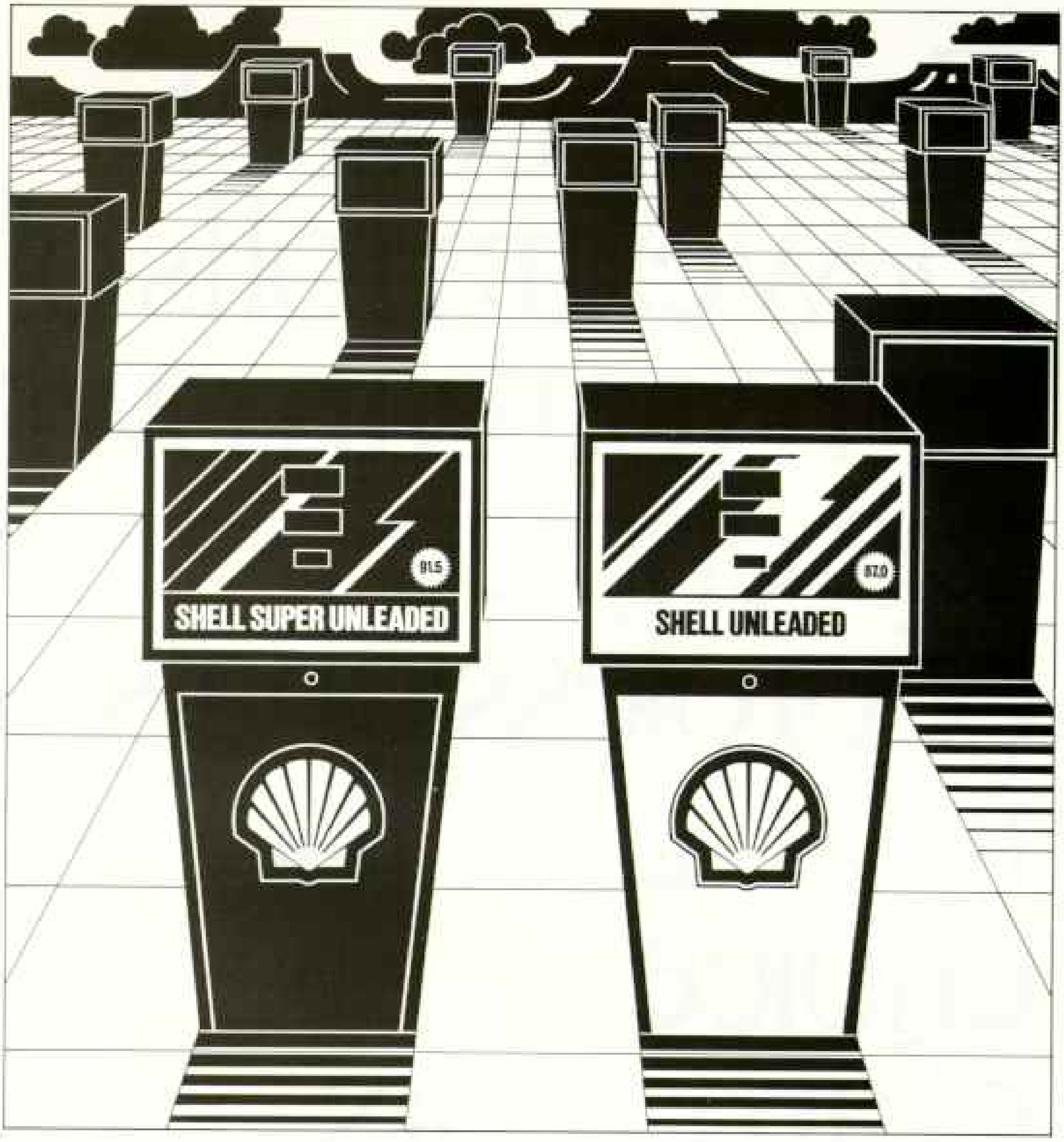
The 1982 Toyota Corolla Tercel 2-Door Sedan pulls you through with front-wheel-drive in any season. And a low Corolla price. Just $4998.*

Corolla Tercel gas mileage makes the going a little easier too. The Corolla Tercel is rated at 48 EPA Estimated Highway MPG, (36) EPA Estimated MPG. Remember: Compare this estimate to the EPA "Estimated MPG" of other cars with manual transmission. You may get different mileage, depending on how fast you drive, weather conditions, and trip length. Actual highway mileage will probably be less than the EPA "Highway Estimate."

The Corolla Tercel. Also available as a 3-Door Liftback. Or a practical 4-Door Sedan with automatic transmission. All built with Toyota's total economy to keep on going season after season.

The 1982 Toyota Corolla Tercel. The front-wheel-drive that really delivers!





Which unleaded gasoline is right for your car? Shell has two answers.

All unleaded gasolines are not the same.

Shell Super Unleaded*, in the red pump, is for cars that need a premium unleaded gasoline with extra octane. It can help keep those cars from knocking, running on, and stalling.

But not every car needs the extra 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. Whichever your car needs—Shell Unleaded or the higher octane of Shell Super Unleaded — your Shell dealer has the answer.

*Shell Super Unleaded is available at most stations where Shell markets.

Come to Shell for answers

For the cost of a few extra rolls of film you can own the choice of professionals, instead of the choice of amateurs.

*Cost comparison based on purchase of 2 to 5 rolls of 36 exposure color print film, plus processing.

Nikons are used by more professional photographers than all other 35mm cameras combined.

But you don't have to be a pro to own a Nikon.

For not much more than it would cost to buy one of those cameras amateurs buy, you can own the Nikon FE. A camera which many professionals buy because it's compact, yet durable.

The Nikon FE—like our top-of-the-line camera—is simple to operate. It features aperture priority automation. Which means you set the f-stop and the camera automatically selects the correct shutter speed. Shutter speeds are electronically controlled and continuously variable from 1/1000th to 8 full seconds.

If you choose to override the automation, just turn a dial and you'll be in complete manual control. Which means you can exercise your creativity by intentionally overexposing, underexposing or double-exposing your shots.

The FE has other features professionals have come to value about Nikon. Things like true center-weighted metering for exposure accuracy. A memory lock feature that helps you get perfect exposures, even under back-lit conditions. Interchangeable viewfinder screens. And a solid, all-metal body for unsurpassed ruggedness and reliability.

And when it comes to lenses, Nikon offers what many professionals regard as the finest system in the world. There are over 60 Nikon lenses in all. Our world-renowned Nikkor lenses range from a 6mm fisheye to a 2000mm super-telephoto. Or, if you prefer, you can choose one of Nikon's superb, but inexpensive, Series E lenses.

So why spend your money on a 35mm camera that's famous among amateurs? When for the cost of a few extra rolls of film,* you can have something in common with the pros?

Nikon

We take the world's greatest pictures.™

THE ARMY HAS HELPED SEND MORE PEOPLE TO COLLEGE THAN THERE ARE PEOPLE IN COLLEGE TODAY.

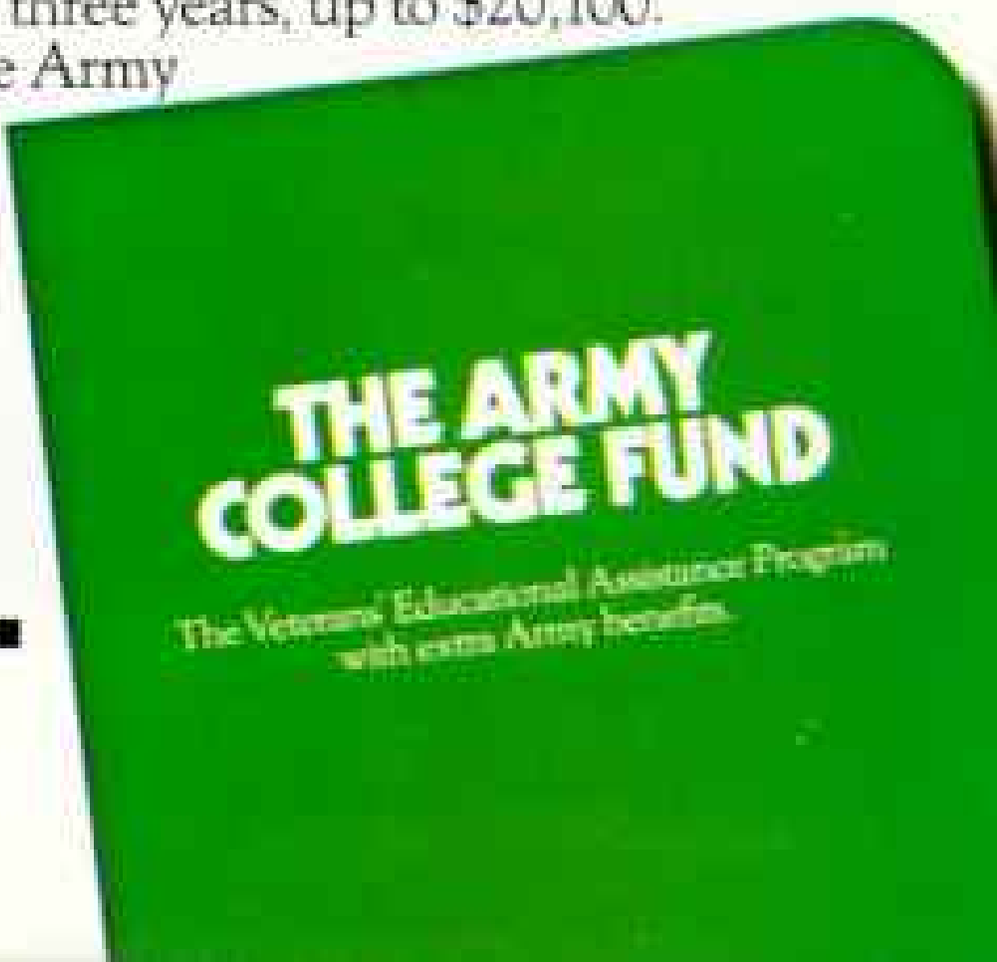
A lot of people, like Norman Griner, got where they are today because the Army helped them get there. By helping finance their college education. These people are proud to have served. Proud to have succeeded.

Today, the Army introduces the new Army College Fund. A high school graduate can join it, upon qualifying, when he or she joins the Army.

For every dollar they put in, Uncle Sam puts in five. Or more. So, after just two years in the Army, they can have up to $15,200 for college. In three years, up to $20,100.

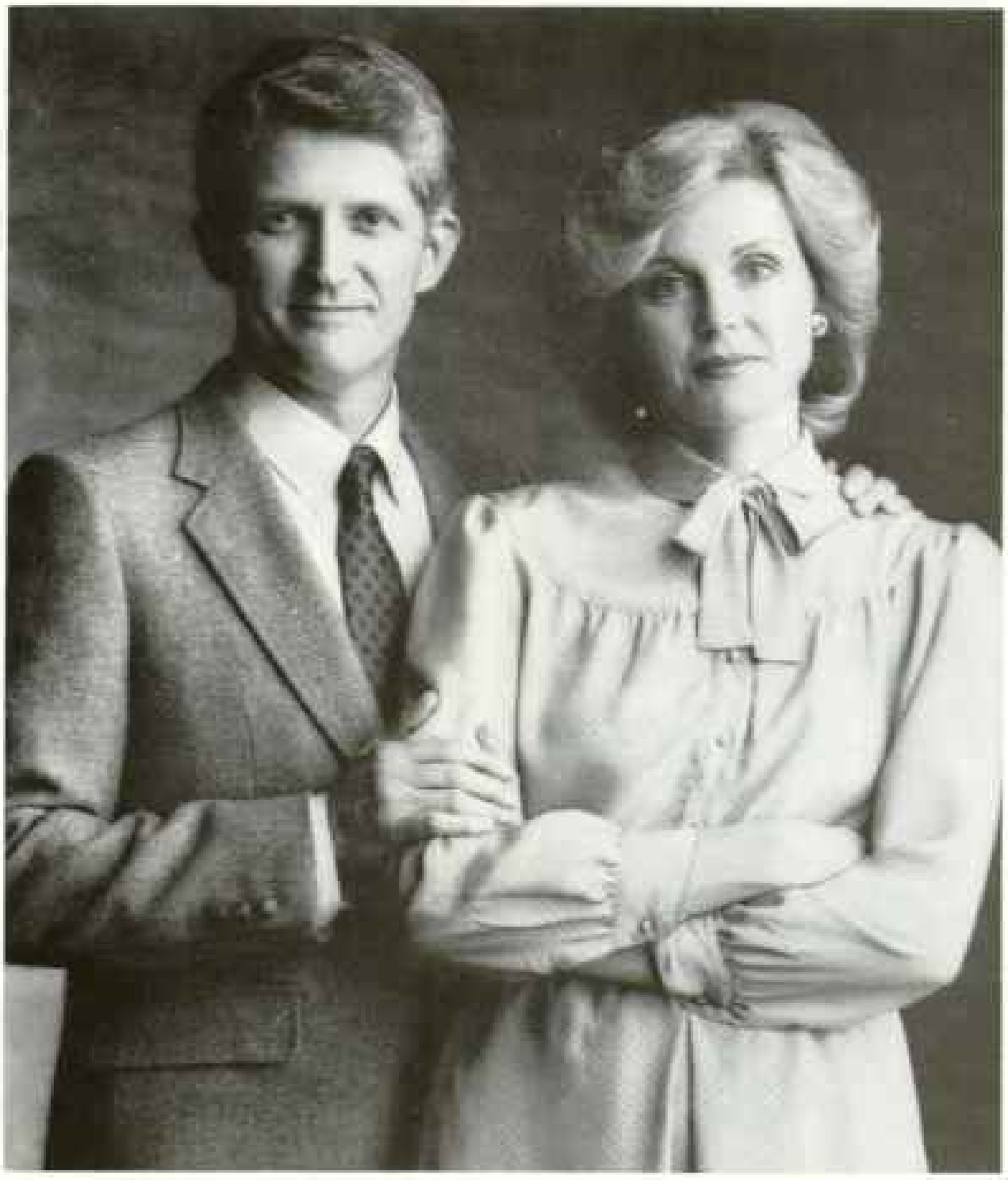
Call this toll-free number for your free copy of the Army College Fund booklet. In California, call 800-252-0011. Alaska and Hawaii, 800-423-2244.

This could be the most important book a high school student ever reads.



ARMY.
BE ALL YOU CAN BE.
800-421-4422

WHY YOU SHOULD OPEN YOUR IRA RETIREMENT PROGRAM WITH A COMPANY DEEPLY INVOLVED IN RETIREMENT PLANNING.



Now that virtually every wage earner is eligible to shelter earnings in a tax-deferred IRA retirement program, the important question is: Where should you open it?

There are a number of significant and substantial reasons why you should consider Metropolitan, a company long involved with the management of retirement funds on which millions of Americans depend.

Begin with this. The most critical fact about an IRA is security: knowing that the money will be there when you retire whether that's 10, 20 or 30 years from now.

Metropolitan makes sure of that. Unlike some other IRAs, the money you pay into Metropolitan's IRA is *guaranteed*. More than that, your money earns a competitive current interest rate with minimum rates guaranteed. There is none of the danger involved in speculative funds that can go down as easily as up.

Furthermore, Metropolitan offers an optional benefit that will keep your payments going if you become totally disabled and cannot continue to contribute yourself.

One last thing. When the time comes for you to retire, Metropolitan will offer you a number of options for using your IRA to provide a guaranteed retirement income that you can't outlive.

We make the purchase of an IRA easy and convenient. Just call a Metropolitan representative who is a trained professional willing to help you choose an IRA in an amount that best complements your other retirement benefits.

Metropolitan Insurance Companies

METROPOLITAN REALLY STANDS BY YOU.

Life/Health/Auto/Home/Retirement

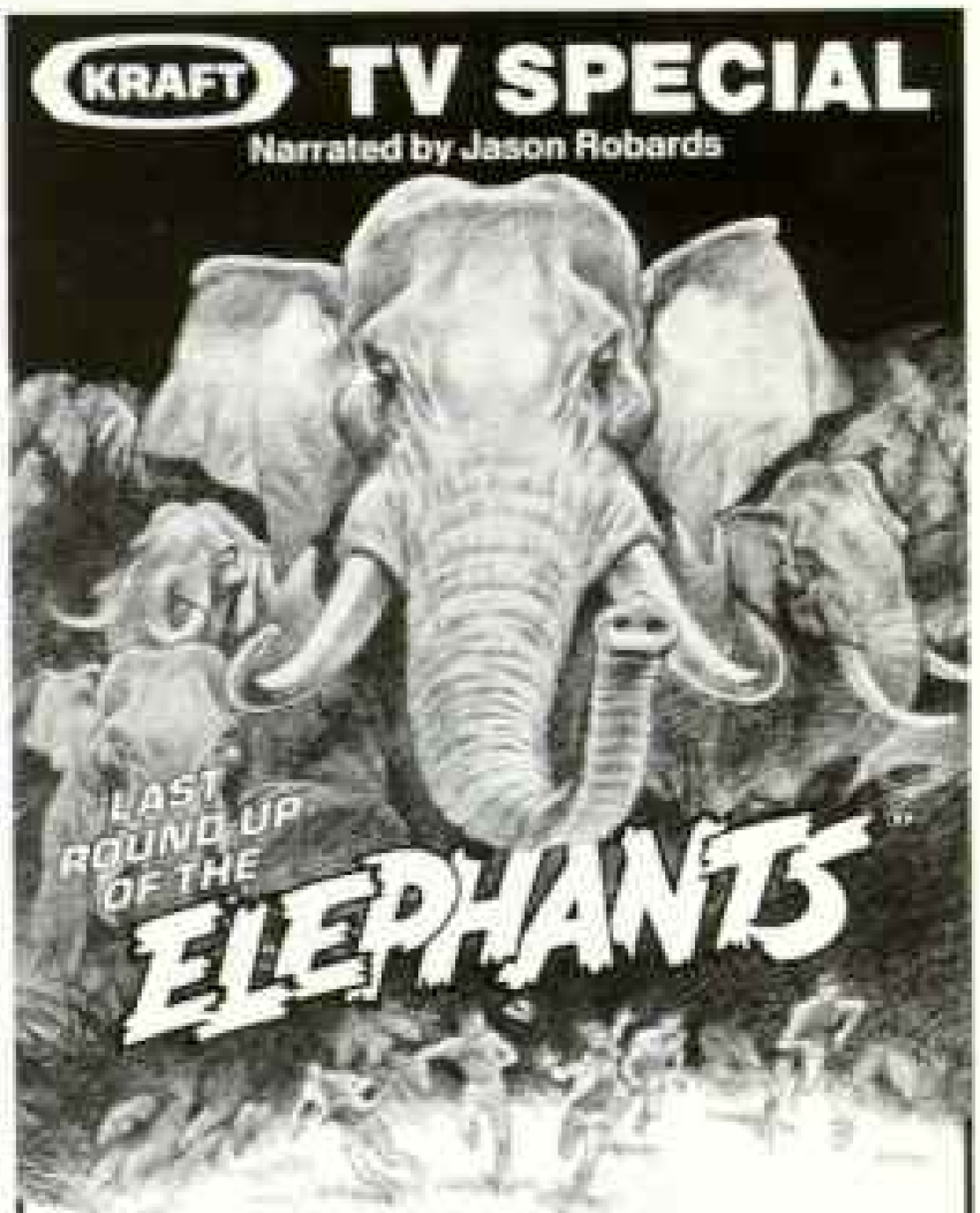
THE CLASSIC MOVE
IS TO BLACK.

CROSS®
SINCE 1846

The distinctive gift of Classic Black. With 22K gold electroplate appointments and lifetime mechanical guarantee. Suggested prices, $15 each, $30 the set.

KRAFT TV SPECIAL

Narrated by Jason Robards



The Singpho tribesmen of India will never again hunt awesome five-ton Asian elephants and train these wild beasts for work in logging, ancient religious ceremonies, even warfare. Conservation laws halted the hunt forever in 1979.

See the round-up that will never be seen again.

Wed. June 16, CBS-TV

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

Seven startlingly contemporary reasons for choosing Sears dependability.

Simulated picture

Inside Sears color television sets, there's a space-age revolution going on.

Thanks to micro-circuitry, as many as a thousand transistors can now be put in one tiny 'chip.' Since fewer components generally means less to go wrong, this helps cut down on the need for repairs.

Foremost of these new-breed color TV's is the 19-inch 4250 model (diagonal measure picture) shown bottom left in the photo.

It has four speakers set in pairs on each side of the screen. And a 'comb filter' produces a picture 25% sharper than our TV's without this advanced feature.

Fortified with all the reliability that modern electronics can build into it, the 4250 is backed by a full one-year warranty providing free repairs on parts *and* labor.

Of the five best-selling TV brands, only Sears offers such a warranty.

Sears dedication to dependability isn't confined to things electronic, however. It extends right across the board.

Witness: Sears Endurables ultra-sheer panty hose, wear-tested by 400 women, lasted an average of 18 wearings.

Craftsman® hand tools are designed for ruggedness. So if they ever fail to satisfy, Sears replaces them *free*.

Sears knows longlasting products lead to longlasting customers. And go a long way to help Sears live up to its famous promise: *Satisfaction guaranteed or your money back.*

You can count on

Sears

THE BUSINESS AIRPLANE REPORTS
NUMBER SEVEN IN A SERIES
OF DISCUSSIONS WITH EXECUTIVES
ABOUT TO BUY AN AIRPLANE.

7

HOW TO PROTECT YOUR COMPANY'S MOST VALUABLE ASSETS FROM THE WEAR-AND-TEAR OF BUSINESS TRAVEL.

There never seem to be enough good management people to go around.

So, chances are, yours are spread a bit thinner than usual right now.

As a result, they've probably never needed to travel more–or more efficiently–than they do today.

Yet, the state of our public transportation system makes this next to impossible.

Airline cutbacks and deregulation have reduced access to more than 72 cities in just the last three years. And since 1968, over a third of all the communities once served by major airlines have been dropped from the schedule.

That leaves you with a lot more road to cover if the airline's destination doesn't coincide with yours.

And at 55 mph, the road is no place to be making up for lost time.

That's why it's pointless to expect your key people to accomplish more on a tighter schedule–unless you've provided them with the one tool that can make it possible.

A company airplane.

It's the most basic, most logical investment you can make to improve the productivity of your top people.

PUTTING TIME BACK ON YOUR SIDE.

By freeing your executive staff from the rigid timetables and routings of the scheduled carriers, a company airplane puts you in total control of your travel agenda.

You go straight from your car to the flight line–with no ticket lines, baggage counters or boarding passes in between.

You can leave at a moment's notice. Fly direct to your destination. Land at any of the airports the airlines use (plus 12,000 more they don't). Conduct your business and often return in time to be back in the office the same day.

As you might expect, this kind of efficiency and flexibility is catching on fast in the corporate world.

In fact, today one out of every three intercity air travelers now arrives on a business aircraft.

Perhaps it's time you decided to do the same.

TAKING THE FIRST STEP.

To help you get started, we've prepared a free and comprehensive portfolio of Business Airplane Reports. To receive yours, simply write on your letterhead to: Beech Aircraft Corporation, Dept. A7, Wichita, Kansas 67201. If you'd rather call, phone collect and ask for Del Chitwood: 316-681-8219.

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1932-1982

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Member General Aviation Manufacturers Association

Photographed by M.D. England. *Seychelles Black Paradise Flycatcher: Genus:* Terpsiphone *Species:* corvina ***Adult size:*** *About the size of a sparrow (above photograph shows female bird; male has entirely blue black plumage and elongated tail feathers)* ***Adult weight:*** *Average 15g (male), 12g (female)* ***Habitat:*** *Formerly on five islands in the Seychelles, now only in lowland forests on La Digue* ***Surviving number:*** *Estimated 60 – 70*

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

Tradition has it that the cry of the Seychelles black paradise flycatcher is a sign of impending rain. But these days it is not often that one hears that cry: now found only on the island of La Digue, there are very few left of this endangered bird.

It could never be brought back if the black paradise flycatcher disappeared completely. And while photography can record it for posterity, more importantly it can help save it and the rest of wildlife.

Photography is a handy, reliable aid to scientific research for saving the black paradise flycatcher. Darting among trees for insects, its food, this bird on the wing is hard to follow, and it inexplicably disappears from its regular haunts most of the day.

Photography can also influence people in general about nature. Capable of reaching an unlimited audience, a photograph of a black paradise flycatcher with its nest (a marvellous work bound with spider's web) makes a perfectly charming picture that can contribute to the understanding of nature.

And understanding is perhaps the single most important factor in saving the Seychelles black paradise flycatcher and all of wildlife.

Canon

Images for all time