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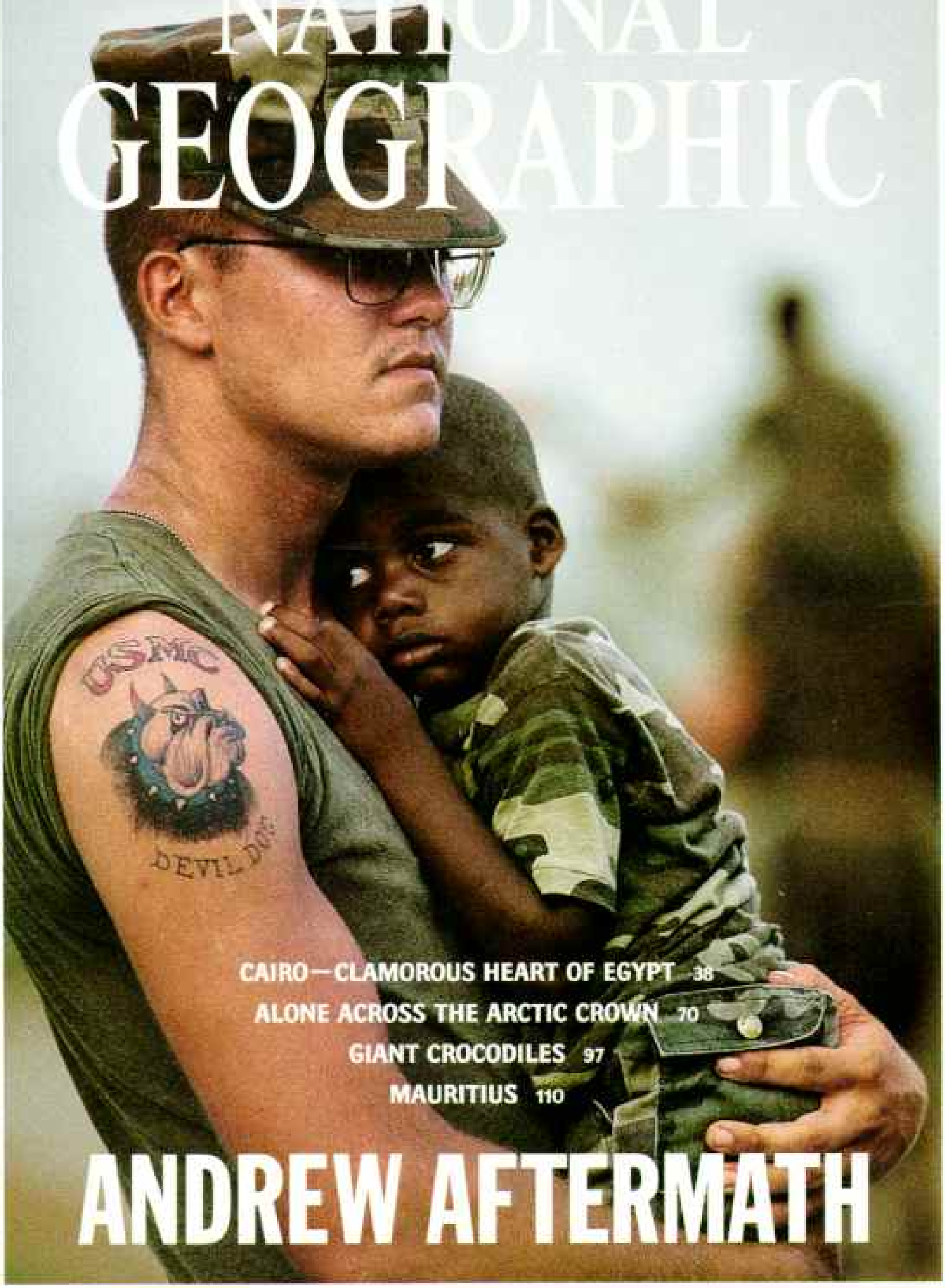
NATIONAL GEOGRAPHIC



ANDREW AFTERMATH

SEE "SURVIVORS OF THE SKELETON COAST" WEDNESDAY, APRIL 14, ON PBS TV

NATIONAL GEOGRAPHIC

APRIL 1993

COVER: Hurricane Andrew "knocked my house down," says Jarvis Williams, three, finding tender refuge in the tough arms of Marine David Ketcham at a Florida City relief camp. Photograph by Joel Sartore.

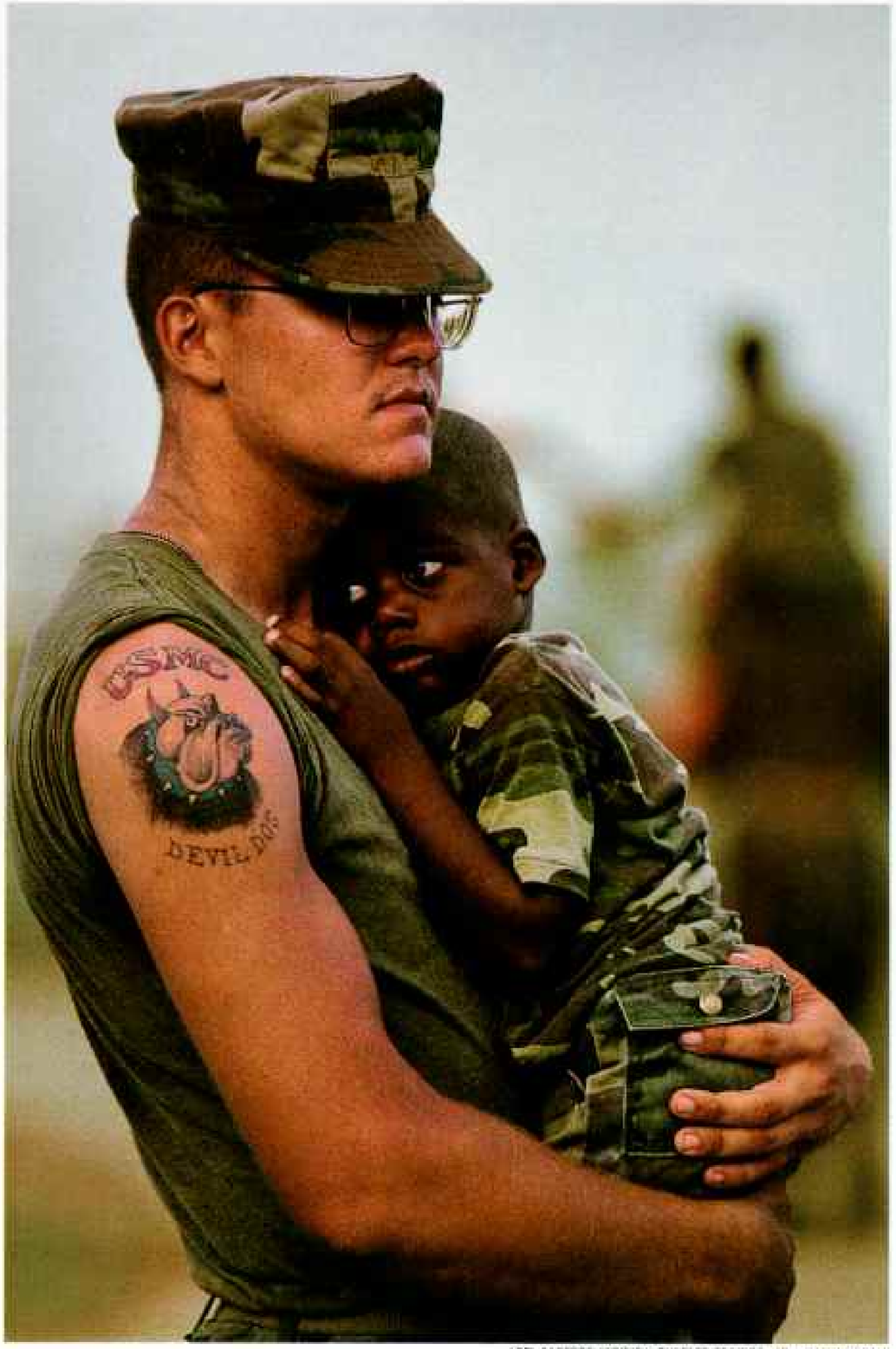
Cover printed on recycled-content paper.

ANDREW

AFTERMATH

Flying in close formation, DC-3s spray a ruined South Florida mobile-home park to battle mosquitoes. In the summer of 1992, despair and fear of disease were legacies of America's most destructive storm—so far.

CAMERON DAVIDSON



JOEL SARTORE (ABOVE); CHARLES TRAINOR, JR., MIAMI HERALD

DEVIL DOG TURNED ANGEL: *Marine David Ketcham cradles Jarvis Williams, a three-year-old who lost his home. "We became like brothers," said Ketcham, after the two met at a Florida City relief center. "I felt how nice it is to give." Praying on the Sunday after Andrew, parishioners of the Southmost Mennonite Church give thanks: No victims were trapped in the flattened sanctuary. "That's only the building. The anchor is solid," says founding pastor LeRoy Sheats.*

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SMASHED LIKE TOYS *by the tantrum that broke area wind gauges, small planes at the Kendall-Tamiami Airport were hauled to this field to be sold for parts or scrap. In all, 275 aircraft were mangled beyond repair.*

CAMERON DAVIDSON

By RICK GORE SENIOR ASSISTANT EDITOR

IN THE RUINS SOUTH OF MIAMI, days after the storm, there are many who believe the "monster" will return. "I think it's coming back," says a seven-year-old Haitian girl, Ernesta Jacques. "I'm gonna cry, cry, cry. . . . And the windows are gonna pop, pop, pop. . . ."

The monster. That's what children in the low-income neighborhoods of Homestead—the 11-year-old girl sucking the pacifier, the boy having an asthma attack while his mother waits in line for help from the Red Cross—call the nightmare that in the dark early hours of August 24, 1992, burst through their windows and tore off their roofs.

Most people call the monster by another name—Hurricane Andrew—and recount how he cavorted wantonly through their neighborhoods that morning, lifting steel-reinforced concrete tie beams weighing hundreds of pounds from buildings and thrashing them into homes, sometimes blocks away.

S. ANDREW ROSE, TIMES-PICAYUNE (ABOVE); CHUCK FADELY, MIAMI HERALD

Now whenever thunder rumbles or lightning flashes, children cry and dogs cower. Even grownups, who know the storm is over, react differently inside. For instance, Noemy Calderon, who huddled west of Homestead in a roofless bathroom with her husband, suffers sharp chest pains when afternoon storm clouds gather. On doctor's orders she has had to leave her husband temporarily and live with relatives away from the devastation.

Farther north in Perrine a young, black single mother, Millie Offord, sits anxiously in an Army tent, telling a Red Cross mental-health worker about her eight-year-old daughter. "Whenever it starts to rain, Kenetta panics," says Offord. "She cries, 'Momma, Andrew's gonna come back. Andrew's gonna hurt people.' "

Kenetta's bedroom was destroyed suddenly by the monster in the middle of the night, Offord explains. Her precious stuffed animals and her brand-new school clothes were ruined. Her family is among the 160,000 people Andrew left homeless.

"Sometimes I freak out too," Offord says. Volunteer psychologist John Carnes reassures her that her child is having a normal reaction to a very abnormal situation. Tears well up in Offord's eyes.

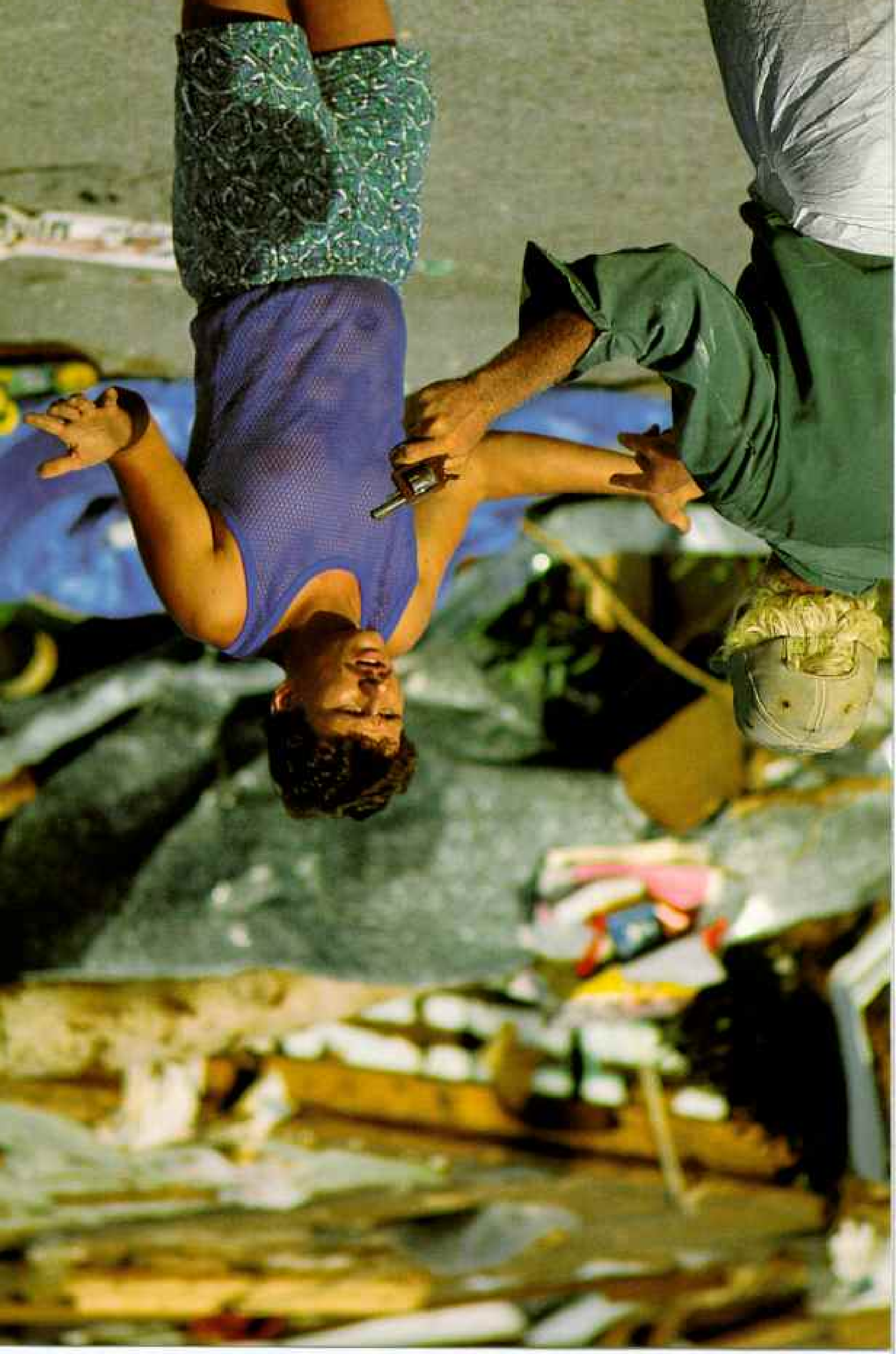
"It's just . . . I remember when *I* was little," she says. "There was nothing my momma couldn't make better . . . I wish I were stronger than what I am. . . . But I can't make this go away. . . ."

Hurricane Andrew began about August 13 as a patch of thunderstorms over western Africa. It moved out over the Atlantic as a rainy low-pressure wave. The U. S. National Hurricane Center tracks 60 or 70 of these waves each hurricane season, June through November, using satellites. This disturbance seemed unusually strong. By Monday, August 17, it had intensified into a tropical storm, developing a central circulation but not yet the clear eye that characterizes a strong hurricane.

STUNNED SURVIVOR ***Kellie Forsythe scours the rubble of her mother-in-law's home in Reserve, Louisiana, where she found the wind-borne photograph of a neighbor's daughter, who was also unhurt. Though potent enough to suck the wall off Florida apartments (opposite), the storm caused fewer than 65 deaths.***

RAMPANT LOOTING *of both essentials and booty emptied stores like this Homestead Circle-K. When resident Benjamin Lewis caught looters trying to steal his few undamaged possessions from the wreckage of his trailer, he ran to his van and grabbed a pistol. "I'd have shot real close to his ear just to scare him," said Lewis, who persuaded this intruder to return his stereo and phone.*

C. W. GRIFFIN, MIAMI HERALD (ABOVE); JOEL SARTORE



BOTH BY CAMERON DAVIDSON, COMSTOCK

A STUBBORN SENTRY ***since 1846, the lighthouse on Cape Florida withstood an 8.7-foot storm surge and 130-mile-an-hour winds that leveled some 325 acres of Australian pine. Biologists hope to replace the trees with native plants.***

Then it encountered meteorologic problems. A well-developed eye resembles a chimney. At its edges warm, moist air near the ocean surface spirals up to altitudes where the moisture condenses and releases its heat energy. But high-level wind shear over the Atlantic tugged at Andrew's central chimney and kept it from staying well aligned. Weak and disorganized, Andrew began to veer north, toward the open ocean.

Then on Friday—two days and a thousand miles off Florida—the wind shear diminished. Also, a high-pressure zone to the north grew stronger, pushing Andrew back westward. Still, most of South Florida went to bed Friday night anticipating a relaxing weekend.

Not Bryan Norcross, a TV weatherman at Miami's WTVJ who had long been trying to warn his fellow Floridians to prepare for "the big one"—the major hurricane that would one day strike.

"I didn't like the looks of this storm," recalls Norcross. "I knew that soon someone within the sound of my voice was going to have a hurricane—and maybe a bad one."

When Norcross returned to work Saturday, Andrew's winds had reached hurricane strength—74 miles an hour. Its chimney realigned, it grew in intensity. Norcross recalls thinking that day that it might not be so bad for South Florida to have a hundred-mile-an-hour storm to shake residents' complacency about hurricane danger. But on Sunday, as Andrew's winds grew to 150 miles an hour, Norcross realized that thousands of lives could be lost.

He would remain on the air virtually nonstop for 22 hours. As Hurricane Andrew bore down and highways out of South Florida clogged and shelters filled, countless viewers heard his urgent warnings: "It's absolutely for sure. No question about it. It's going to happen tonight."

In the hours ahead, Norcross would talk his

radio and television listeners through the most horrifying hours of their lives, telling them how to find safe places in houses that were blowing apart. He would become a local hero. People would spray-paint "Thank you, Bryan Norcross" on the remnants of their homes.

That Sunday night Andrew hit the northern Bahamas, where it took four lives, then weakened somewhat, its winds dropping below 140 miles an hour. Meteorologists may have been observing a phenomenon discovered only a decade ago: "eyewall replacement."

In this process, says research meteorologist Hugh Willoughby, the wall of storms circling the eye is sometimes surrounded by a new wall of storms. The inner wall disintegrates and is replaced by the outer wall. The process usually lasts 24 hours and weakens the storm.

In Andrew's case the process may have taken only nine hours. The storm suddenly gained strength as it hit the coastline. For reasons no one understands, it may even have briefly strengthened over land—a highly unusual occurrence for a hurricane.

WHAT HAPPENED early Monday morning was the creation in south Dade County of a zone of devastation larger than the city of Chicago, or equal to 12 Manhattan Islands. In that path—home to 355,000 people—almost every building was ravaged. More than 80,000 dwellings were demolished or damaged too severely to live in. Another 55,000 were less than 50 percent destroyed and still considered livable.

No one knows exactly how strong Andrew's winds gusted. The wind-measuring instrument at the National Hurricane Center in Coral Gables, which itself barely missed Andrew's eye, was knocked out. Officially its meteorologists estimate sustained winds of 145 miles an hour with gusts of 175. They concede, however, that top winds may have approached 200 miles an hour in places.

What is beyond doubt is that Hurricane Andrew—in its toll of destruction and economic loss—is the most devastating natural disaster ever to strike the United States. In Florida it took a miraculously low count of 43 lives, because residents heeded evacuation and emergency warnings. It also destroyed perhaps 30 billion dollars' worth of property.

After the storm, the people of south Dade County found themselves broiling under a withering sun without power, water, food, or any of the vast infrastructure we rely on. Thousands of cars lay demolished, some with windshields shattered, others flipped over. Almost every tree had been blown down or stripped of its leaves. In fact, say several National Guardsmen who served in Operation Desert Storm, the devastation in Kuwait City wasn't nearly this bad.

"If you put Hurricane Hugo and the 1989 San Francisco Bay area earthquake together and doubled the magnitude of damage, that's what we have," said Red Cross damage-assessment officer Nicholas Peake.

Andrew's rampage continued beyond Florida. Two days later it surged ashore in the bayou country of Louisiana, where it killed another 15 people and inflicted another two billion dollars of damage. But in Louisiana Andrew struck mostly marshland, sugarcane fields, and small rural towns. The destruction lacked the epic scale of Florida.

I was born in South Florida in 1945. My hometown, Fort Lauderdale, had only 26,000 residents. Miami, just south of us, was, of course, much larger—192,000. Homestead was just an agricultural crossroads en route to the Florida Keys.

Between 1945 and 1950, five major hurricanes struck southeast Florida. My earliest memory is watching from our porch as men rowed boats through the streets of flooded Fort Lauderdale. In 1950 I recall my mother holding me while a storm named King shook our house violently in the middle of the night. (Why is it that hurricanes always seem to strike after midnight?) Then hurricanes stopped hitting us. As a boy I was upset. I wanted to experience the thrill of a bad storm, and I never really understood why my parents said, "No. You don't."

In 1960 Hurricane Donna devastated the keys. Hurricanes Cleo and Betsy brought down trees in the mid-60s, but until August 1992 South Florida's Gold Coast had been strangely exempt from severe hurricanes.

Although I left Florida in the late 1960s, I return often. I have watched an incredible population boom in which my hometown has merged with Miami, creating a megalopolis of more than three million people. Swamps and scrublands have been covered with subdivisions, shopping malls, condominiums, town houses, and tenements. South Florida became a developer's carnival, especially during the

1980s when drug dollars flowed, the savings and loan people had money for real estate speculation, and compliant inspectors did not always enforce the area's building codes. By last year, one could say, South Florida was ripe for a big hurricane.

NOW I AM FLYING BACK to the wounded state. I want to examine the damage and efforts at aid and reconstruction. I want to learn what useful lessons can be drawn from Andrew and if our scientific knowledge of hurricanes has increased.

I am personally relieved that my mother's and my brothers' homes were spared; forecasters had warned that a giant storm surge might hit them. Andrew didn't make an expected northwest jog as it struck the coast, probably because it was moving so fast, and spared most of Miami and Fort Lauderdale.

Yet I feel stunned as my plane approaches Miami International Airport at night. All that land to the south, usually a sea of light, is now a black hole. Waterlogged from post-Andrew rains, the void glistens as lightning flashes. It is indistinguishable from the dark Atlantic.

As dawn breaks, it is clear even up in central Miami and adjacent Coral Gables that a major hurricane has passed through. Traffic lights are out. Toll booths are totaled. Huge trees are uprooted. Signs are smashed. The shady romantic tropical foliage of Coconut Grove, a Miami landmark, has blown away.

The office towers of downtown Miami's sparkling skyline narrowly missed the monster's worst. To the south, along Biscayne Bay in Perrine, the multistoried headquarters of Burger King took a direct hit. It reveals what those downtown buildings could have looked like had Andrew veered slightly. Floor after floor of windows have blown out. Desks, computer screens, and file cabinets are flipped over and smashed. The ceilings and walls have

JOHN J. LOPINOT, PALM BEACH POST/SYGMA (ABOVE); CAMERON DAVIDSON

A HALF-MILE SCAR *over land and through mangroves plots the course of the 44-foot sloop* **Pourquoi Pas.** *Blown inland from a Homestead marina, her rigging survived, but the port side was stove in. Lamented owner Elizabeth Earl: "This is like losing our retirement home. It still hurts." In south Coral Gables, powerboats were stacked like dominoes, joining some 15,000 other battered Dade County craft.*

C
Vortex hits 80 mph. On the side where it spins with winds averaging 120 mph, it reaches 200 mph, ruining homes in mere seconds. On the side where it spins against surrounding winds, it slows to a benign 40 mph.

Intense updraft

B
Vortex stretches and increases to 40 mph, causing peak winds of 160 mph.

Intense updraft

130-mph wind

ANDREW'S RECKLESS RIDE

The official warning came at 8 a.m., August 23. A full 21 hours later, few were ready for what hit—the third strongest hurricane to touch the U. S. mainland this century. Spawning winds that some scientists believe may have reached 200 miles an hour, Andrew caused up to 30 billion dollars' damage.

It became the nation's costliest natural disaster. But damage could have been worse. Andrew crossed Florida far to the south and raced at nearly 20 miles an hour, twice the usual pace for hurricanes in this region. Had the eye struck Miami and Fort Lauderdale, scores more might have died. Had it lingered, more wildlife might have perished. Such what-ifs prompt coastal dwellers to keep a cautious eye on the horizon.

Andrew's scythe cut hard through the Bahamas, South Florida, and Louisiana. Track shows center of the eye at local times.

PAINTING BY DAVIS MELTZER

A
Vortex spinning at 30 mph and traveling with winds averaging 130 mph can create winds of 140 mph.

Intense updraft

110-mph wind

Intense updraft

Average updraft

Center of eye

New theory of eyewall offspring

Vortices that whirl between winds of different speeds can be stretched by intense updrafts (A), says Ted Fujita, professor emeritus of the University of Chicago. Gaining speed as they stretch (B), the "spin-up vortices" can leave 50- to 300-foot-wide swaths of ruin (C).

The fury of an eyewall

Currents of warm, moist air (purple arrows) spiral toward the voracious low-pressure eye. As the air rises, water vapor condenses, releasing heat that fuels hurricane winds. In Andrew, some updrafts raged with rare intensity, spawning destructive vortices beneath them.

In the Everglades, 70,000 acres of mangroves were destroyed. Non-native trees may replace them.

Center of eye

Miccosukee Indian Reservation

DADE COUNTY

Hit by the peak storm surge of 16.9 feet, Burger King headquarters was nearly gutted.

The National Hurricane Center lost its radar and anemometer, which recorded a top gust of 164 miles an hour.

Fort Lauderdale

At Turkey Point power plant a smokestack was lost but nuclear reactors were unharmed.

Atlantic Ocean

Coral Gables

Miami

Coconut Grove

Cape Florida

THE EVERGLADES

Homestead

Florida City

Perrine

Cutler Ridge

BISCAYNE NATIONAL PARK

Biscayne Bay

EVERGLADES NATIONAL PARK

Homestead Air Force Base was leveled. Its annual payroll had put 144 million dollars into south Dade pockets.

Scouring currents ripped apart sea fans, sponges, and coral in areas of Biscayne Bay.

Florida Keys

Florida's painful scar

With its fiercest winds spanning some 25 miles, Andrew sliced across 60 miles of Florida, felling orchards, grinding homes to mulch, and denuding hardwood hammocks.

been ripped away, exposing ducts and pipes. Some equipment was found two miles away.

My destination, however, is Homestead, heart of the catastrophe. I creep down U. S. Highway 1. Traffic lights are not just out, they have blown away. (They were part of the heavy shrapnel that Andrew used to break into buildings. Flying diesel-fuel drums were another.) Sometimes soldiers direct traffic at major intersections, but often drivers must play a war of nerves. You have to guess where you are; most street signs are gone.

Andrew took particular vengeance on the urban blight that bordered Highway 1. All the strip malls are battered, their glitzy signs in shatters and shards. It's hard to tell the remnants of a Wendy's from a McDonald's.

Reaching Homestead, I ask directions from a state trooper. He tells me the looting that exploded here the day after the storm has subsided, thanks to the arrival of the National Guard. The guard is everywhere. So are about 16,000 troops from every branch of the armed forces. That wasn't so at first. State and federal officials apparently did not appreciate the scale of the disaster until about two days after Andrew struck. Then Kate Hale, Dade County's director of emergency management, called a press conference. "Where the hell is the cavalry on this one?" she complained. "We need food. We need water. We need people. For God's sake, where are they?"

The complaint worked. Now military convoys help clog the roads. The skies whirr with helicopters bringing slingloads of supplies from naval vessels offshore.

Two guardsmen with rifles sit outside a former photo shop on Homestead's main street. It now serves as a food distribution center. Inside, volunteer Joe Ann McGinnis describes Homestead's ordeal.

"Oh hon, on the day after, people were crazy," she says. "They were breaking into stores, stealing and grabbing. And it was so hot! Lord, on the day after, if I could have had anything in the world, it would have been an ice cube in my mouth. Now it's a hot bath."

Another volunteer, Lorenzo Lightburn, pauses from unloading boxes.

"It's made a lot of people realize their lives and all them things they worked years for could be took from 'em real fast," he says. "It's all gone. Brought folks down to reality. Now we got to learn to stick together. That's about the only good I can see from this."

A passerby stops in to inquire: "Y'all don't have a crowbar?"

"Ask one of them looters," says Lightburn.

JOEL SARTORE (ABOVE); RAYMOND GEHMAN

AWED BY ANDREW, ***Amber Daugherty, 7, drew her damaged home on the first day of school, which opened two weeks late. "I felt sad 'cause all the trees fell down and my baby doll got blown away."***

More than 80,000 homes were lost, including the trailer of Shirley Shaffer and husband Jack, who dug out their tepee replica for shelter. Said Shaffer, "Inside it was bright and calm and peaceful."

"HELP!" reads one of the thousands of signs now spray-painted on the buildings of south Dade: "We have fallen and we can't get up."

The town house on which this sign is painted—indeed this whole complex of homes in Homestead—is deserted. Across the street lie the remnants of a mobile-home park. In front of one surviving mobile home Mildred Gray sits talking with neighbor Larry Erb.

"We spent our winters here," says Mildred, explaining that she had arrived just this morning from Johnstown, Pennsylvania. "The manager called us to say everything was gone, and he was going to bulldoze in two weeks. We came down to salvage what we could. I still can't believe what my eyes are seeing."

"We were like one big family in the park," says Larry. "This was one of the nicest parks around. Must have had 500 trailers. I know it had the nicest people.

"If they rebuild, are you coming back, Mildred?" he asks.

"Not this winter. We didn't have insurance." She looks around. "I think the looters were as bad as the storm. They took all my husband's clothes and left their dirty jerseys. Took our TV and VCR."

Her husband, James, arrives. He has been videotaping the destruction.

"We've got to pack up and get out of here," she tells him. "This is really getting to me."

SO MANY busted up pieces of people's lives. At another trailer park all that's left of one home is a sofa smashed into the side of a Ford Tempo, a rain-stained piano, and an oven thrust into a refrigerator. Down the block Betty Vale, who had just moved into this park three weeks before, sifts through the debris of her home. "First time I bought a place," she says. "I was fixing it up." Vale fled to a friend's home to ride out Andrew.

"It was a concrete house, but still the walls were trembling," she recalls. "The door blew open, and my friend and I braced it with our bodies. It sounded like a poltergeist or the devil himself was out there trying to break in. I'll never forget that horrible sound. It went on for hours. It was all we could do to keep that door shut. I mean grown men cried."

In a large condominium subdivision in nearby Naranja Lakes, Sandra Kaye Brandon and her family are the only signs of life as they load

RAYMOND GEHMAN

A LONE CANDLE *her only light, 64-year-old Flora Laible, a diabetic, stayed at a friend's apartment after the storm, where relief workers brought her medicine. Ignoring evacuation orders, she had ridden out the winds in a bathroom. The next day she joined Florida's 160,000 newly homeless. "I can't get over it, no matter how much nerve medicine they give me. Makes me sleep, but when I wake up, I got the same problems."*

a U-Haul. "Most people said what they had left wasn't worth packing," she says. "We got lucky. Everything's wet, but salvageable."

Like many residents, they are moving out. Sandra takes along memories of chaotic days when hunger brought previously unknown desperation. "At night when the relief vehicles came through with food, people would run out of their houses like dogs racing for meat. It was like nuclear war had happened."

Up U. S. 1 in Cutler Ridge, security guard C. C. Jordan stands alone on a jumble of concrete slabs. Before Andrew these slabs had formed the walls of a warehouse. "I'm lucky to be alive," he says. "Look." We get on our knees and peer under one slab. It has crushed and compacted a truck. "I was sittin' in that."

Despite the storm warnings, Jordan said he was told to show up for work that night. "I was just watchin' the storm, but about 4:30 the winds was really pickin' up, and somethin' told me to get into the warehouse. So I climbed into another truck parked inside.

"Then the wind started roarin' like a train. I never heard nothin' like that before. It started takin' the roof off. Then those big beams crashed down. Pretty soon the concrete walls started to fall. I wanted to get out of here so bad, but the wind was too strong. I couldn't go nowhere. Sparks was runnin' through the sky like blazes. I know'd as long as I stayed in that truck I wouldn't get 'lectrocuted.

"Then somethin' crashed into the windshield. I got down under the steerin' wheel. I just kept prayin'."

He pauses. His eyes swell and quiver in a way I've seen over and over again on the faces of south Dade. "I need help," he says softly. "Every time I look at all this I have flashbacks, and it's aging me real bad."

Many people shared the nightmare of Andrew. Julius Keaton, a maintenance worker at Biscayne National Park, spent that night with family at his 67-year-old mother's home.

"I heard one window break, so I jumped up and put a mattress against it," he recounts. "But I guess that storm really wanted to get in, 'cause it blew out another window and beat down the front door. Then it knocked down a wall and began suckin' things out. It lifted a mattress off a bed and sucked it up against a window. It was like a vacuum cleaner. Nothin' we could do but pray and sing."

In a battered trailer I meet Hernán DeLao, who recalls his night of horror.

"I was scared. I cried: 'Jesus, Jesus, help me.' " During the relative quiet as the eye of the hurricane passed, he and his wife fled their trailer to seek refuge in the bathroom of a concrete packinghouse nearby. Then Andrew came back, stronger than before.

"I held the door with my body," he says, "but the storm, it was so terrible. Sometimes it seemed it was lifting the walls. It broke the window and tore off the roof. I heard someone crying, 'Help me, help me.' But, O Jesus, I thought, I cannot help anyone. I can't explain you. . . . For three hours. . . . It sounded like bombs. It was so terrible . . . the sky was flashing, like when a volcano blows up. I lost everything I have but my life."

Others were less lucky. Mary Cowin, 64, was impaled by a two-by-four in her bathroom. Incredibly, after the storm her telephone still worked. Neighbors called 911 but couldn't get through. They guarded and comforted her for three hours. Right after she died, the phone rang. It was her daughter calling from up north to see if she was all right.

Twelve-year-old Naomi Browning also was killed—by a beam that fell on her in her bedroom. Andrew Roberts, 25, was crushed by his collapsing home. So were Claude Owens, Harry Boyer, and Natividad Rohena. Robert Ramos, 49, was killed by flying debris after his house collapsed. Eighty-year-old Gladys Porter refused to leave her mobile home and was later found in its debris. Jesse James, 47, was crushed in his truck while seeking refuge. As far away as north Dade, Anthony Margiotta, 78, died after falling off a balcony whose railing had been blown away. He was blind.

The tragedies are endless. "We had two elderly women yesterday—85 and 87," says Red Cross volunteer Eleanor Morgan. "Their home had been flattened; they hadn't eaten in three days. Another lady just left here with three retarded kids. And no home, no food."

THE SUFFERING TOUCHES the nation's heart. Volunteers pour into south Dade. Typical is Steve Rodríguez, a young man who stops me at a shelter. He's just arrived from Waco, Texas. His voice quivers with urgency.

"I want to help," he says. "I saw it in the news. I couldn't bear it. I told my boss and my wife I got to go there. I'm a certified forklift operator. I know CPR. Who can I talk to?"

Likewise, Joy McKenzie of Jacksonville is

MAKING ORDER *of chaos, Homestead's Harris Field gave 1,400 uprooted residents a spot for shade, sustenance, and showers. In a mobile ambulance, Florida National Guard medic Harrison Waithaka pulls glass from a child's foot and treats infected injuries made worse by lack of clean water and sanitation. The native of Kenya recalled seeing "sores similar to what I saw as a kid in Africa."*

CAMERON DAVIDSON (TOP); RAYMOND GEHMAN

washing people's hair at a church relief center. "My heart broke," she says. "I had to do something. I am a beautician, so this was it."

Andrew is bringing people together who normally don't share a bond.

For instance, one day on the hard-hit Miccosukee Indian Reservation in the Everglades a convoy of mostly young men pulls up.

"I've got a couple of U-Hauls with food, lumber, supplies, and able bodies to rebuild roofs," says contractor Bob Raech. He introduces me to Dwina Gibb, wife of rock star Robin Gibb of the Bee Gees. She has organized and paid for this mission.

The team unloads supplies into the tribe's gym, which is already so loaded with donations that they won't be playing basketball for a long time.

"Why are you all doing this?" I ask Raech, who, according to one of his team, has built some of South Florida's trendiest nightclubs.

"Well," he says, pausing, then smiling. "We're a bunch of queens who want to help. Every one of us. My lover has AIDS. AIDS is a human problem. So is this. We care."

A FEW DAYS LATER at a Florida City church, I see care being ladled out by Southern Baptists. The Baptists, renowned for feeding disaster victims from mobile kitchens, were perhaps the first samaritans on the scene.

"We were here before the Red Cross," says Jeff Revels, a youth minister from Jacksonville. "If they are hungry, we feed them."

A mobile kitchen operated by the Tennessee Baptist Convention has been cooking 4,000 hot meals a day here. Tennessee is about to be relieved by a Kentucky unit that can fix 8,000.

Revels himself focuses on a largely forgotten niche of victims—those who live in hard-to-reach regions near the Everglades.

"I go off the road looking for people," he says as we head out with 80 hot meals.

We enter Everglades Labor Camp, the main quarters for migrant laborers. About 350 trailers have been obliterated. Volunteers work to restore the remaining homes. New donated tents dot the grounds. The needs of these people, the ones who put tomatoes and winter vegetables on our tables, were the last to be met. Now relief flows in.

Revels moves on. Turning down a dirt road, we soon honk in front of a hovel in the middle of a banana plantation. No one appears. We leave meals and ice in their cooler.

"They are from Guatemala," says Revels. "They're afraid of people coming to check their papers or steal whatever they have left."

Farther down the road, volunteers from Florida's Division of Alcohol and Tobacco are building a shelter for Pat Thoopin, a young Thai woman who bought five acres out here three years ago. Working alone, she had planted fields of fruits for Asian and Cuban food stores. The trees and her trailer are wiped out.

"I felt so sad. So hurt," she says. "I worked so hard. I had 320 banana trees. Many guavas and litchis. I just began to have income. Why did this have to happen?"

"She won't leave," says volunteer carpenter David Banks. "This is her land. It's all she's got."

"IT WAS KINDA ROUGH," *says Herman Andrews of the horrendous mess she faced before troops helped clear her yard of debris. In its brief cross-state spree, the storm churned out four years' worth of trash.*

SHERMAN ZENT/*PALM BEACH POST*/SYGMA

SNAPPED WILLOWS *in Louisiana's Atchafalaya River basin provide barren perches for ibis and heron that likely survived killer winds by cowering in underbrush. Cruising part of the basin's 700 miles of streams, fisherman Henry Truelove and son T. J. view a ripe fraction of the 182 million fish that suffocated after organic matter depleted oxygen in the water. The muck was as murky as "Cajun coffee," says Truelove.*

BOTH BY JOEL SARTORE

Down another road, we find Julio González, who had built a minor Eden of orchards after moving here from Granma Province in Cuba. A few pigs scavenge his ravaged land.

"*Mucho problema grande,*" he tells me. "Andrew—no good! I had 60 pigs. Now five. Seventy chickens. Now six. Fifty ducks. Now five. I have only one fighting cock left, and his leg is broken."

THE MOST MASSIVE AID in this disaster has come from the military. Not since Desert Storm have our all-volunteer forces been so challenged. In fact, the number of airlift missions into Florida on some days has exceeded those into the Persian Gulf during the buildup.

"This is the granddaddy of all assistance operations," says Col. J. W. Thurman, deputy operations officer for the military's joint task force in Miami.

"We're approaching this like a war—except we're putting troops in the field to help people, not kill them. I'm an old war fighter, and I see the same excitement and energy devoted to this as when we were crossing minefields into Iraq. We're fired up."

Every branch of the service has been given specific tasks, says Thurman. He sees none of the parochialism that can clog joint efforts in wartime. "Andrew's brought a bonding between the services," he says. "It's special."

At a camp in Perrine, I join several soldiers wearing the red berets of the 82nd Airborne Division at a lunch table.

"A kid came up and asked me for my autograph today," says one. "Me too," says another. "Like I was some superstar."

The work—directing traffic and cleaning up—is perhaps even hotter than in the Persian Gulf. There are more mosquitoes. Patrols, especially through the crack-infested slum areas, can be dangerous. Punks know that only the National Guard has live ammunition. Federal troops have been taunted and even shot at by gang members. The troops' professionalism under Andrew's fire is impressive.

"Sir, would you like us to get that tree out of your backyard?" asks Spec. Domingo Lucero of the Army's Tenth Mountain Division out of Fort Drum, New York.

I am standing in a Homestead neighborhood where most houses are shared duplexes; most names are González, García, or Hernández; and most of the roofs are gone. The soldier has mistaken me for a homeowner. His platoon is on a hot but spirited patrol, bearing tools and rakes.

"We're infantry soldiers," says Staff Sgt. Frank Woolery. "We've done Sinai peacekeeping, helped with the Haitians in Cuba, and now we're doing Andrew. We've cleared 15 blocks in the past two days."

"We'll carry out anything they can't get out themselves," says Lucero.

I have come to this neighborhood with two medics from the Florida National Guard's 156th Medical Company. Gene Adelsperger is normally a baker in St. Augustine, while Harrison Waithaka is a student and waiter.

"We're like the ice-cream man," says Adelsperger as we slowly cruise in a mobile ambulance. "Everybody comes to us."

They are surrounded by children, and in this neighborhood it is often the children who speak English. They are the interpreters. The parents' eyes express emotions, but they do not have the words that would make surviving this ordeal with dignity less stressful. This storm makes adults out of kids, and vice versa.

Cuts, scrapes, infections, and tetanus shots are mostly what draw people to the ambulance whenever it stops. But the medics also make house calls.

"Where you been?" asks 64-year-old Flora Laible of Waithaka when he enters the stifling, mildewing apartment a friend is letting her take shelter in. "I ain't seen you in two days." Her gruff greeting relaxes into a relieved smile. Laible is diabetic. Waithaka makes sure she gets her medicine. And someone to talk to.

NOT ALL the problems are human. Animals suffered severely. Hundreds of horses died, while many more were wounded by flying debris.

"There's animals everywhere," says Laura Bevan of the Humane Society of the United States. "People's houses get condemned. Often they take their most precious belongings and let the animals fend for themselves."

Also, many pets got separated because they could not be taken to shelters, or their owners underestimated the damage Andrew would cause. Now, with walls and fences down, thousands of dogs roam lost and injured. Declawed cats hide in the rubble of trailer parks. Packs of vicious dogs prey on these orphans of the storm. The more fortunate have

CAGED INDOORS *as the wind howled, only two of Lex Beatrous's Red-lored Amazon parrots—worth $600 each—died. "They huddled up and buried their heads under each other, same as us," says Beatrous.*

JOEL SARTORE

ORPHANED BY THE STORM *or by fleeing owners, strays of all stripes roamed free. Many were adopted by samaritans like Toni Sammarco, who added 23 homeless cats to her own 18. Hog-wild and fit to be towed, this porker bested Todd Hardwick by snapping his lariat. But Hardwick, who owns an animal-capture business he calls Pesky Critters, did nab a cougar, a python, and other creatures on the lam.*

BOTH BY JOEL SARTORE

been brought to an emergency M.A.S.H. (Mobile Army Surgical Hospital) unit set up in a pasture outside Homestead, where they wait in portable kennels to be transferred to foster homes or treated by veterinary doctors and students. Anxious owners bring in Polaroids of their animals or search a poster board of pictures, hoping to locate their pets.

Sally Matluk, who organized the unit and the poster-board network with her husband, shows me a three-foot-long piece of cable with fur attached. "We cut this out of an Australian shepherd's fur. It blew into him. He's OK."

Sally, like so many volunteers, speaks in a frazzled tone. She is pushed to the limit, but the endless need, the "chaotic darkness of the situation," keeps her going, trying to save these refugees from animal-control officers, who would most likely put them to sleep.

Not only pets are loose. Hundreds of monkeys and baboons have escaped from research facilities near the Everglades. Rumors of free-roaming lions, panthers, gorillas, and dangerous snakes abound.

No dangerous animals escaped from Dade County's Metrozoo. They had been confined in concrete pens, and the pens held. The animals, however, were traumatized.

"OUR MALE LION was roaring loudly," says assistant curator Ron Magill. "He was agitated and nervous and came at us. The female had cut both sides of her chest, indicating she was running against the bars in panic. Our chimp hasn't recovered. She was so playful. Now she just sits there, eyes glazed, and rocks back and forth."

Zookeepers were shocked to see their aviary destroyed and most of its 300 exotic birds missing. They also saw that their three koalas, which lived in air-conditioned quarters, needed urgent attention.

"Koalas are extremely susceptible to heat and humidity," says Magill. "They are so lethargic that they don't show signs of stress, but they get the hiccups when they are ready to go stark raving mad. One was hiccupping.

"We figured we had about 24 hours to evacuate them. A pilot volunteered to fly them to Busch Gardens near Tampa."

Plants were also battered. "We certainly had the world's leading collection of palms and cycads," says William Klein, director of Fairchild Tropical Garden, an 83-acre retreat along Biscayne Bay. Andrew destroyed or damaged perhaps 70 percent of its cataloged 13,000 plants. Three weeks after the storm the gardens resound with the sound of chain saws and leaf blowers. Wood props brace many trees. Others lie with root masses exposed and red tags that signify they are total losses.

"This is the good news," says Klein, as we approach a small palm. "*Copernicia ekmanii*—native to Haiti—was left standing. It's the only known specimen. We don't really know yet if it will survive. Palms have only one growing point—an apical bud encased in a sheath of leaves at their tops. Winds can torque and twist a palm, damaging that bud."

Also, the garden lost none of its 150 species of cycads—tough, fibrous plants that predate the dinosaurs but are threatened globally by habitat loss.

Still, the type specimen—the one plant chosen to represent a botanical name—of the 50-foot-tall palm *Scheelea fairchildensis* lies like a fallen colossus, tagged with red. Nearby stands the propped-up talipot palm from India, whose brown, drooping leaves normally measure 16 feet across.

"After 20 years or more this palm produces the largest flower cluster in the plant kingdom," says Klein. "Then it dies. We think perhaps the stress of Andrew may trigger a flowering."

Andrew also dealt a severe blow to the natural ecosystems it cut across. The defoliated islands of Biscayne National Park—Elliott, Adams, Boca Chita Keys—look as if they have been drenched with Agent Orange. However, these ecosystems experience hurricanes every four years or so, and even one as big as Andrew should not pose a long-term threat.

Biologists are less confident about the Everglades. Under natural conditions, this great marshland would be as resilient to hurricanes as to the droughts, fires, and freezes that have afflicted and shaped its landscapes for thousands of years. But man has intervened, putting the system under stress by diverting water for drainage and flood control to the east.

I walk through Royal Palm Hammock in Everglades National Park with park biologist Tom Armentano. Before Andrew we would have strolled through dense shade. Now we walk in sunlight. So many native hardwood trees have been battered back or uprooted. Royal Palm fared better than many of the hardwood hammocks in Andrew's path.

"I JUST FELL *to my knees and cried," says Daniel Beasley, whose $114,000 dream house was totaled. Stapled shingles and poorly nailed roofs took flight in Andrew's vicious winds, baring interiors to ruinous blasts and torrents —and prompting Dade County to revamp building codes. Spotting the heart-shaped hole in his wall, Beasley declared: "My heart is broken, but I'm still here."*

BOTH BY RAYMOND GEHMAN

"It's not a catastrophe, except aesthetically," says Armentano. "It won't be a splendid place again for a couple of decades."

"But can it rebound as it has before?" asks the park's research director, Mike Soukup. "South Florida is chock-full of exotic plants now. Will they outcompete the natives?"

I see this threat vividly as I travel by boat with University of Miami geologist Hal Wanless to a remote region of mangrove forests just north of Shark River on Florida's southwest coast. This area, known as Highland Beach, marks where Andrew left Florida en route to Louisiana. It is a graveyard of blown-down, mangled mangroves, trees considered ecologically critical because of the nutrients their decaying leaves provide the estuaries. Their tenacious aerial roots also help build and protect the coast from erosion.

Wildfires will burn these fallen mangrove forests, says Wanless, and regrowth would normally begin. But at a campground he shows me a thriving tree known as Brazilian pepper. Imported early this century, it has taken over vast acres of disturbed land in and around the park. It is well adapted to swampy conditions and is poised to encroach on coastal habitat formerly dominated by mangroves.

Two days after battering the mangroves, Andrew plowed into the Louisiana coast: It cut new channels through barrier islands, filled shrimping and fishing waters with debris, and flattened sugarcane fields—cutting the industry's net income by a quarter.

The area Andrew hit hardest—between Morgan City and New Iberia—is rural, dotted with small towns and sugarcane farms. The marshland weakened the storm as it struck. Still it was a memorable night. Charley McKinley of Patterson recalls hearing the nails of his mother's house popping out of the roof just before the front of the house exploded. "I ran towards my neighbor and saw the walls of his house expandin' like they was breathin'."

"It was bad, bro, it was bad. It'd take a grown man and make a baby outa him," says fisherman Daryl Fluke of Charenton, who spent the night at a shelter. "I'd invite you to see my trailer, but all that's left is the toilet. A neighbor said he saw the trailer flyin' apart. Said to his self, 'Young'un, if you'd got anything in there, you ain't got nothin' now.' "

And then Andrew, born in Africa, its fury spent, disappeared somewhere below the Ohio River Valley, throwing its last rain showers as far north as central Virginia.

SEVEN WEEKS after the storm, I return to South Florida and find signs of recovery. Many trees are flush with new growth. Power has been restored. So have many roofs and windows. The military has left, and new trailers are replacing the tent cities. Still, Andrew has not gone away. Massive rebuilding lies ahead. An estimated 25,000 people have abandoned south Dade permanently.

Enough time has passed for scientists and others to draw some lessons. Meteorologists may have discovered one secret of this hurricane's power. Andrew was the third strongest hurricane to strike the U. S. coast this century, ranking after a 1935 Florida Keys storm and

Hurricane Camille in 1969. Aerial surveys of debris patterns in its wake show narrow swaths of exceptionally heavy damage across the storm-hit area.

"There are sharp boundaries between these streaks of total devastation and—a hundred feet away—areas of almost no damage," said National Hurricane Center director Bob Sheets. Many survivors attributed the bursts of destructive power to tornadoes around the eye of the storm. Scientists discount tornadoes but are uncertain of the cause of the bursts.

Ted Fujita, professor emeritus of the University of Chicago, theorizes the swaths were created by innumerable little vortices, perhaps only 50 feet across, embedded in the eyewall. These vortices are similar to eddies in a river. Fujita believes that when such vortices meet a region of intense updraft, they are stretched upward. This stretching spins the vortices faster.

Winds spiraling in the same direction as the storm is moving would spin up the storm's winds by perhaps 30 miles an hour. As they swing around to go in the opposite direction from the storm, they would retard its winds. Thus a 150-mile-an-hour wind could be spun up to 180 over one home and down to 120 over a neighboring house.

Fujita believes that winds might have been spun up in the swaths to as much as 200 miles an hour. "At that velocity everything—even

C. W. GRIFFIN

Dumpsters and concrete—would be flying," he says. "Such winds could destroy a house within a few seconds."

South Florida building codes require that houses be able to withstand 120-mile-an-hour winds. But Andrew exposed shoddy building practices. Much of the newer housing stock of South Florida technically met code minimums. Nevertheless, most structural engineers believe that these houses with flimsy roofs, stapled roof shingles, and wallboard for siding failed before winds reached even 120 miles an hour.

The problems go deeper. There was a flagrant lack of inspections by the county. Homeowners also bear responsibility. Houses often

FOR HEAVENLY REPRIEVE *from unrelenting heat and a landscape of despair, Marjorie Conklin soaks in a tub of cool water. Though weary from an armed vigil near her demolished double-wide mobile home, Conklin spoke for all Andrew's survivors: "We're alive and well. The rest is just stuff that can be replaced."*

failed because Andrew broke through an unprotected window or door, then was free to ravage the interior or help blow off the roof from inside. Adequate storm shutters would have saved untold numbers of homes.

ANDREW ALSO REVEALED that mobile homes not only blow apart in a hurricane but disintegrate into shrapnel, inflicting enormous damage. Many people want them banned, but that could create a crisis; they are the only homes many residents can afford.

Emergency officials discovered that their reliance on radio and telephone links was misplaced—transmitting towers were down and telephone lines were jammed after Andrew.

Evacuation before a storm remains a question. It saved lives with Andrew, but planners fear a possible problem next time. Few who lived through Andrew will want to do it again. Millions of fleeing residents might gridlock roads to Orlando and beyond. What if the storm should veer north and descend on people trapped in their cars? Many would be far safer in a properly shuttered home.

Finally, Andrew has had this impact: It has brought South Florida's residents—a diverse, often bizarre, and fractious lot—closer together. Many seem infused with the spirit embodied on a sign outside a Florida City church: "We will rebuild. We can. We must. We will grow stronger."

"Homestead was blown into the 21st century," says city parks director Paul Burleson. "We'll be the newest city in the country."

But beneath the courageous statements lurks a deeper feeling, one I see scrawled across the only remaining wall of a crumbled home. It says: "Damn you, Andrew." □

A National Geographic EXPLORER film on Hurricane Andrew will be broadcast April 25 at 9 p.m. ET on TBS SuperStation.

Clamorous Heart of Egypt

Cairo

By PETER THEROUX
Photographs by REZA

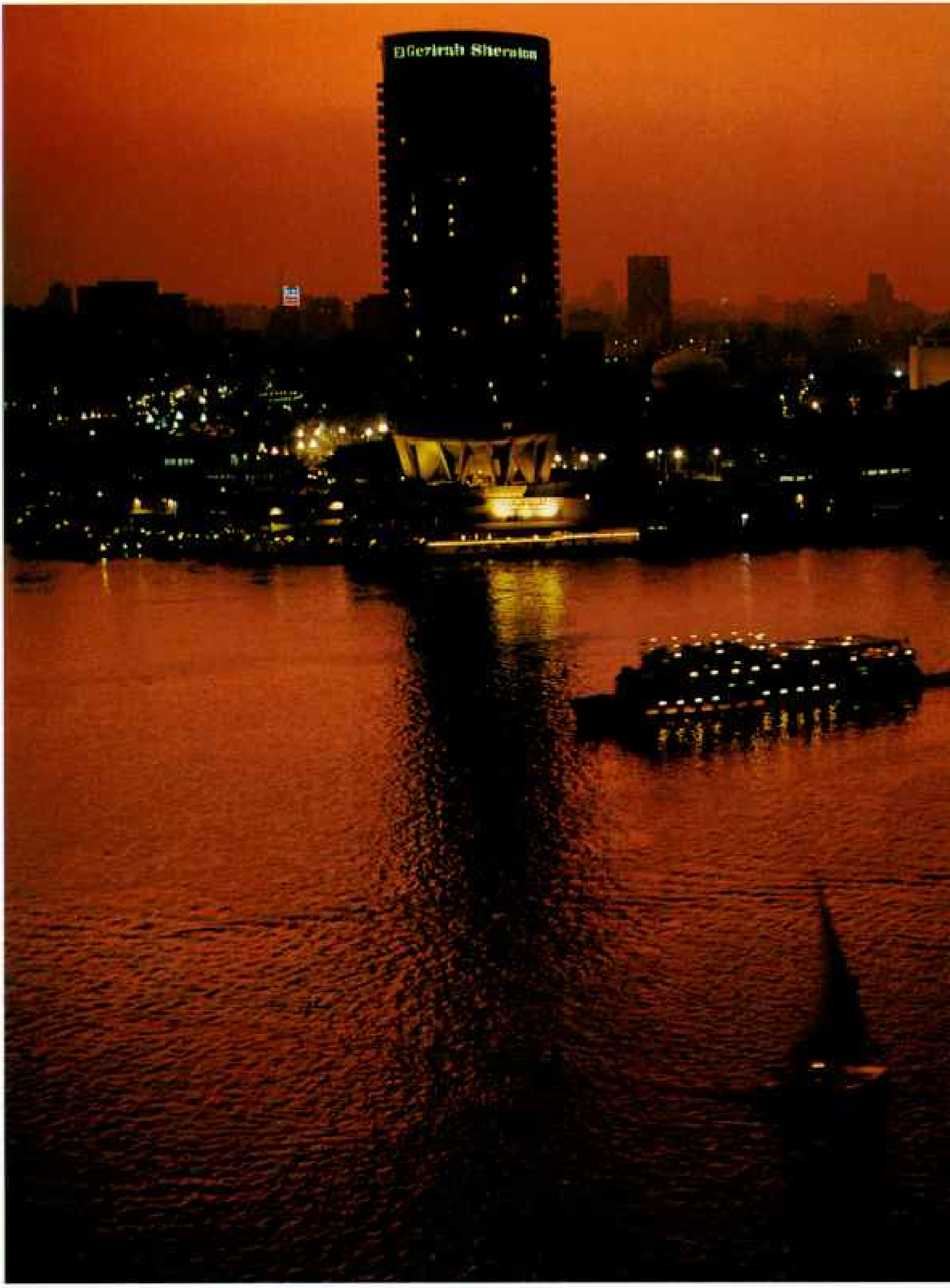
"I'LL TELL YOU how Cairo has changed," a Cairene woman told me over a convivial dinner. "I took my son's shoes to a street cobbler. He wanted a deposit! I told him, 'Look, do you need a deposit when you'll have these beautiful American loafers? Do you think I won't be back?' I had only one pound in cash on me [about 30 cents] and offered it. He threw it back at me, along with the shoes, and said, 'Keep your pound.' This snarling attitude is incredible in Cairo."

I agreed but had to smile at this tame Cairo horror story—she had told it the way a New Yorker might describe a homicide. Was this the most notable change in the Middle East's largest city, the biggest metropolis in Africa?

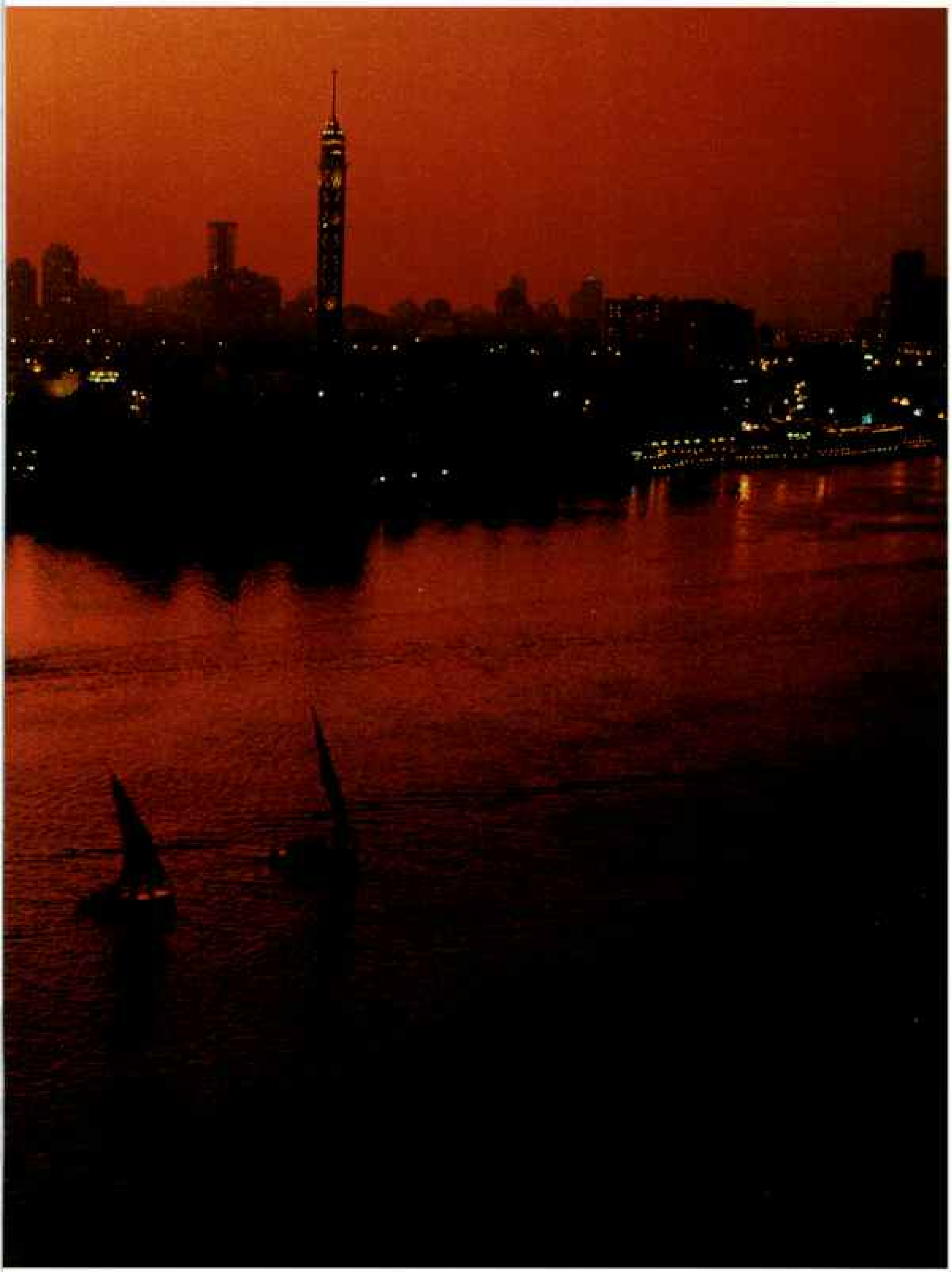
It had been 12 years since I'd been in Cairo. In the interim the city's population had nearly doubled to 13 million, and its streets were thick with pollution. Yet instead of complaining about those things, Cairenes were fretting over whether the proverbial sweet nature of the natives was eroding.

Having lived in the city's outer regions as a student of Arabic and a teacher of English at the American University in Cairo, I had some idea what that irascible cobbler's day had been like, starting with a long and bruising commute on a bus overflowing with workers, crated produce, and possibly chickens. On his curbside post he would have breathed the blue, lead-laden *(Continued on page 44)*

Adding to the chaos of the Middle East's—and Africa's—largest city, a drover and his camels jostle through crowded streets to a slaughterhouse. Bringing both vitality and problems, people from the countryside continue to flood Egypt's swollen capital.



With waters that have nourished civilization for more than 5,000 years, the River Nile sweeps northward through Cairo. Escorted by a desert sunset, a cruise ship and traditional feluccas carry sightseers past El Gezira island,



site of the city's new opera house and a waterfront high-rise hotel. Though its economy is riddled with unemployment and debt, Cairo has regained primacy as hub of the Arab world and clings to tourism to stay afloat.

The sacred precincts of thousand-year-old El Azhar Mosque are invaded by impurities of the secular world as a fog of pesticides billows in from garbage-strewn streets. Undeterred, many of the city's poor visit on the day

before Id al-Adha, the Muslim feast when sheep are slaughtered to commemorate Abraham's sacrifice of a ram instead of his son—a story in the tradition of Islam, Judaism, and Christianity alike.

(Continued from page 38) air of downtown and endured the car horns and engines of what is arguably the world's loudest city.

As I surveyed this congested labyrinth that had replaced the lovely city I knew as a young man, I wondered if the Cairenes themselves had changed.

Then I came across the snake charmers. Such people still enliven the city on the Nile, plying their trade as itinerant pest controllers, offering their services door-to-door, often in twos. Their prey is usually the cobra, which has ceded its place on the crowns of ancient Egypt to become a lurking city menace.

I overheard the charmers negotiating with a café owner in central Cairo, near the Nile Hilton. The snake men wore the white turbans and collarless robes of Nubia. Both were dark-skinned; one was old and bearded, the other young, and I assumed they were father and son, or master and apprentice. I would have walked on, thinking that they were arguing over a check, until I saw the older man's staff and heard what he was saying as he brandished his skinny finger.

"I *know* I smell a cobra here," he said, persisting. He would not take no for an answer, and he swore that his services would not disrupt the two dozen businessmen sipping Turkish coffee before work. Finally the charmers agreed to sniff it out for about two dollars and speedily found a little serpent in a back corner of the café. "Cobra!" they shouted, and hustled it into a cloth bag.

"It's harmless, and I saw you take it out of your pocket," the owner grumped, but paid up, and by the time his wallet was back in its place, the charmers were casing the record store next door.

The promise of Cairo, which seems to gleam from a key to the city, has dulled for much of the rapidly growing population. Severe housing shortages and an unemployment rate of 20 percent leave many young Cairenes with no hope of marriage and family. In a coffeehouse in the Khan el-Khalili, a bazaar in the medieval quarter, a disabled woman sells jasmine, while café patrons smoke and drink and debate why life is not better.

IF THESE CHARMERS are any indication, the humor and wisdom of the Cairenes are not only thriving but offer perhaps the only way a person can endure the poverty, pollution, and overcrowding. The city sprawls across three of Egypt's 26 governorates: not only El Qahira on the east bank of the Nile, and endless El Giza (containing about 80 towns and villages) on the west bank, but also the agricultural Qalyubiya governorate, stretching some 40 miles to the north, well into the Nile Delta.

When you ask Egyptians what the city's population is, they invariably reply, "Day or night?" At dawn the roads from the surrounding country—from Benha in the north to Beni Suef in the south—are choked with groaning buses and cars. At the same hour, oceans of workers from distant Helwan and El Marg surge against turnstiles of the underground Metro stations. Some are teachers or clerks who cannot afford Cairo rents; others are countrypeople who peddle goats or bushels of garlic in neighborhoods.

The city's blue-and-white Metro cars run on a 26-mile north-south route roughly parallel to the Nile River. Except in the far-flung stations, full of peasants bearing baskets of lemons or armfuls of squawking poultry, the Metro's commuters are a quiet and sedentary subspecies of the boisterous pedestrians one sees above ground.

Emerging from the subway into my old neighborhood of Geziret

PETER THEROUX, a free-lance writer and translator, is the author of *Sandstorms: Days and Nights in Arabia*, an account of the people and places he knew during the 12 years he lived in the Middle East. REZA is a native Iranian who lives in Paris. This is his first assignment for the GEOGRAPHIC.

Badran was something of a shock, because so much life had moved into the street.

Caned chairs and tables from tiny tea shops crowded beyond the sidewalk, rerouting the mobs of pedestrians that filled both sidewalk and street. Old mustard-colored buildings were up to four stories taller, accommodating new residents but dramatically darkening the street I had known as drenched with sun.

The cramped shops of clothes pressers and jewelers now looked out on a swarm of black-draped countrywomen selling produce in the middle of the street. Their huge aluminum trays were crowded with radishes, celery, cauliflower, parsley, onions, bananas, oranges, lemons, and white cabbages as big as basketballs. Old whiskery men in striped *galabias*—the long, loose robe traditional in all parts of Egypt—sat cross-legged by buckets of Nile fish on ice and shouted across the muddy market. They spoke in the city's distinctive Masri dialect. Strongly accented, this rapid-fire speech sounds like an operatic torrent of alternating jokes and complaints, which it usually is. The vendors were just gossiping.

"Ragheb from Asyut, Elhamy's son, is going to marry one of the Saad girls and move in with them," a vegetable hawker confided, in a shout, to her neighbor across the way.

"God help them," came the response, with a cackle. "As it is, you can faint in the Saads' apartment and not fall over!" This was often said of tiny apartments that seemed as crowded as any commuter-packed Metro car.

"O my fish, you crazy things!" bellowed a fishmonger—his cry referred to their rising prices and was a warning to shoppers to buy before the price got any dizzier. In a nearby street wrathful motorists maneuvered between donkeys and carts of kumquats and legions of children.

I had once been among them, living with an overflowing Egyptian family in the Shubra district. Shubra is an industrious place, and while it was certainly dirtier and more crowded than I remembered, I saw no begging. These throngs of Cairenes, whether in school or army uniforms, sneakers or high heels, all seemed to have a sense of purpose. And such neatly barbered heads—in a city of cheap haircuts even the very poor often looked well-groomed.

Only a few days before, I had been shaved in a public park by Sabry, the same outdoor barber whom I had patronized when I lived in Cairo. He had not been a bit surprised to see me show up after so long. He smiled, motioned me to perch on his low wall, and said, "Your mustache is *still* uneven, Sayyid Peter."

Twelve years are less than a heartbeat in this city, where tradition holds that Jesus spoke his first words. The city's history is so deep and so many people walk in and out of the Cairenes' lives that

Voice of moderation, President Hosni Mubarak has brought steady leadership to Egypt since taking power in 1981 after the assassination of Anwar Sadat. Some of his efforts go toward appeasing the powerful Islamic clergy. Speaking at a book fair in Cairo, Mubarak outraged publishers by failing to intervene on behalf of a writer deemed blasphemous by conservative clerics.

Cairo unlimited

A modern city by Egypt's millennial standards, Cairo commands the head of the Nile Delta. The present city—built on the site of an earlier Roman fort and an Arab settlement—was founded on the east bank in A.D. 969 by Muslim invaders from Tunisia. They called it El Qahira, or "the victorious," which became Cairo to Western ears. With a population of 13 million, Cairo now sprawls over 175 square miles.

nothing seems to faze them. Something told me that a surprise call on my old "family," like my reunion with Sabry, would be a kind of affectionate anticlimax.

I TIPTOED UP THE AGED, SHATTERED STEPS to my old address in a tiny alley off Geziret Badran Street, shuffled across the dark landing, and felt around for the double doors of the Khalil-el-Mazlawi family's apartment, which looked exactly as I remembered it. That was reassuring, as was the sight of Tante Zuzu, the kindly matriarch of the family. She paused from watching television, looked me over for a fraction of a second, and ordered one of the kids: "Get Peter a cold drink."

Then she turned back to the television, as if I had just returned from running a five-minute errand. Nobody seemed in the least surprised that I had turned up on their doorstep again, but they did manage to be warm and welcoming, and bit by bit they gave me the family news from the intervening years. Sons and daughters had gone away and returned, married, had children, emigrated. Some moved back to their ancestral village, miles up the Nile; one of the younger sons, Nehro, had married an American and earned his bachelor's degree from Columbia University. He had just returned after a ten-year absence.

"One thing that surprises me about Cairo," Nehro told me, "is the way the village has moved to the city—but has not been transformed by it." An example, he said, was the little side room at the entrance to his family's building. About the size of a walk-in closet, this new cubbyhole had been built for the convenience of the *bawab*, or doorman—in this case a woman from Upper Egypt.

"But the woman moved in with her husband and five children," said Nehro. "So now there are seven people living in that one small room.

"Of course, 90 percent of Cairenes originally came from villages, even if they don't like to admit it," Nehro continued. He then explained that in the sixties President Gamal Abdel Nasser encouraged them to keep their village ways as a means of asserting their Egyptianness against the foreigners who had controlled this country for so long. Cairenes, once nearly powerless in their British- or Ottoman-ruled city, eventually came to dominate the place.

The results seemed obvious: Village Egypt was erasing the big-city atmosphere of districts such as Shubra with huge rural-style families, goats and litter, loud radios and come-as-you-are street life.

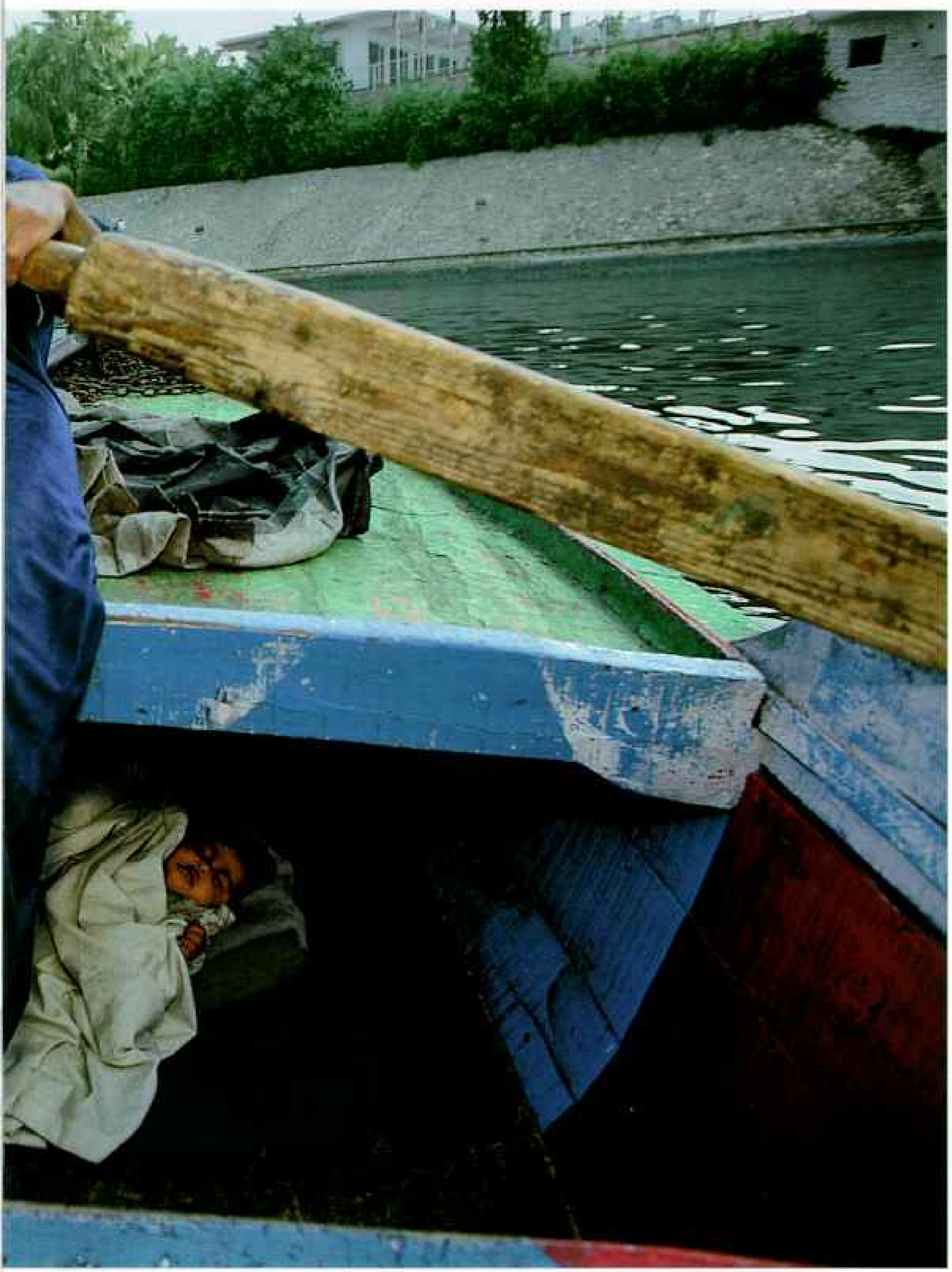
Yet the real trouble could lie in the intense frustration of the thousands of hard-to-employ young Cairenes rebelling against a city they have never come to terms with. While the great migration to Cairo has spared them the boredom and poverty of rural Egypt—though bringing only slightly better urban boredom and poverty—the actual volume of their migration has been a crushing job eliminator.

I wanted to catch up with at least one of my old language students to get another viewpoint on changing Cairo, and I actually ran into one by coincidence; Sherif Rifaat and his wife of three months were moving into a new apartment in Zamalek, across the landing from a Palestinian professor I knew. The lanky back-row student of

Power of massive geometry draws tourists and locals to the Pyramids of Giza. At a businessman's posh villa, waiters lay a table in sight of the royal tombs. Persian Gulf Arabs, escaping the strict codes of their homelands, eye the scenery at a club on Pyramids Road.

"I've seen Saudis stick thousands of dollars in a dancer's garter," says photographer Reza.

Working the river, Um Sara rows for eight hours a day while her husband casts and hauls a net. A baby daughter sleeps at her feet. When the fishing is done, the family stays aboard, the boat doubling as a home.



Scores of such fellahin, or rural peasants, pour into Cairo to improve their lot. The city's density has reached 75,000 people per square mile, and many end up in overcrowded rooms, rooftop sheds, or the confines of boats.

Growing up fast, a seven-year-old boy puts in long, dirty hours at his family's pottery factory. Child labor, officially illegal, props up many of Cairo's small businesses and sweatshops. Little different from rural labors, women's work in the Imbaba district calls for hauling water (left) along the railway tracks amid distinctly urban fumes and garbage.

English was now an aide to Egypt's foreign minister. He put in late nights and looked anything but well rested. "We must have dinner together," he insisted. "When is your *next* visit to Cairo?"

I decided to attribute his reluctance not to my failure as a journalist but to my brilliant success as a teacher: In a city scourged by unemployment and enforced idleness, my student was the exception, a busy man, too important to have dinner with me.

A LATE EVENING STROLL revealed Cairo without commuters. Along the Nile the streets were nearly deserted, but the looming hotels and apartment blocks shone as bright banks of light in the darkness, and traffic noise from Pyramids Road, a street lined with nightclubs, provided an urban sound track of honking and skidding rubber. The tremendous lion statues guarding the ramp of the Tahrir Bridge, the river walls covered with peeling election posters, and the sulfurous smog hanging in the air gave Cairo a Londonish feel. The rain usually does that, when a dousing instantly highlights all the city's old marble and iron. Even in the dark, however, the mazes of parked cars and the lack of a single empty space can be felt: The city is too full.

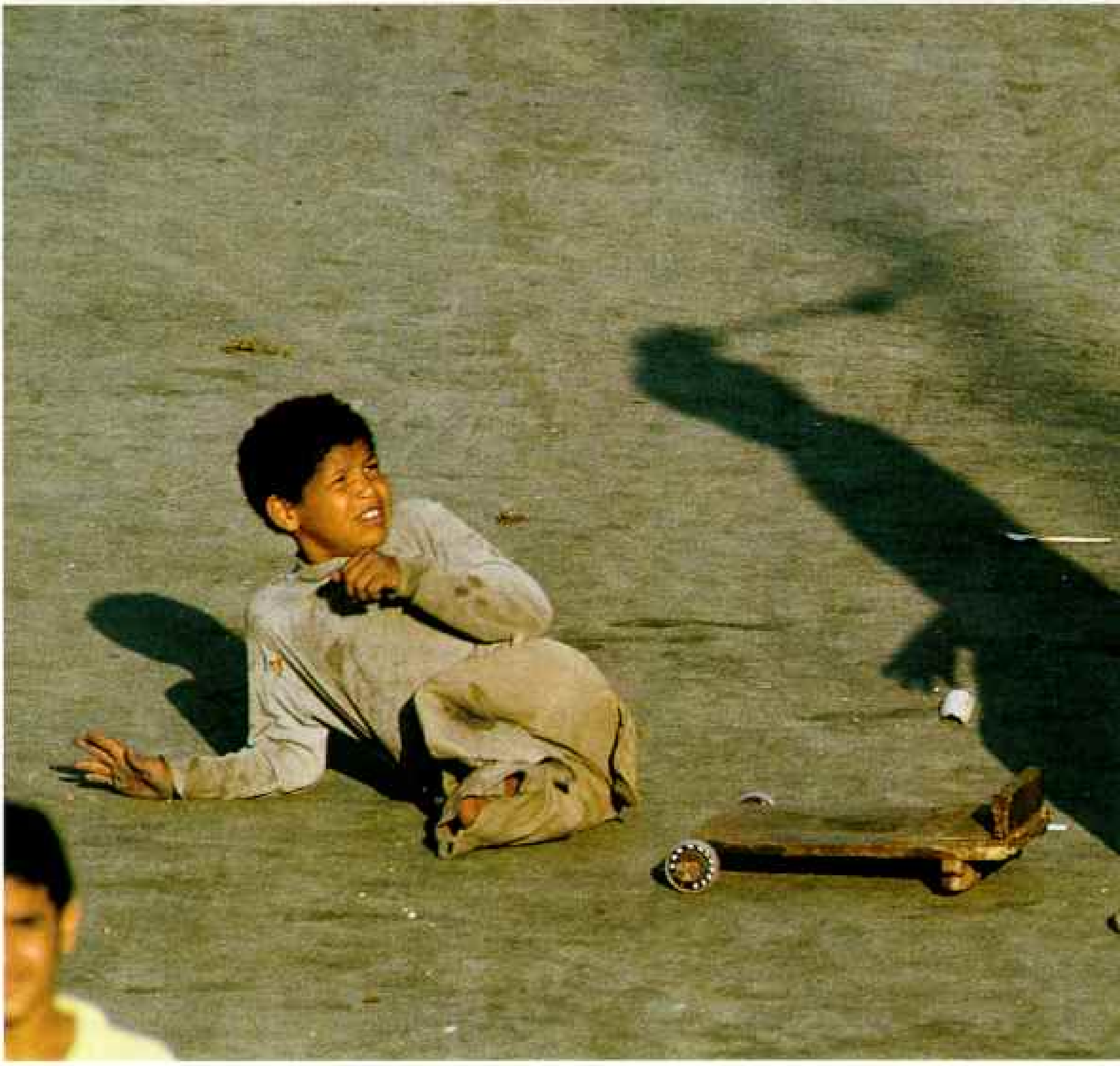
"Cairo's population is growing at an amazing rate," Walter Armbrust of the American University told me as we made our way through a noisy tide of automobiles. "The government is treating family planning as an information war—they use television commercials to persuade Egyptians to have fewer children. Some of them are pretty good!"

I had seen one—a short ad showing a grimy boy working in the street and imagining himself well-off—as if he had been born into a smaller family. He sees himself in a neat school uniform, which fades back to his dirty ditchdigging, followed by the logo of the family-planning agency.

In addition to sponsoring the television ad campaigns, Egypt's National Population Council actively promotes the use of birth-control pills and has enlisted not only Muslim and Christian clergy but also the wives of all Egypt's governors to lend their prestige to the effort. I recalled birth-control campaigns in the late 1970s, which failed because village women ended up wearing the pills in lockets, as talismans.

Cairo is paying the price, with a population density of 75,000 people per square mile. Thousands of rickety tenements have sprung up throughout the metropolis. Many could not withstand the force of one of the worst earthquakes in Egyptian history, which struck Cairo last October. Perhaps half the 600 Cairenes killed by the quake died when poorly constructed buildings collapsed on them. Many children were trampled to death by their classmates as they panicked and fled schools so overcrowded that teachers were unable to keep order.

Some Cairenes cannot afford even to live in tenements. They go in for some highly unconventional housing, which borders on creative homelessness. I discovered this one morning, exploring a neighborhood beside the Nile. For as far as the eye could see, the banks of the river were lined with rowboats converted into populous houseboats, covered with tents of plastic or canvas and nosed into the land. A few ragged children interrupted their selling of papyrus bookmarks on the Corniche el Nil and led me down to



their lurching 20-foot home moored near the Tahrir Bridge. I could smell food being cooked on open fires and the damp, fecund smell of the Nile itself.

"Buy some magazines," said a kid no more than eight, following with a question before I had time to decide.

"Do you want to smoke something?"

The bright-eyed boy showed me a grimy sheaf of old *Time* and *Newsweek* magazines and indicated a freestanding hashish pipe nearly as tall as himself on the muddy levee. I wondered how badly anyone would want an illegal smoke in full view of six high-rise hotels. From one of the boats I heard a mother shouting at one of her children, then the sound of squalling babies.

The misery was plain, and yet the string of laundry drying on shore was very white, and one of the boys selling hashish spoke proudly of his father: "He is an important fisherman."

Hardly less conventional was the shelter provided for a half million Cairenes by the Northern Cemetery and Southern Cemetery, also known as the City of the Dead. These gigantic graveyards on

A beating is foreshadowed as a legless beggar flinches from his onrushing manager. Accused of shirking work, the boy was belt whipped. Child beggars in tourist areas are often organized in groups of five to ten ruled over by a teenage boy, himself a former beggar. The leader guards his group's turf from other beggars and in turn demands a cut of the take.

the eastern outskirts of the capital have become a new suburb, and the governorate of El Qahira has long since resigned itself to the inevitable and supplied it with water and electricity.

One never got the sense that the inhabitants of the City of the Dead were regarded as mere squatters, nor did the tomb dwellers seem to fear ghosts. Despite being the land of the mummies, Egypt tends to associate the dead with blessings rather than curses.

One measure of the Cairenes' adaptability can be found in the old city's profusion of mosques, synagogues, and churches still standing and still in use. In a region beset by centuries of religious violence, Cairo is something of a sanctuary.

"These are true Cairenes," said Gamal al-Ghitani, a novelist and friend who paused with me outside a tiny compound housing a little Coptic church along a claustrophobic urban lane. He was referring to the religious tolerance of the local people. "This used to be a Christian quarter, but now it's all Muslim. The Muslims keep it up, and Christians visit.

"Egyptian religion is unique," Ghitani told me. "Coptic Christianity has elements of ancient Egyptian worship, but so does Islam here. All the Prophet Muhammad's family have tombs here, whether real or fake. In Cairo the myth of Isis and Osiris shines through Christianity and Islam too."

Ghitani especially loved the reverence accorded Rifai, the founder of a Cairo brotherhood of Sufis, devotees of a mystical tradition of Islam. Usually associated with Shiite Muslims in Iran and Afghanistan, it has always flourished in Sunni Egypt. The Rifai Mosque is one of the city's most splendid, soaring on the slope below the Citadel built by Saladin. I had visited it mostly to see the green marble chamber where Mohammad Reza Pahlavi, the last shah of Iran, was buried, adjoining the resting-place of Egypt's last king, Farouk.

"There are five kings buried in that mosque," Ghitani said. "But what is it called? Rifai Mosque, after this poor mendicant Sufi." He held my arm as we left an alley of drug dens—drug cafés, really—where sleepy men puffed at their hashish pipes and played erratic games of backgammon. Often, where the curving lanes intersected, two or three policemen sat in chairs to keep an eye on the smoky cafés, watchful for drug sales. We emerged near a giant concrete freeway bridge loaded with creeping trucks. Beyond us, the domes of the City of the Dead rose above the traffic.

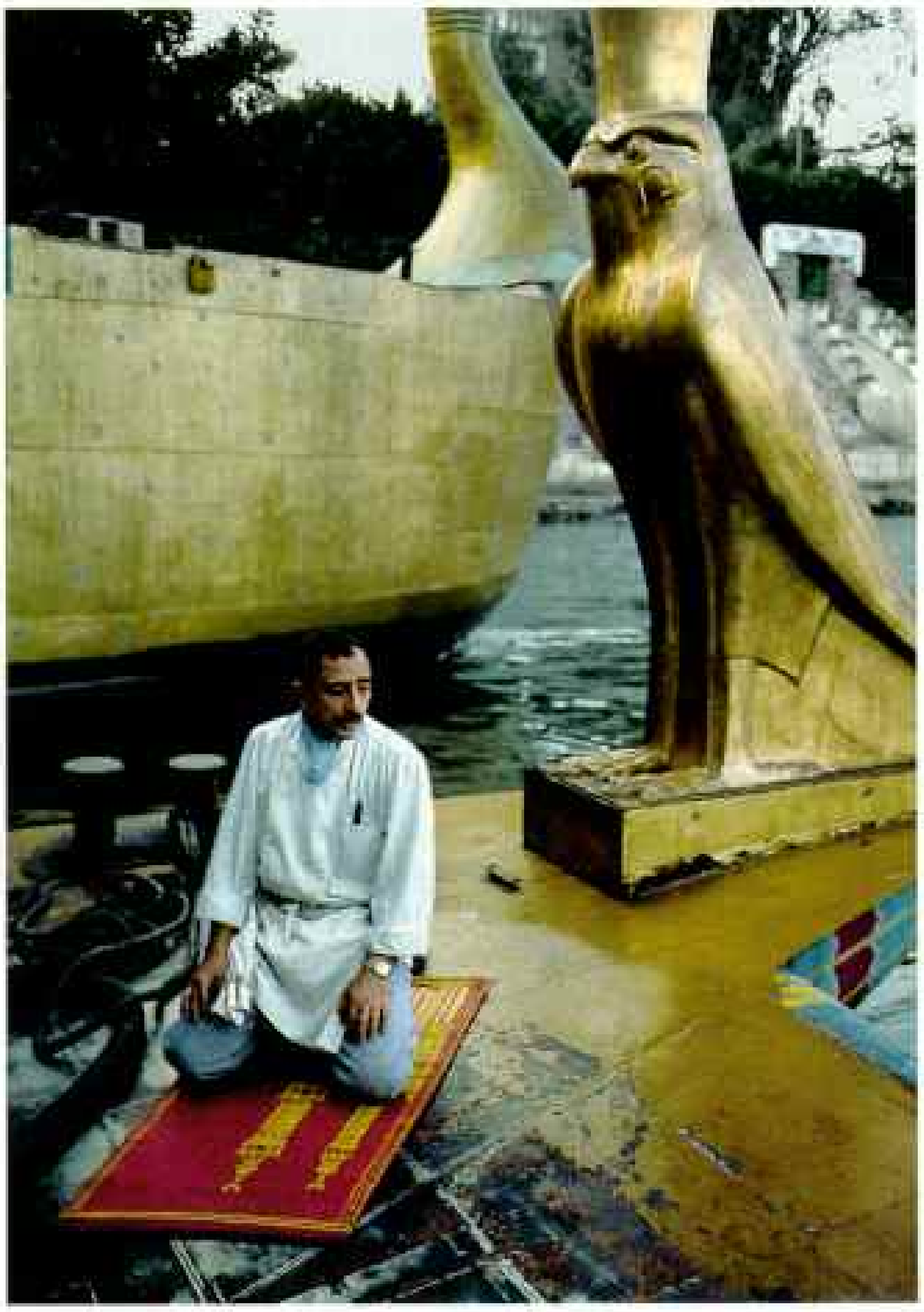
CAIRO STILL MANAGES to be the hub of the Arab world, especially in terms of popular culture. The city's bookstores were bursting with volumes in Arabic, and newsstands stretched halfway down the block. And I could hardly plow through the videocassette and music stores, where Arab shoppers of 20 nationalities browsed down the aisles, pointing and chattering as they went.

I knew from living in other Arab countries, as much as from living in Egypt, that visitors here identify with different aspects of the city: The gulf Arabs love the freedom and nightlife, the Lebanese respect it as a fellow ancient culture, and, despite Egypt's peace with Israel, Palestinians continue to find a haven in this metropolis at the other end of Sinai. For rural Sudanese, Libyans, and other Africans, a visit to Cairo is the ultimate uptown experience.

That is the reason the first Miss Africa Contest was held in the city, which considers itself the continent's capital. The event, which is to be an annual spectacle, took place in a glittering convention center. It featured eight Miss Egypts, two Miss Sudans, and entries from Libya, Tunisia, Chad, Senegal, and other states. The pageant shunned a Western-style swimsuit competition in favor of a National Dress Competition and a much touted quiz segment to "test the information" of the contestants.

The quiz of the hopefuls—conducted in Arabic, French, and English—soon bogged down in confusion. Miss Sudan volunteered that her favorite actress was "Yul Brynner," and Miss Chad when asked the name of the U. S. First Lady guessed "Ronald Reagan" and then "Margaret Thatcher." The blushing master of ceremonies, an Egyptian comedian, hastily substituted food and tourism questions for the rest of the contestants. ("What is a national dish in Libya?" The correct answer is lamb.)

To no one's surprise, the Miss Africa crown went to a Miss Egypt. The first and second runners-up were also Miss Egypts, to the delight of the gleefully partisan crowd. A rousing pan-African dance number followed, but, still, the point was made about Egypt and its mother continent: In this city Africa is part of Egypt, not vice versa.



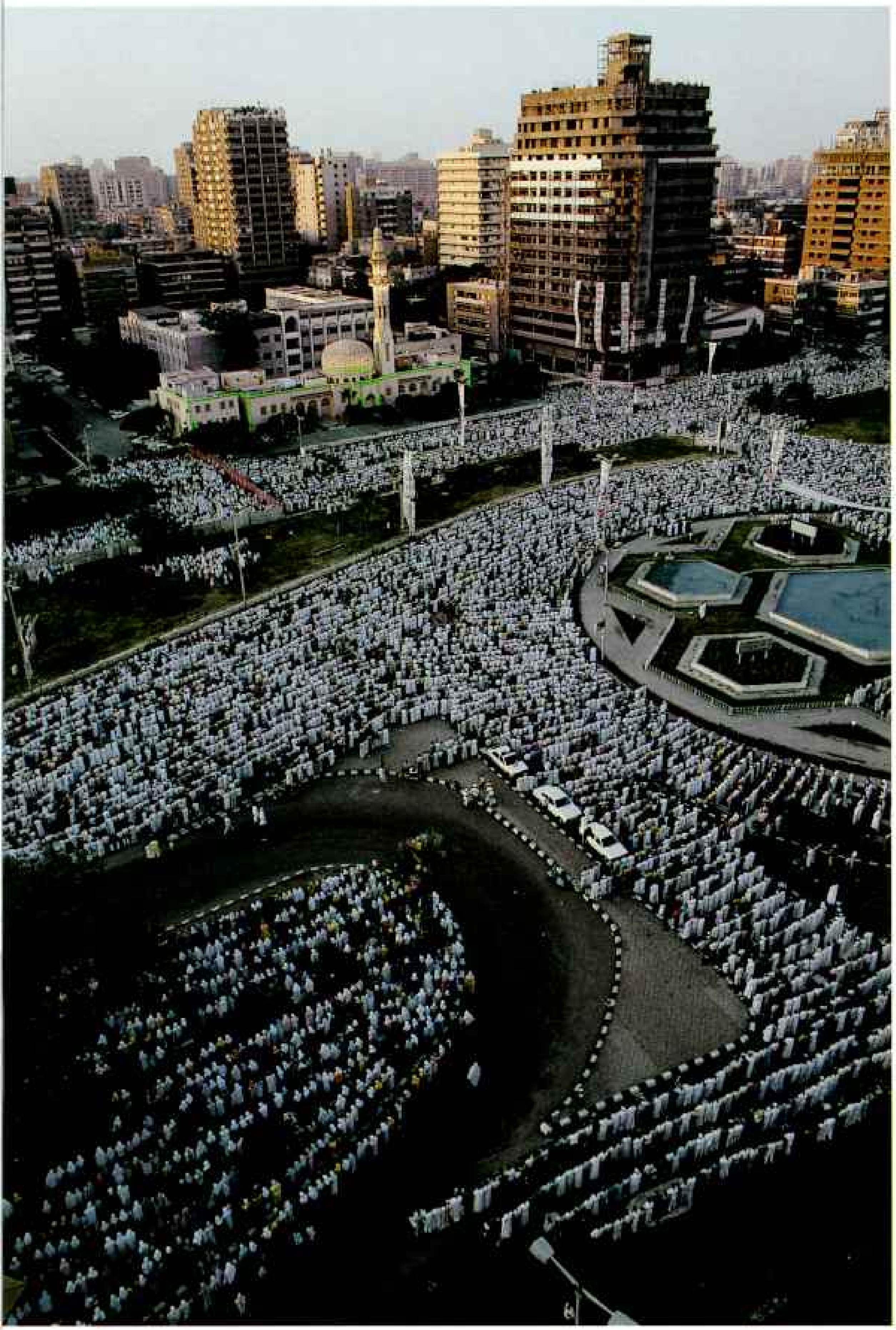
Reciting verses from the Koran, a cook from a tourist boat prays toward Mecca. Behind him looms the falcon Horus, worshiped by the pharaohs. For the feast of Id al-Adha, the devout blanket a square at Mustafa Mahmoud Mosque. A growing number of Islamic fundamentalists now call for the end of secular rule in Egypt.

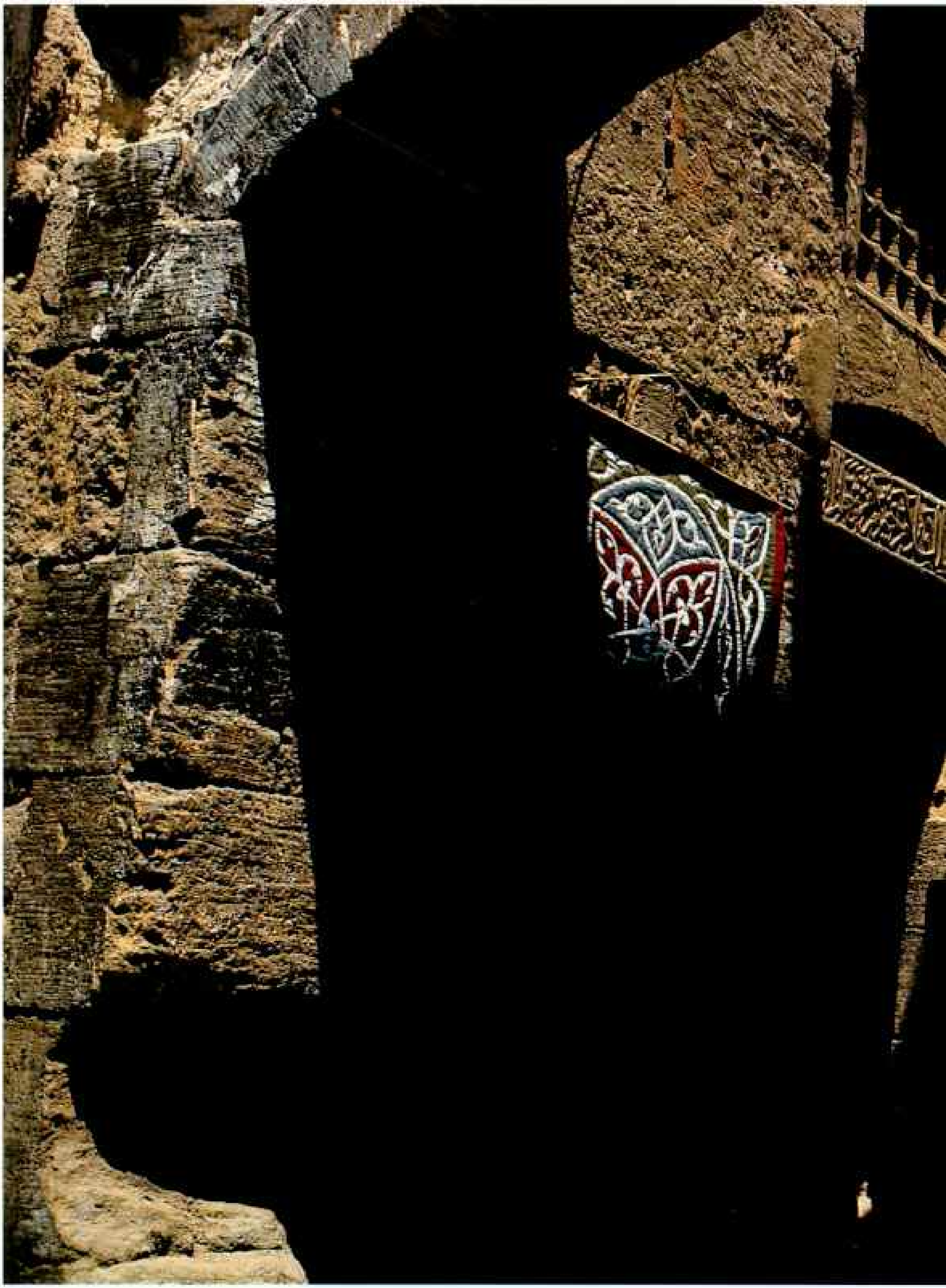
POLITICALLY, Cairo's new standing can be gauged by the return of the Arab League headquarters, embassies from every Arab country but Iraq, and the world's largest American embassy. The mammoth 15-story building towered over the ruins of the previous embassy, a small but graceful mansion on Latin America Street, where another eight-story building would soon be erected.

Among Arab capitals, one thing sets Cairo apart: the Israeli flag flying from the 18th floor of 6 Ibn Malek Street. I called on this penthouse embassy to interview the ambassador, who bristled at being called an Egyptian ("I am an Israeli who was born in this country") but had no problem thinking of himself as a Cairene.

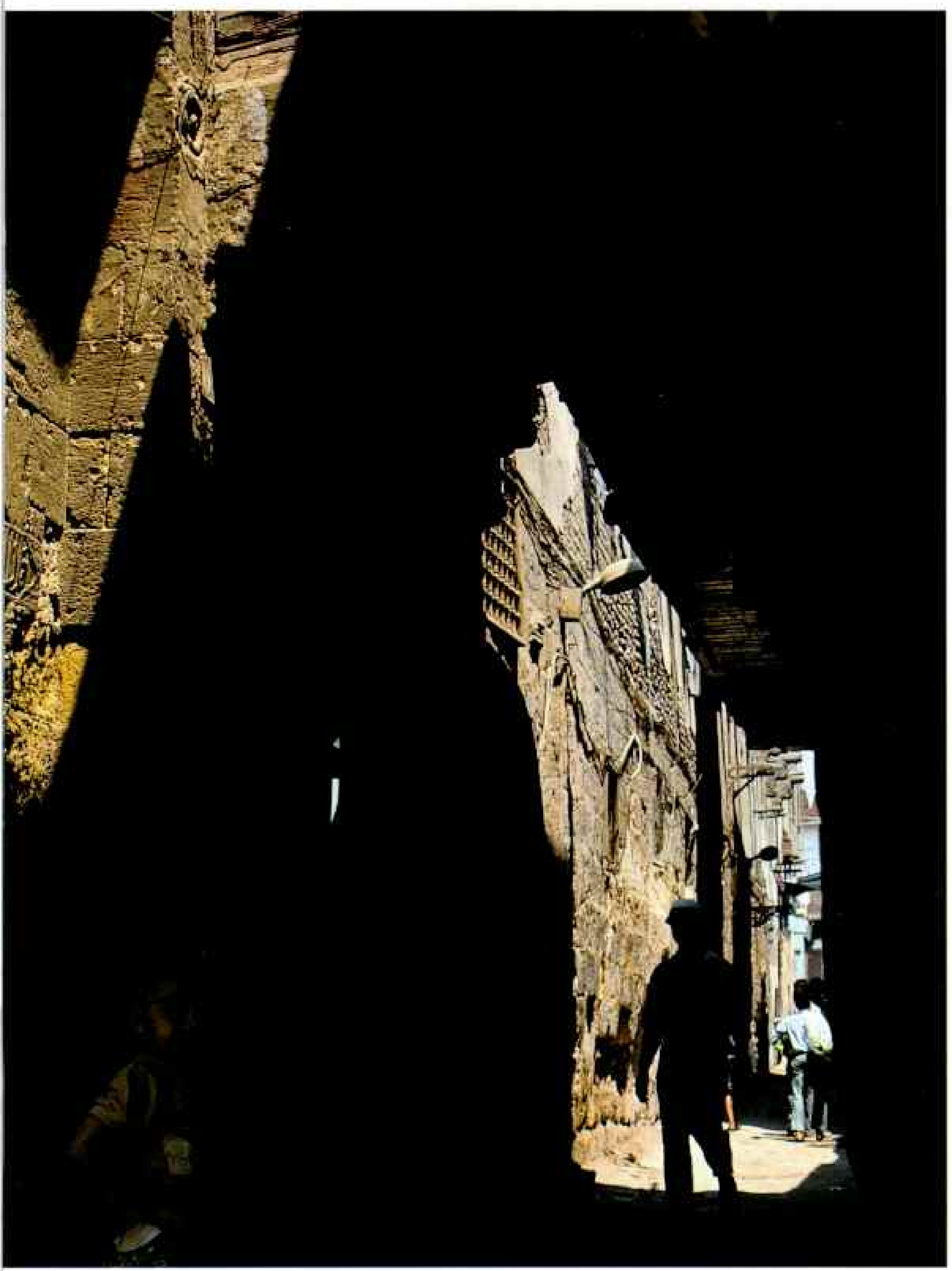
"Cairo is second nature to me," said Ephraim Dowek of his hometown, sipping tea in what is very likely the Egyptian capital's only office displaying a portrait of David Ben-Gurion, Israel's first prime minister. "The post is difficult but very gratifying—there is no better post than the heart of the Arab world."

It is no surprise that Cairo has absorbed outsiders like Dowek: Within only a few hundred yards of the Israeli Embassy were small crowds of Kuwaiti refugees peering into shopwindows, along with





A riot of shapes—from jagged shadows to the lush curves of a vendor's cloth—breaks out in the narrow reaches of Sharia El Sukkariya, or Sugar Street. This alley and the surrounding streets in old Islamic Cairo set the



stage for many of the novels of Naguib Mahfouz, Egypt's 1988 Nobel Laureate. His characters are at home where "the houses bunched together untidily on both sides of the road like a row of soldiers standing at ease."

Make-believe suits the temper of Cairo, whose manners and customs flavor the fables in Arabian Nights. *"See the woman with the body of a snake," cries a barker at a street fair in a Cairo slum. At a five-star hotel the props for a shoeshine include a King Tutankhamun-style throne.*

some of the city's large Eritrean community. And a new flood of Palestinians were also settling in the safety of Cairo.

It is not just that flights into Egypt provide sanctuary to refugees—whether from King Herod or from famine in the Sahel. Even in its hard-line socialist days, Cairo welcomed deposed monarchs like King Idris of Libya and King Saud of Saudi Arabia. The shah of Iran finally settled here when no other country would have him. Even Farida, the former wife of Egypt's last king, left a sumptuous exile in Paris to return, with her watercolors, as a commoner. In suburban Cairo, she proclaimed, despite the dirt and pollution, "This is a blessed city."

SOMETHING in Cairo's brimming self-esteem seems to provide immunity to xenophobia. And its most exalted citizen, I had been told, was one of the most approachable. I wanted to meet Naguib Mahfouz, Egypt's most celebrated novelist and the only Arab winner of the Nobel Prize for Literature. This was easily arranged by a phone call to a secretary at *Al-Ahram*, the newspaper for which he writes a weekly column.

Mahfouz's Cairo is changing with blinding speed and continues to provide him with the only setting he desires.

"The Cairo of my childhood was smaller, more beautiful, more quiet," he conceded with a warm smile. He sat at one end of a green leather sofa in his office. Short, slender, and balding, he fiddled with his hearing aid. His strong voice belies his frail looks. "But now it's a greater city—great universities and other institutions. If it were within my power to change it back, I would not do it."

At 81, Mahfouz walks more than two miles to work twice a week from the middle-class neighborhood of El Aguza, through Tahrir Square, where he has a cup of coffee at the Ali Baba café, and into the maze of the newspaper district, which I knew as one of the most hazardous walks in Cairo. Its competing delivery trucks, errant, five-foot-high rolls of newsprint, and riptide of frantic reporters require death-defying agility. Mahfouz, undaunted, mixes easily with them. As a novelist, he is to Cairo what Balzac was to Paris or Dickens to London.

"Doesn't it surprise you," I asked, "how serene Cairenes are, given the noise and overcrowding of the city? And crime is so low."

"Crime *is* low," he said. "As a rule, people here respect one another. But they are serene only in comparison with other city dwellers. They seem serene to foreigners. We used to be more quiet and patient and saw the comic side of everything. We can tolerate more than others, but the difficult thing is our ongoing crisis, the economy. The unemployment among youth. There are generations that are suffering pain and frustration."

Proof of what Mahfouz said filled El Galaa Street outside his office. Unemployment of about 20 percent meant sidewalks throbbing with 20-year-olds busily puffing on cheap Cleopatra Menthols and going nowhere. I had been told that "almost no one in Cairo is employed all the time." This was a city of odd jobs—where both young and old washed cars, hawked papyri, acted as impromptu tour guides.

But no steady work also meant no marriage, and the resulting decade-long courtships filled the riverside Corniche el Nil with whispering lovers. They were everywhere in their hopeless quest

for privacy. I had even seen one couple in their 30s huddled in an unoccupied guard post outside the Mauritanian Embassy, singing to each other.

As to crime, the fact is that its major Cairo varieties—prostitution, drug dealing, protection rackets, and car theft—do not touch most Cairenes, who are working-class or middle-class people. Walking down El Galaa Street on a hot morning in autumn, I was reminded of how good-natured Cairenes can be about petty crime.

"Most welcome—have a nice day!" a nut seller called out to a well-dressed woman who, without paying, helped herself to a pinch of roasted watermelon seeds as she passed his stand, complete with a small coal-fired roaster puffing gray smoke from its short chimney. Snacks could be had for free in Cairo, even from a nut seller whose children were busily rolling discarded newspapers from *Al-Ahram*'s trash bins into cones to hold their wares.

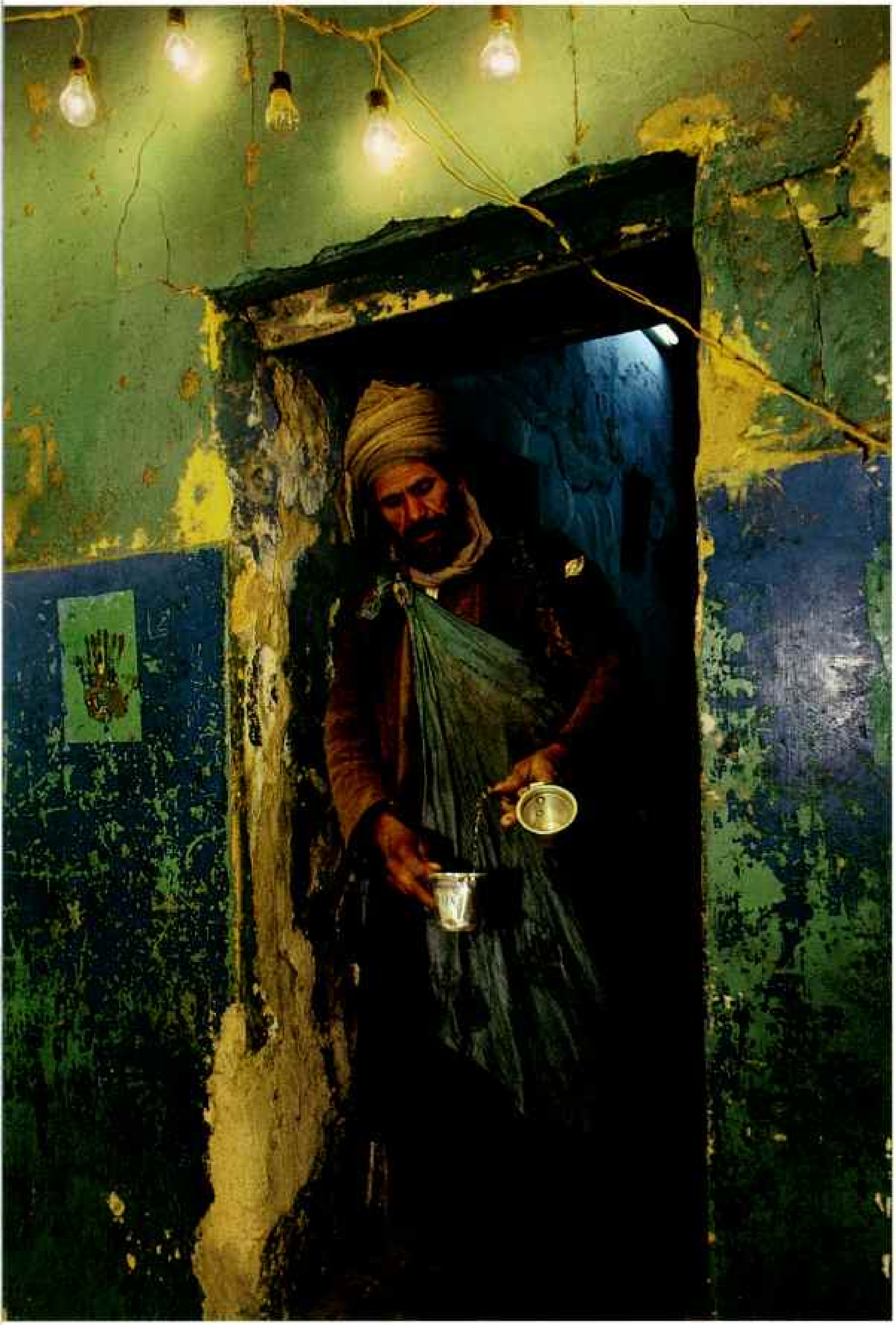
No Metro or roomy pedestrian tunnels lead to the jam-packed neighborhoods of eastern Cairo, though a new subway line is planned. Instead, the overpasses that block light to El Azhar Street

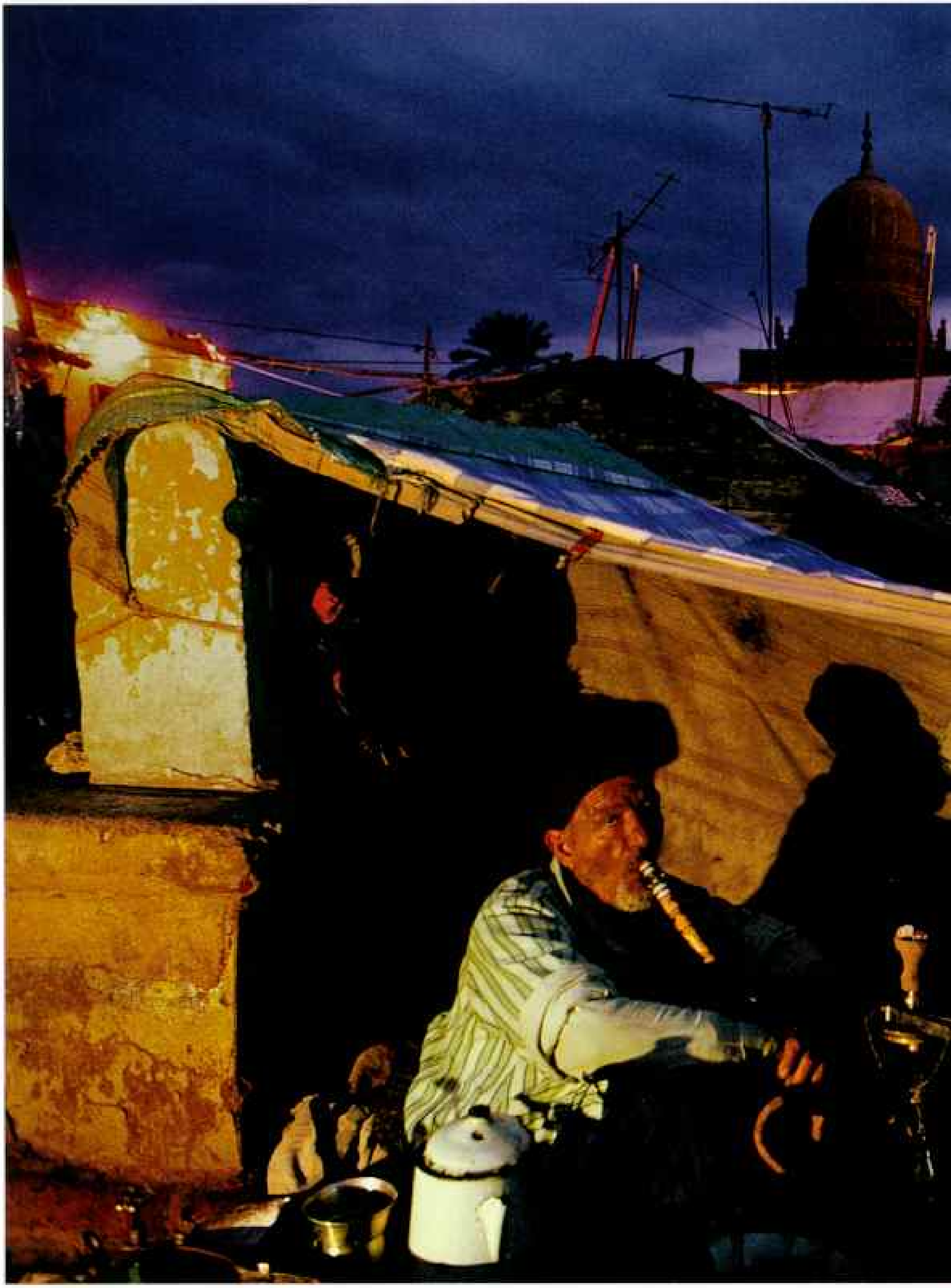
Making a living in the City of the Dead, a man sells water from inside a neglected tomb (facing page). He is one of half a million people squatting in cemeteries on the city's eastern edge. Residents of a cemetery lane gossip beside a phone ready for wiring. A tomb wall features scenes from a pilgrimage to Mecca.

groan with thousands of nose-to-tail cars, trucks, and buses. The street below is much the same, only with pedestrians and bicyclists weaving in and out of the traffic and motorcycles zooming by, leaving jet streams of smoke.

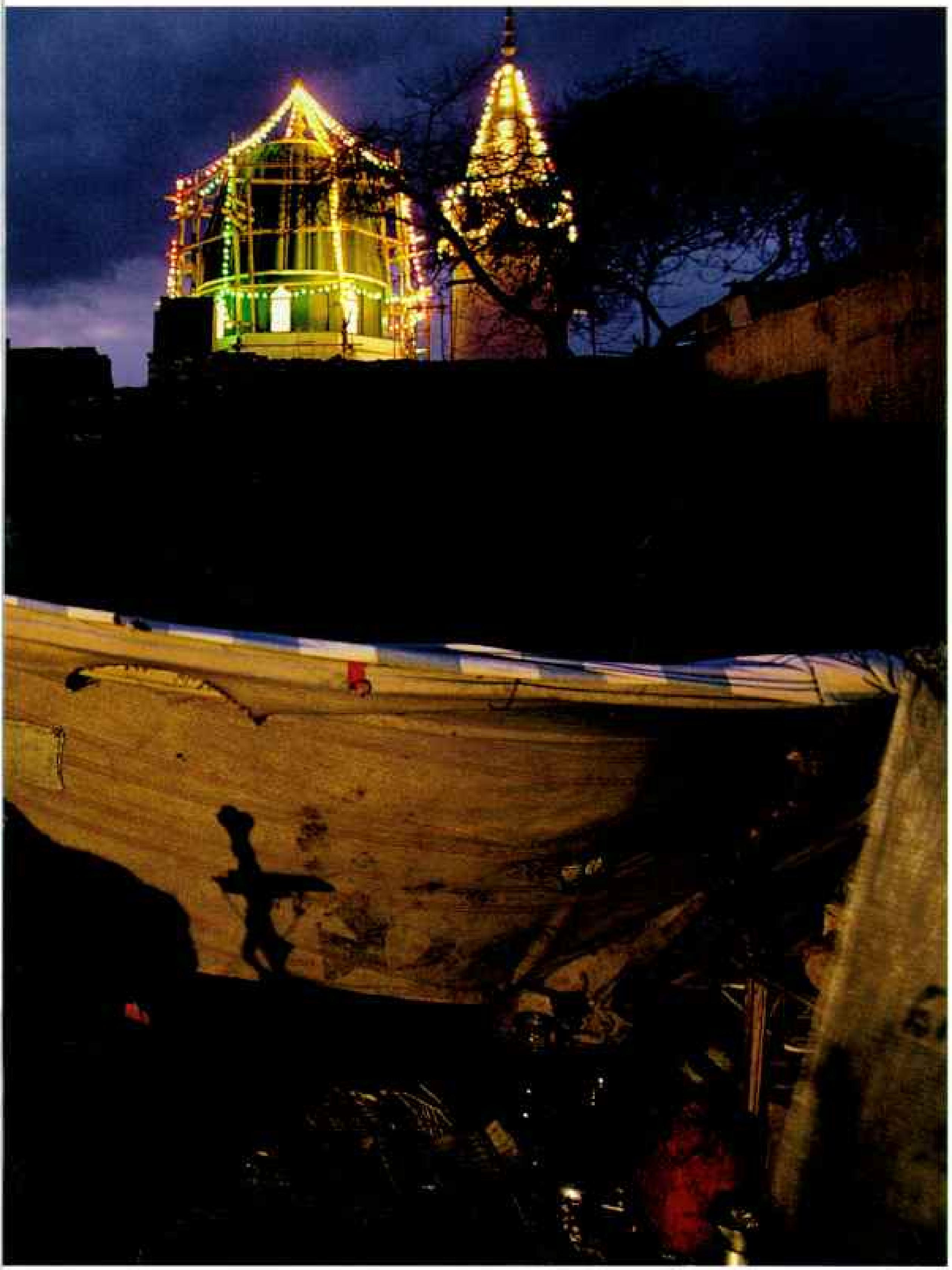
The thunder of engines and the blasting of horns are no doubt a major detraction from the population's good humor. But much subtler sounds can be heard on the sidewalks: hisses, whistles, songs, and the cheeping of birds.

Because the stacked goods from shops spill out nearly to the curb, where the capital's beloved pets are sold, the pedestrians and





Resting in peace, a squatter puffs on his shisha, or water pipe, under a tarp strung between tombs in a city cemetery. Behind him glows the mosque associated with eighth-century holy man Zein el-Abidin, lit up for the



saint's mulid, or birthday celebration. Musicians and peddlers gathered in the graveyard to serve the festival crowds. Families both middle-class and poor come to live in the necropolises, lured by space and quiet.

bicyclists must skirt precarious mountains of sponges or suspended slabs of beef on one side and the pet sellers on the other. Squatting peddlers line the gutters, shielding platters of turtles, shallow cartons of chickens, and cages nearly opaque with songbirds from the bustle. When you add the dozens of sprinting cats and the fact that half the pedestrians seem to be balancing things on their heads, the lack of collisions seems to be a miracle—but it is, in truth, a matter of codes.

Walking down a narrow street, I heard them all, one by one: men with carts who whistled to clear the way with long, sharp notes; bicyclists puckering to make bird sounds behind me; men and women hissing like cobras to announce that they were carrying something on their heads—baskets of laundry, bread, merchandise, even teapots and cups. And, of course, there were the overburdened pedestrians singing or yelling about the goods they were lugging around, which happened to be for sale.

From this noisy market I walked across a potholed freeway, passed under one of the arched gateways common in suburban Cairo, and entered the Southern Cemetery. The district is separated from the rest of the city only by an intermittent wall, and its ten square miles are foreshortened, as you approach on foot, into a typical Egyptian skyline of domes, minarets, and TV aerials.

ONE OF THE IRONIES OF CAIRO, an unrivaled hive of life, is that you are never far from spectacular monuments to death. In the City of the Dead you notice that it is quieter and slightly better behaved than what you have left behind on the sidewalk. The men in this prairie of mausoleums offer spare parts for automobiles and the women sell used kitchen utensils, but they show their goods on wide cloths rather than hawking them.

"Please come in! Come this way!" An old woman beckoned me inside a doorway beside a grand gate just as I was noticing the stares of curiosity that followed me down Farsi Street.

Fatima Rashad el-Bayoumi—as she immediately introduced herself—waved her cane at a small boy who had skipped in behind me and told him to bring the foreigner a Pepsi.

"That's my grandson, Nader Abdelmoneim Rashad el-Bayoumi. He told me that mannerless people were looking at you! Rest. Sit down."

We sat on a dusty wooden bench in the open air, protected from the street by a seven-foot plaster wall. The el-Bayoumis lived in a metal shack in this packed-dirt courtyard, eight yards from three marble tombs whose tall, narrow headstones were strung with laundry. A gray laburnum tree stood over the graves with its droopy pods. I could hear birds singing. There was no sound of traffic. The door of Mrs. el-Bayoumi's shack, rather than the graves, was adorned with a pot of white flowers. My soft drink was icy cold.

"We have a refrigerator, thank God," Mrs. el-Bayoumi told me in her cheerful way, as if such things were normal in a cemetery. "My husband works in a hospital in town; he is a cleaner. Our son works in the ice-cream factory—yes, there is an ice-cream factory in the tombs."

"Does the family of the deceased still visit here?" I asked.

Joining a skyline of domes and minarets, a child goes heels over head at a carnival in front of Muhammad Ali Mosque. Built inside the Citadel, the former headquarters of Egypt's rulers, the Turkish-style mosque honors the early 19th-century leader credited with bringing the nation and Cairo out of a medieval past—and into vexing modern times.

"Not any more—they used to. We'd give them lunch. I still keep the graves polished! People have always lived here, you know. We're countrypeople. I've always wanted a foreigner to come visiting, and here you are—I must be a witch!"

I was sorry I couldn't stay longer with Mrs. el-Bayoumi, but I had to get back to town for an Arabic-language performance of *The Marriage of Figaro* at the Cairo Opera House. I wanted to find out what the worst thing was about living here, so I asked what would be the one thing she would change about the city.

"I wish people could make better livings in their villages. There's no more peace and quiet here. Too many people moving in, you see—especially here in the tombs. Families keep inviting more cousins, and everyone just settles in."

I set down the Pepsi bottle and rose from my bench, and she sent Nader to walk me out from the silence of the tombs and into the blazing sunlight and blaring horns of the old city. Her voice rang out behind me.

"Come back," she said, "if you ever need a place to live."

Rare Quake Shatters Cairo

Years of overcrowding and unsafe and illegal construction finally caught up with Cairo last October 12, when one of the most powerful earthquakes in Egypt's history rocked the city. The medium-strength quake, 5.9 on the Richter scale, leveled thousands of homes, killed some 600 people, and injured another 10,000. Many of the dead were schoolchildren trampled in panicky escape attempts.

In a city where buildings crumple nearly every week, tenements in the central slums collapsed like a house of cards. The largest building to fall was a 14-story apartment complex in the suburb of Heliopolis (left). Four floors had been illegally added. After three hours of digging,

rescuers pulled Samia Regab Khalil (right) from the rubble that crushed her son.

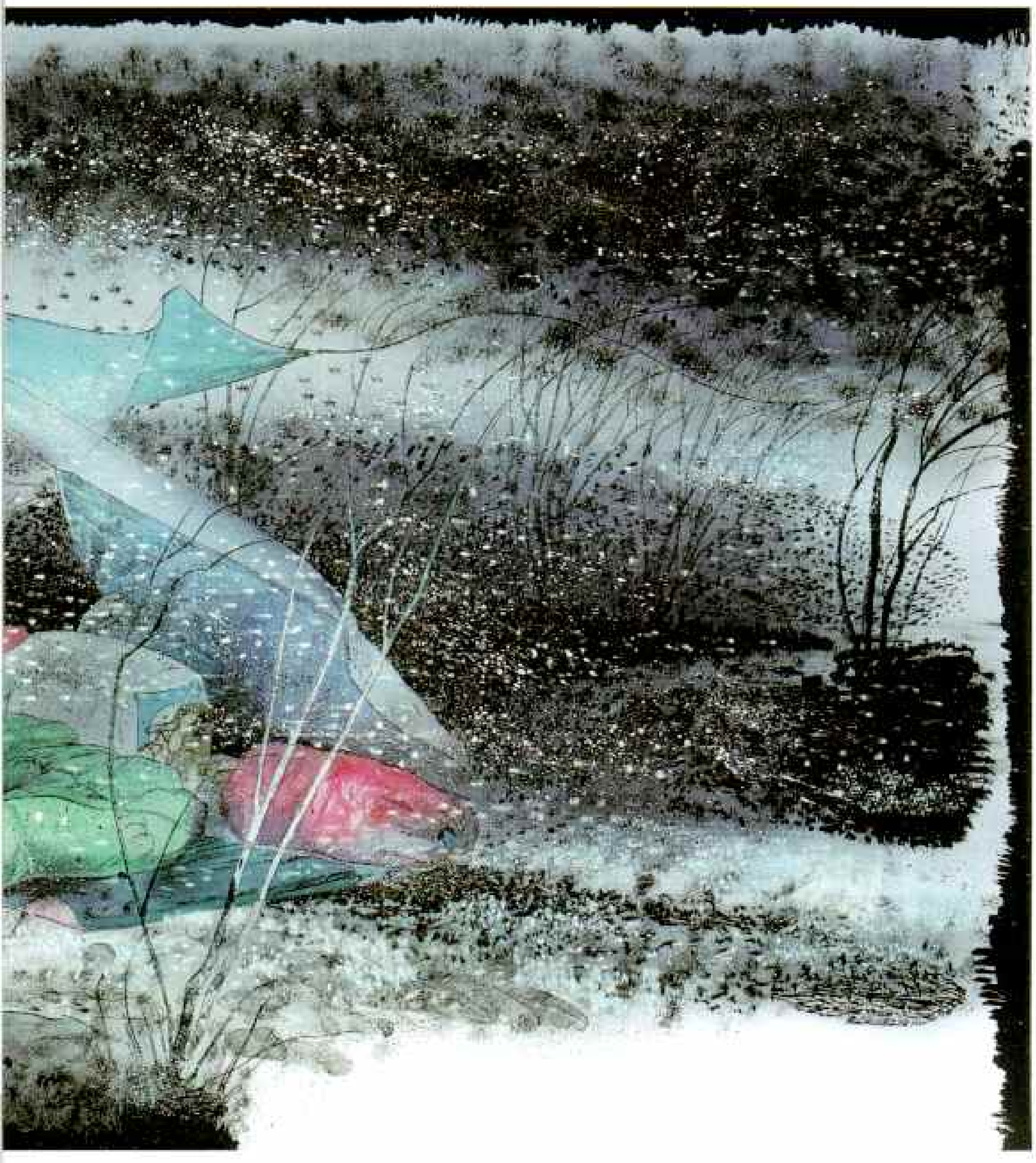
The epicenter of the 20-second tremor was ten miles south of Cairo near the ancient capital of Memphis, on what geologists think was a previously inactive fault beneath the desert. Though the pharaonic monuments escaped harm, more than a dozen historic mosques suffered serious damage, including one whose minaret (left) crash-landed in the middle of a busy street. □

JEAN-CLAUDE KIRKEL, GAMMA LIAISON (TOP LEFT); INSET, SYGMA PRESS (BOTTOM); AP WIDE WORLD PHOTOS

Blizzard! When gale-force winds pummeled me awake on Alaska's Noatak River, the race against winter

Alone Across the

Article and photographs by KEITH NYITRAY



was lost. Numbed, I saw my dream—to cross North America's wildest mountains—fade under a stinging snow.

Arctic Crown

Paintings by JACK UNRUH

Buried alive. The first blizzard of winter slammed into my camp that October night with a force that tore my tarpaulin apart and dropped the windchill temperature to minus 80 degrees. Winds of 40 to 50 miles an hour roared across the tundra and howled down Alaska's Noatak River. Wrapped within the tarp's remains, I shivered in my sleeping bag and waited for the blowing snow to drift over me. To stay alive, I needed the snow's insulating protection, and fortunately it wasn't long before I was encased in a personal isolation chamber beneath a foot of snow.

For two and a half days I listened to the sounds of the storm filtering down with the air through the space around my ax handle and, when there was any light, watched six of my fingertips slowly turn from a pale white to the deepening black of frostbite. I tried not to think about food. I tried not to wonder what had happened to my wolf dog Smoke. And I tried not to think about dying alone above the Arctic Circle. Patience, I knew, was the key to survival. "Things could be worse," I kept repeating silently. "At least I'm still alive."

When the storm finally abated, both Smoke and I emerged from our icy cocoons and went on, determined to finish what we had begun nearly eight months before: A complete traverse from east to west of Alaska's vast and rugged Brooks Range. This mosaic of mountains, tundra, boreal forests, alpine lakes, and wild rivers contains some of the finest wilderness in North America. It is also a land of extremes—a land of nightless summers and sunless winters, where temperatures can range from 100 degrees above to 80 degrees below.

My journal brimmed with entries on climate and geography during my east-west traverse of the Brooks Range—a feat never before attempted in one continuous trek. Harder to record were the quiet lessons of Arctic old-timers like Ken Nukon (facing page). A Gwichin Indian elder who lived alone on the Porcupine River, Ken taught me to counter hardship with wit. His laughter was constant, feisty, pure.

I moved to Alaska in 1979 from the urban environment of New York City, setting out in search of the essence or spirit that is found in the vastness of the land and of a philosophy where life is learned from the patterns found in nature—where the land is not just a scenic backdrop but an integral part of human life.

By the fall of 1985 I'd trekked much of south-central Alaska, and while studying a map of the 49th state looking for possible future routes, I couldn't help but wonder what it would be like to travel the wildness of the Brooks Range. Then and there the dream of traversing the length of the "arctic crown" lodged itself in my heart and mind.

I hunched over maps, read books, and talked to people who'd been there. Eventually the dream matured into a definite plan: In the time between spring and winter, I would mush, hike, and canoe the 1,460 miles from Fort McPherson in Canada's Northwest Territories to Kotzebue on Alaska's northwestern coast.

Unlike many contemporary expeditions that rely heavily on external

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support, I wanted to recapture and experience, fully and firsthand, the physical—and the psychological—isolation confronted by past explorers. Therefore, resupply points would occur only at the four villages and one lodge along the route, and no radio or tracking devices would be carried or air support arranged between the resupply points. But I did invite my friend Paul Lowe—better known as Pappy—to join me.

This was the plan: We would stock up on provisions at Fort McPherson and take two dog teams and sleds (loaded with several hundred pounds of food and supplies) 300 miles to Old Crow in the Yukon Territory and then across northeastern Alaska to Arctic Village. There we would trade the dogs for more food and supplies and hike 395 miles west along the spine of the Brooks Range, through the village of Anaktuvuk Pass, to a lodge on Walker Lake in the Gates of the Arctic National Park and Preserve. At the lake we would load everything into a waiting canoe, pole 40 miles up the lake and its tributary, then portage a mountain pass to the headwaters of the Noatak River. Finally, we'd float 425 miles down the Noatak through Noatak village to Kotzebue. All this before freeze-up in late October.

But the wilderness has its own plans.

On March 13, 1989, Pappy and I set out from Fort McPherson. Most of the town turned out to see us off, and rifle-fire echoed from a 21-gun salute

Muscling to the horizon—and 900 miles beyond—the peaks of the Brooks Range beckoned me onward from the Junjik River Valley, approaching the halfway point in my trip. Broad river valleys and game trails were my highways through this rugged land.

❸ August 24, 1989. Months of solo travel nurture a deep kinship with the land; here I advance effortlessly, like the caribou.

❹ October 1, 1989. My race against winter's freeze-up begins. I retrieve a cached canoe at this lake and shove off for the westward-flowing Noatak River.

❺ October 15, 1989. Wolves serenade me at my campsite. Within days the river freezes, and I am forced to abandon my canoe.

❻ December 20, 1989. Noatak villagers dub me Pisruuktii—the "walking man." Having survived cold and hunger, I spend a thankful Christmas here.

❼ FINISH: January 10, 1990. I reach the frozen sea beneath a bone white Arctic moon. Some 1,450 miles of wilderness lies behind me.

as our dogs raced down the hill onto the frozen surface of the Peel River toward the Richardson Mountains.

Climbing toward McDougall Pass, we took solace in knowing that others had been over the pass before us. We were following a little-used but traditional trail over the mountains to the village of Old Crow. Edward Itsi, a Gwichin Indian elder, had given us a verbal map of every hill, drainage, and landmark along this route, and one by one we began passing each of the features he described.

At McDougall Pass we dropped to the upper Bell River in the Yukon Territory. It was there that we began to encounter a series of major difficulties. Deep powder snows slowed us down, and what should have been a quick two-week trip to Old Crow became a six-and-a-half-week slog. We spent most of our energy breaking trail for the dogs. To advance a mere six miles a day meant snowshoeing eighteen miles—six up, six back, and six up again with the dogs. By the time we reached the abandoned trading post at La Pierre House the miles had taken their toll. Little by little we had run out of supplies, the dogs were dropping in their tracks from exhaustion, and Pappy began to have second thoughts about the expedition.

When we reached Old Crow on April 27, spring breakup—a period when neither the rivers nor the backcountry is fit for travel—was well

PANORAMIC COMPOSITE OF THREE PHOTOGRAPHS

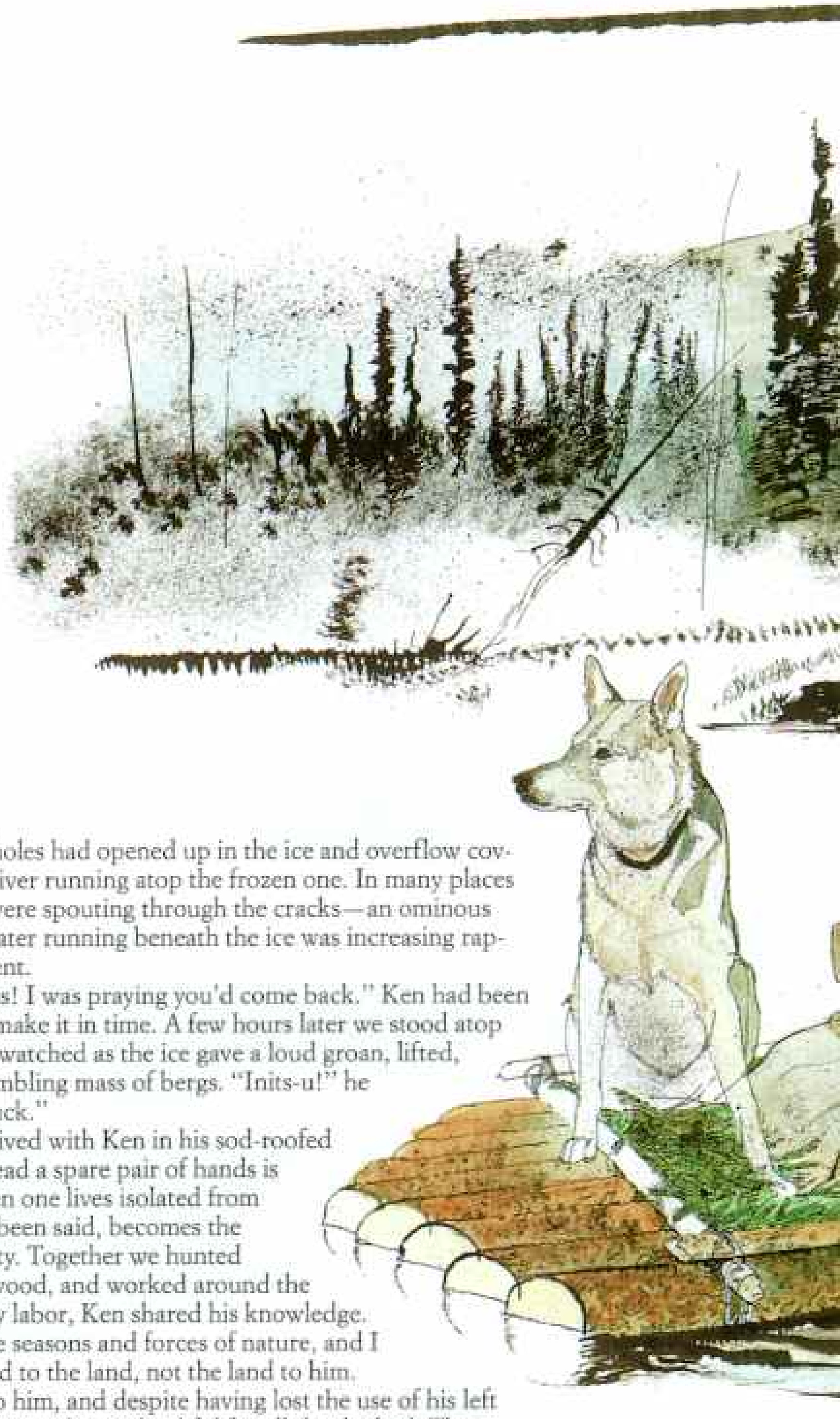
under way. Pappy made his decision to quit the expedition; and I wrestled with the possibilities and probabilities of continuing on alone. I couldn't face the end of my dream so soon.

"**Be careful.** The river's not safe—the dogs could fall through," were the last words I heard as I headed out, with seven dogs and one sled, onto the soft gray ice of the Porcupine River.

My goal was Ken Nukon's camp. Almost 70 years old, Ken, another Gwichin elder, lived alone 20 miles upriver from Old Crow. On our way to the village Pappy and I had visited him, and Ken invited me to return to spend breakup with him. In the sled I carried plenty of supplies—coffee, tea, flour, grains, dried fruits and vegetables, dog food, and batteries for the tape deck Ken loved so much. My only hope was that while I waited for summer to begin and travel to become possible, I could figure out a means of reaching Arctic Village.

Wet sleet and snow fell as I mushed through a nebulous world where the grayness of the sky merged with the grayness of the river. In the faint light

"This can't be happening," a stunned voice inside me said. "This isn't real." Declaring an eerie truce, a thousand-pound grizzly halted to lock stares after repeatedly charging me in the Arctic National Wildlife Refuge. Protective of a nearby cub, she had barreled to within yards; my frantic shouting stopped her at the last second. Eleven bear encounters marked my journey. All ended peaceably.



Christened for the river that carried us, the S.S. Chandalar *floated me and my wolf dog Smoke in rough-cut style to Arctic Village, where I resupplied and mended a sprained ankle. More than a decade of Alaska outdoor experience had toughened me for the rigors of the Brooks Range. Even Smoke pitched in on the trip—hauling 40 pounds of dog food in a special pack.*

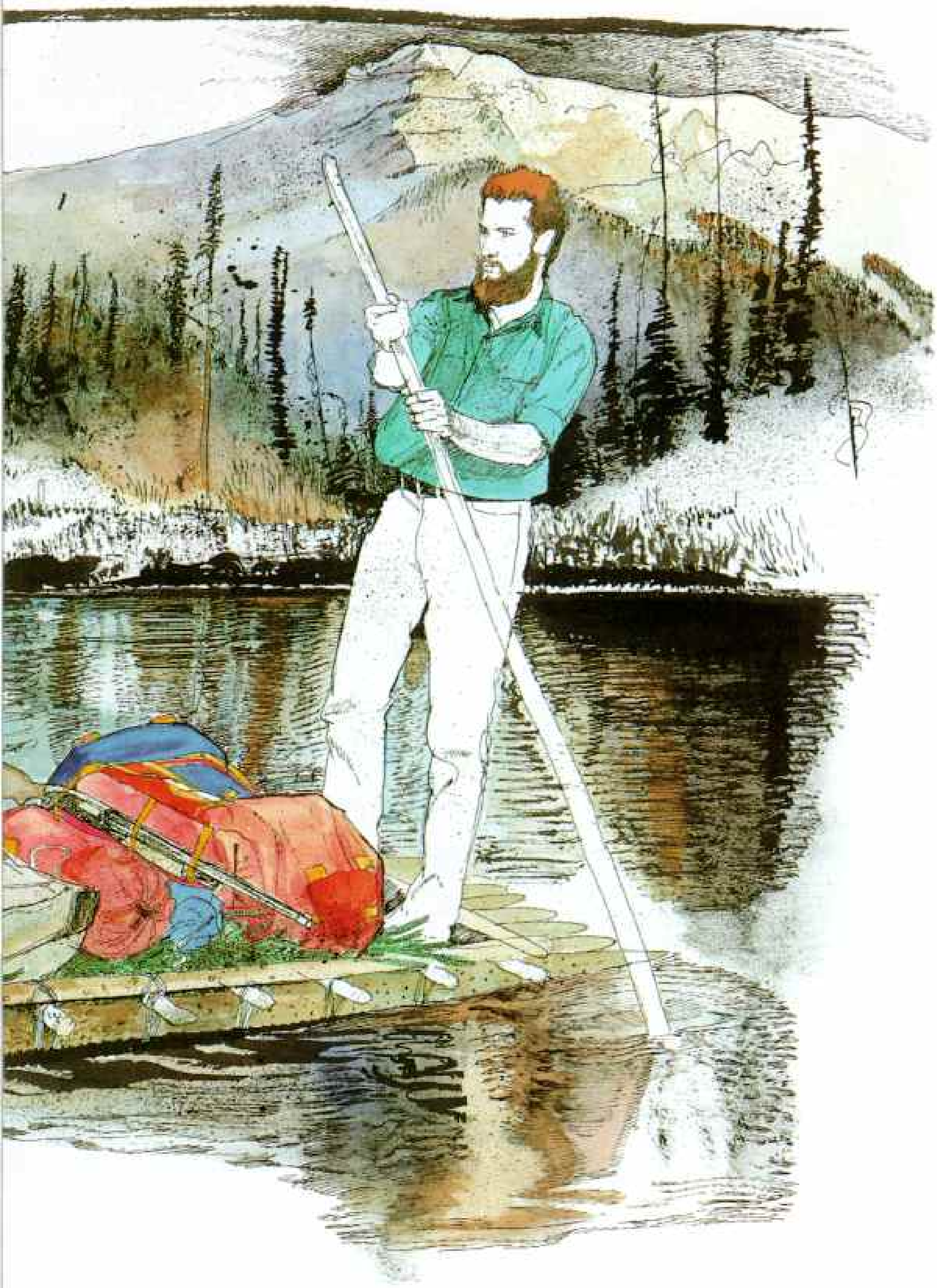
of dawn I could see that holes had opened up in the ice and overflow covered its surface: a liquid river running atop the frozen one. In many places large fountains of water were spouting through the cracks—an ominous sign that the volume of water running beneath the ice was increasing rapidly. Breakup was imminent.

"*Inits-u!*—My goodness! I was praying you'd come back." Ken had been worried that I might not make it in time. A few hours later we stood atop the bank of the river and watched as the ice gave a loud groan, lifted, and broke apart into a tumbling mass of bergs. "Inits-u!" he laughed. "Now you're stuck."

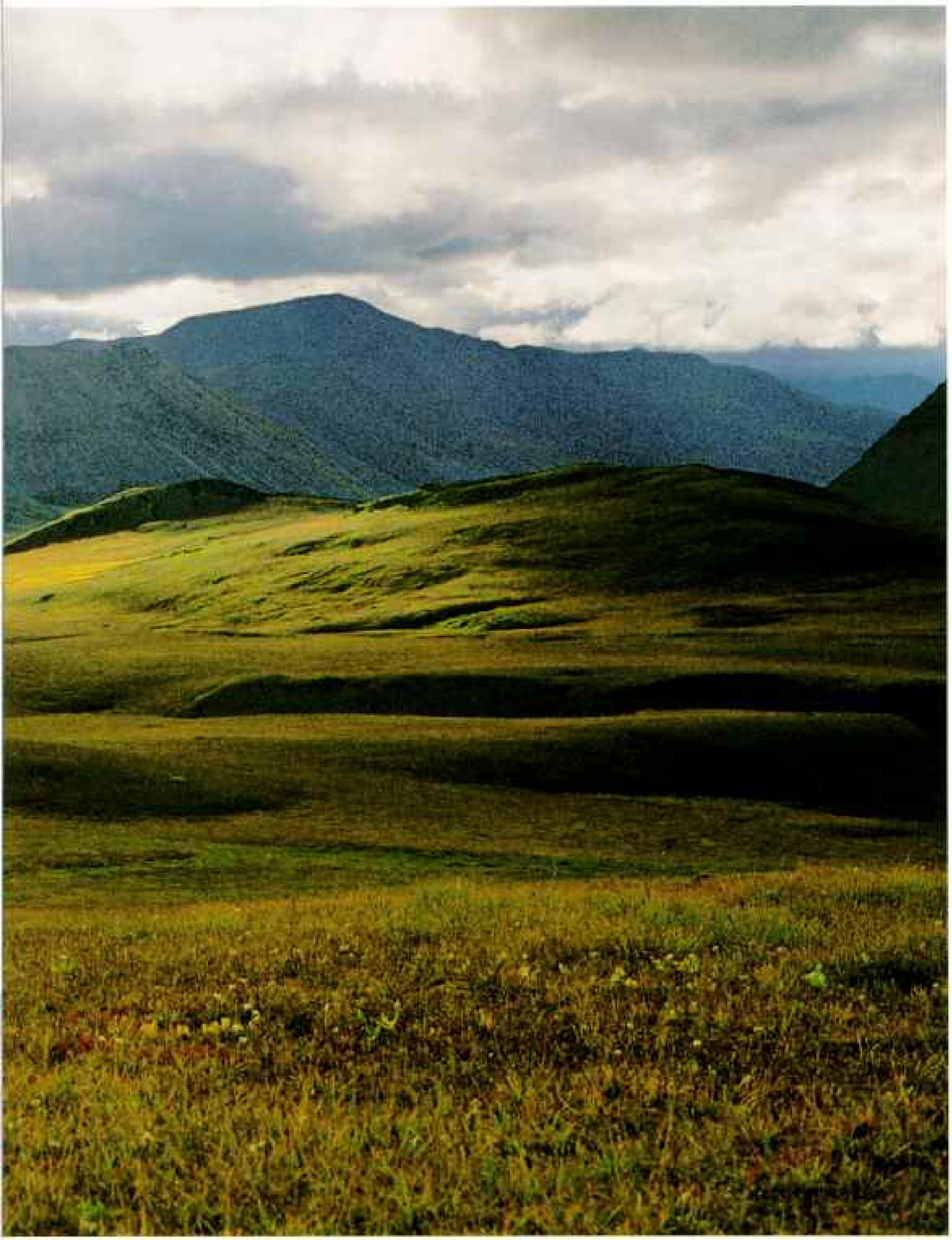
For the next month, I lived with Ken in his sod-roofed log cabin. At any homestead a spare pair of hands is always welcome, and when one lives isolated from people, loneliness, as it's been said, becomes the fountainhead of hospitality. Together we hunted caribou, cut and hauled wood, and worked around the camp. In exchange for my labor, Ken shared his knowledge. His life was shaped by the seasons and forces of nature, and I could see that he belonged to the land, not the land to him.

Laughter came easily to him, and despite having lost the use of his left arm to polio as a child, he was always thankful for all that he had. The Creator, he said, gave him what he needed when he needed it; it was his task to recognize and appreciate those gifts. Throughout the day, as he went about his chores, I'd often hear him whisper: "*Mahsi-choo*—Thank you greatly."

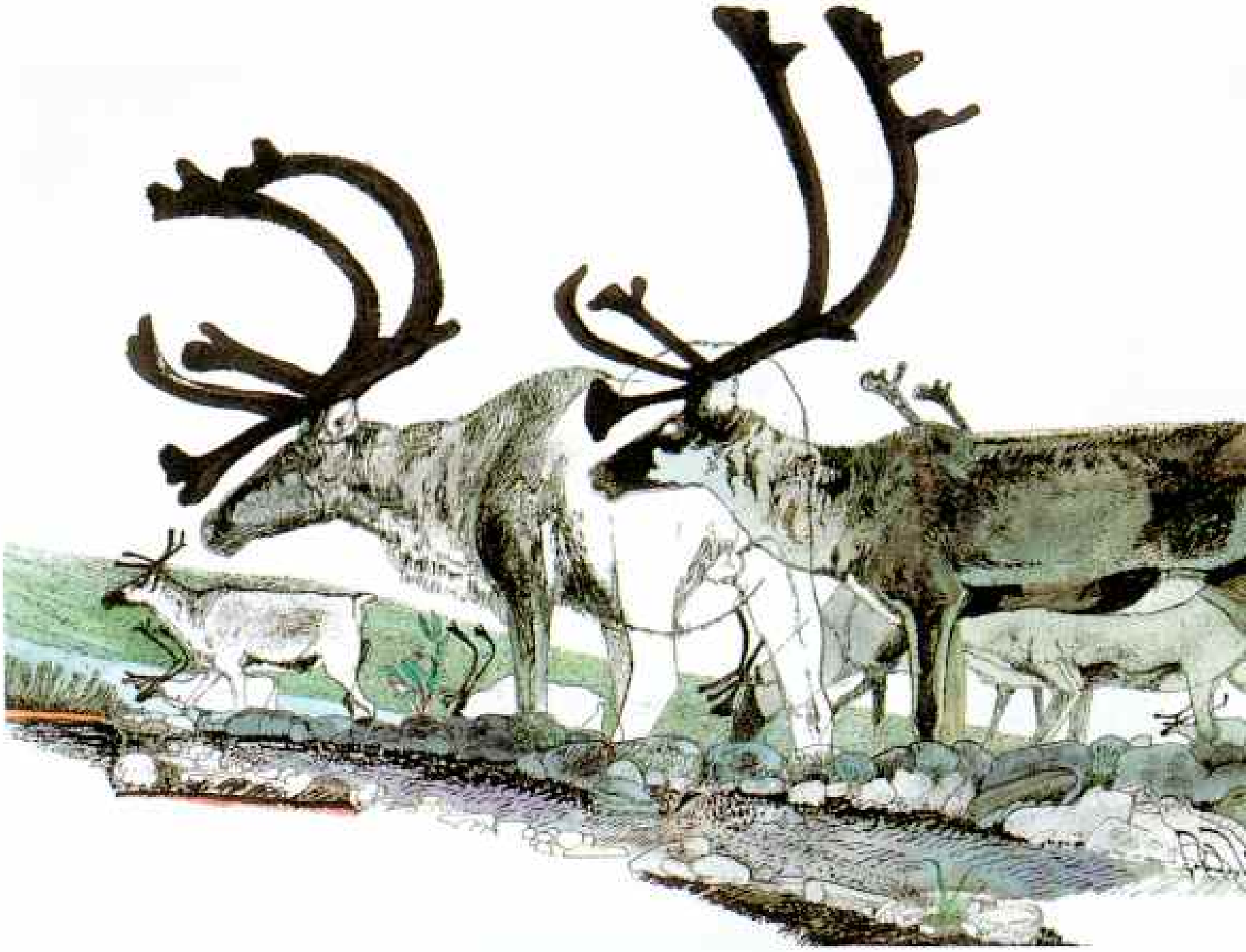
As the days lengthened into summer, the time came for me to be on my



Less is more in the tundra; no roads, no trees, no clutter—just an abundance of light and space. Here, at the upper Anaktuvuk River, I was struck by my growing connection to the landscape. In the still Arctic air ravens' cries traveled to me across miles of emptiness. And as if by



instinct, my eyes began reading the land—picking out routes through patches of moss, around grassy bogs, and past bleached caribou antlers. Even lugging a heavy pack, I felt buoyant. Humming a Gwichin Indian tune, I sometimes covered 15 miles or more before camp.



way. On June 4, Ken and I drifted downriver into Old Crow. Because I live in Alaska, people immediately asked me what I thought of the *Exxon Valdez* oil spill. I'd never heard of it. That night, for the first time in three months, I watched television to catch the news. Its impact shook my soul.

Live reports were coming in from Tiananmen Square—the flames, the tanks, the shootings, and the panic. Then came a report from Prince William Sound—blackened water, beaches, and sea otters. The outside world came crashing in. Tears came to my eyes. Ken simply shook his head.

My best hope of crossing the lowlands to enter the Brooks Range was to head up the Old Crow River, retracing the route taken by Olaus and Mardy Murie in 1926. They had poled a boat through Old Crow Flats to the river's headwaters. If I could do that, I'd be in a good position to strike out overland to the next village—Arctic Village.

Friends offered to take me in their motorboat up the river as far as Timber Creek, and on June 10, having traded my dogsled for a 17-foot canoe and all but one of my dogs—Smoke—for food and supplies, we headed north into Old Crow Flats.

I stood for a long time watching as the motorboat disappeared downriver around a bend. For a while I could still hear its engine, then that too was gone. It was quiet and still, and in that silence I became aware of how alone I suddenly was. As if their departure had taken something from me, I felt a growing emptiness inside. I wondered if I truly was ready to begin.

To keep myself from dwelling on the uncertainties, I began loading my gear into the canoe. There wasn't much: backpack, dog pack, ax, 12-gauge shotgun, burlap bag of dried meat, small box of groceries, and a watertight

five-gallon bucket that held matches, spices, and baked and baking goods. No more than 250 pounds.

Once on the river, the poling was easier than I'd expected. I didn't think of town now; I observed how the winds blew or the river flowed, where the flowers, shrubs, or trees grew, and where and what type of game trails came down to the river's edge. I began to notice patterns and relationships between the land, the weather, and the animals. I began to hear and see more.

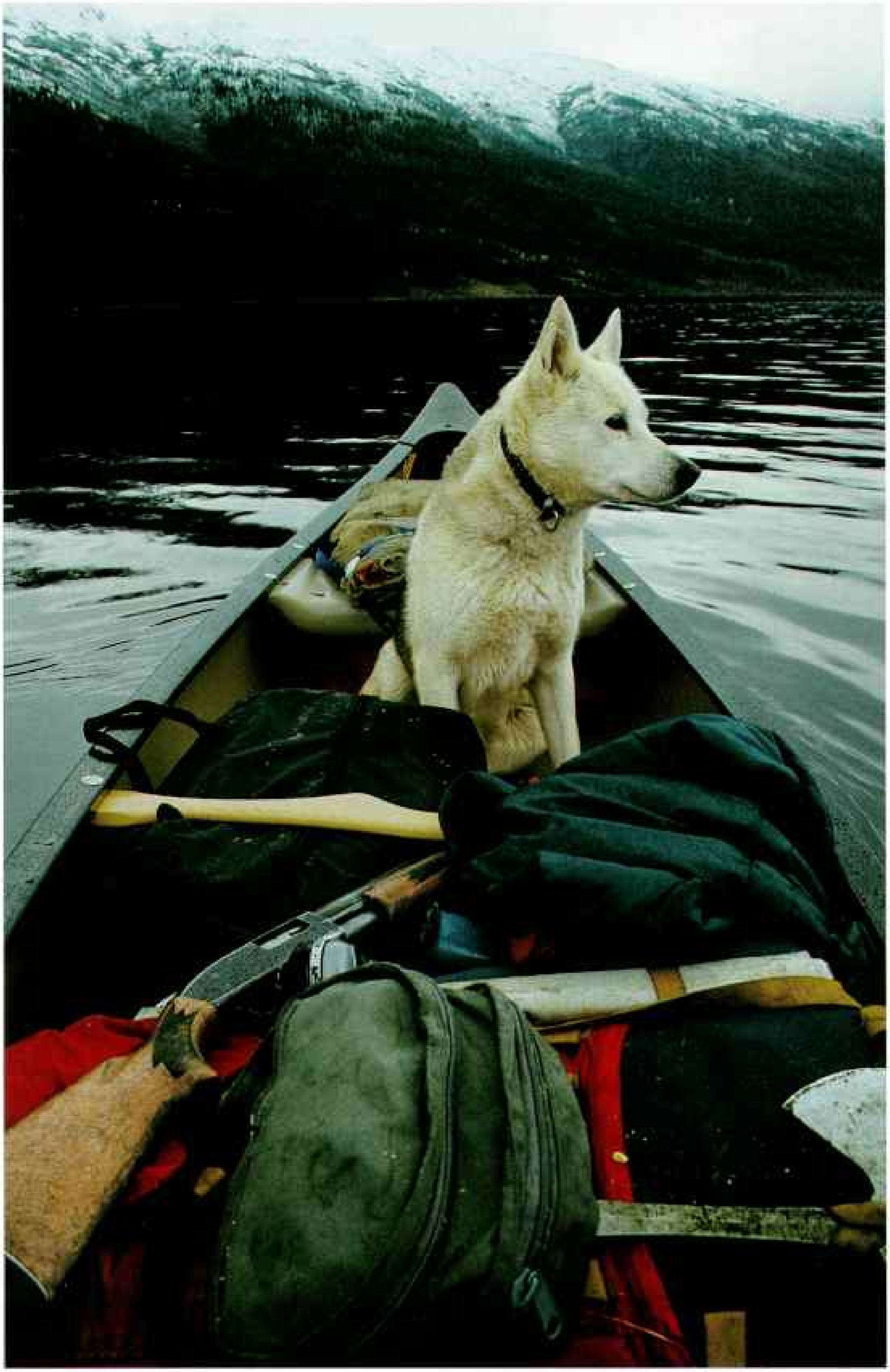
There were multitudes of birds—ducks, geese, swans, eagles, kingfishers, loons, ravens, waxwings, and robins—and I often saw moose, wolves, and grizzlies. The most numerous creatures, though, were the mosquitoes.

The noise alone was terrible. The ceaseless drone of millions of mosquitoes made the air vibrate. I was stunned to see Smoke's fur shimmering as thousands crawled over his coat. They were all over me as well. Liberal applications of repellent helped, but the head net provided the best protection. Whoever invented mosquito netting deserves a Nobel Prize.

After a week of poling I reached the boundary between Alaska and Canada—141° west longitude. I thought I'd feel different, even elated, to be back home in Alaska, but looking up and down the 20-foot clear-cut swath, I realized the boundary was meaningless. My real home—the land—extended across all borders.

June 21: the first day of summer. The last few miles of river snaked into a narrow tundra valley west of Yankee Ridge, and I left the canoe and a small amount of emergency supplies in a stand of trees at the base of a long ridge pointing north. Six miles away, the Continental Divide ran along the gray granite line of the Davidson Mountains, and 101 days after leaving Fort

I felt like a human rock surrounded by a torrent of life the day a caribou herd crossed my path, bound for grazing grounds. The graceful animals showed little fear. I stood still and ordered Smoke to do the same. They rumbled by—200, 400, then thousands, moving down a tundra valley in waves, wanderers like me.



McPherson, I shouldered my pack and headed into the mountains of my dreams, the Brooks Range. Arctic Village lay more than three weeks and 200 trail miles to the west.

The tundra was covered with tussocks, closely spaced columns of grass and heather rising out of the wet, boggy ground. The wobbly hillocks, eight to twelve inches in diameter, reduced me to a stumbling stagger. I could barely take two steps in a straight line before the mounds forced me to shift direction or the ankle-deep muck between them sucked a sneaker off. Constant shifting and pivoting threw me off balance, and the weight of my pack (110 pounds) only made doing the "tussock two-step" worse.

I sometimes fell, but Smoke was getting stuck. His 40-pound pack—mostly dried dog food—would become wedged between two or three tussocks, and I'd have to stagger back and grab his pack and lift him free. If I'd believed the entire journey was going to be like those first five miles, I would have returned to the canoe and ended the expedition right then and there. Eventually, though, the tussocks gave way to drier, firmer ground.

Threading my way through the Arctic National Wildlife Refuge, I followed an extensive system of trails formed by countless hoofs over untold years—testimony to the mass semiannual migrations of the Porcupine caribou herd from their calving grounds on the northern coastal plain to their wintering grounds in the boreal forests to the south.

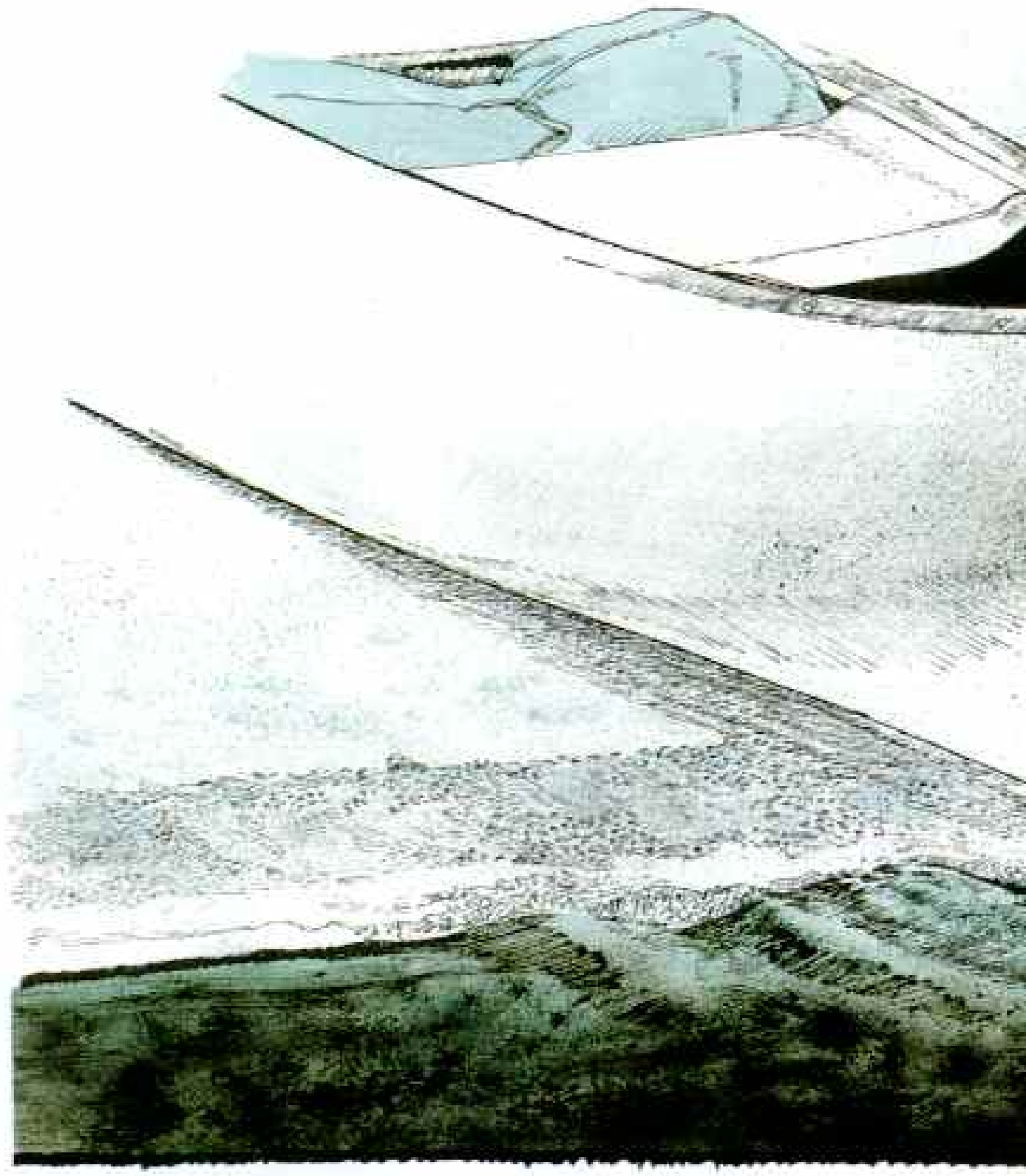
I worried about the future of the caribou. The oil industry wishes to open the coastal plain within the wildlife refuge to development, despite the fact that Congress created the refuge specifically to protect the Porcupine caribou herd.*

Whooping like a broncobuster, I rode my canoe down a snowy pass to the Noatak River—an adrenaline rush that capped hard days of portaging. Earlier, on Walker Lake, Smoke enjoyed a more conventional style of cruising.

Hiking the land made me feel alive. The pack no longer felt heavy. My body was stronger, my strides longer, and my senses alert. Often I stopped just to listen. In the cries of loons, the screeches of raptors, and the songs of wolves, I heard the wilderness calling. In Old Crow an elder had told me to "walk with the spirit." I felt as if I belonged on the land. Surrounded by mountain peaks, I felt small, but not insignificant.

I had just entered some head-high willowy brush when I saw a flash of blond and a smaller blur of silvery brown: A sow grizzly and her cub were foraging on the far side of the brush. Shouldering my shotgun, I cautiously retreated to a small knoll 20 yards back. The bears had seen me and were

*Douglas B. Lee reported on the debate over development of this wilderness area in "Oil in the Wilderness" in the December 1988 NATIONAL GEOGRAPHIC.



With heart-stopping crunches, the Noatak River's thickening sheet of ice broke beneath me several times on my push to the Chukchi Sea. My chest muscles cramped from the icy shock. Breathing came in gasps. And in seconds my hands numbed like lumps of lead. The dunkings were potentially lethal: October temperatures hovered at 20 below, exposing me to deadly hypothermia. After hauling myself out, life depended on a quick match stroke—and a fire. "COLD!" I scrawled miserably in my journal, days before abandoning my canoe 300 miles from the coast. From there, I would walk.

edging closer. Suddenly the sow charged. Racing as fast as a horse, she covered 50 yards before I found my voice.

"STOP! STOP, DAMMIT!" She stopped. Smoke was tense, growling at my side. I made no threatening display but kept yelling at her to back off. Her response: three quick charges that brought her to within 20 yards. Unfortunately, the effective shotgun killing range for a grizzly is uncomfortably close—ten to fifteen yards. I forced myself to wait.

She lunged, and lunged again. Rolls of muscle and fat rippled, and she clawed the ground, tossing clumps of moss behind her. On the fourth lunge, she charged again.

Adrenaline surged, and everything went into slow motion. I remember looking down the barrel of the shotgun and yelling "STOP!" one last time as she broke out of the brush. Seven yards away she stopped. Something inside me snapped. Words poured out. I was yelling, pleading: "Look, I don't want to shoot you. If I kill you, your cub will die without you. You *don't* want to do this."

The more I yelled the madder I became. "I'm just passing through! DAMMIT! I CLAIM MY RIGHT OF PASSAGE!" Nothing else came to mind. In the silence we locked eyes. Then she sat down. It was over.

It was as if we had reached an understanding: I had stood my ground and conditionally gained her respect, while she had protected her young

and, for the moment, ensured its survival. With a loud "chuff," as if to say "you may pass," she went back to her cub. As they moved off, the only words that came to mind were words of thanks. "Mahsi-choo!" I shouted.

I moved deeper into the mountains. The days all began to blend together. At Ambresvajun Lake I wrote: "Were it not for this journal I would surely lose all track of time. Often I feel like I've taken a journey back into time . . . though the days of the mammoths are long gone, the wilderness remains—a portal to the past."

In the valley of the East Fork of the Chandalar I slipped while crossing a creek and sprained my left ankle. Fortunately I was below tree line near where I had planned to build a 4-by-11-foot log raft to float downriver to Arctic Village. Four days and 60 miles later I was enjoying the comforts of town life—a real bed, showers, and foods I didn't have to cook.

August 5: After nearly a month's rest in Arctic Village I felt both physically and mentally ready to head back into the mountains. I had enjoyed getting to know more of the Gwichin culture, but time was getting short to finish my trek before winter. Summer was sliding into fall: The days were cooler, and the tundra was turning red-brown with the first frost.

I entered the most rugged section of the Brooks Range—the Philip Smith Mountains. As I crested each new pass, I saw a sea of peaks

extending over the horizon. Now that I was high enough to really see the distances, my destination, Kotzebue, 900 miles away, seemed an impossible goal. "One day, one mile, one pass at a time," I told myself.

As I descended into the valley below Atigun Pass, a strange smell wafted through the air. It was fumes from the trans-Alaska pipeline, its past spills, and diesel exhaust from vehicles that used the adjacent haul road. The wind, which had carried the scent of plants and animals, now blew with a sickening chemical tinge. Garbage was scattered along the road, and as I walked along its verge, I became nauseated.

West of the road, I entered the Gates of the Arctic National Park and Preserve and felt my strength return. When I reached the upper Anaktuvuk River on August 24—day 165—I crossed a personal threshold.

Descending out of the clouds, I suddenly realized that my internal dialogue had stopped. I was aware of only my breathing; I no longer thought about where I placed my feet—peripheral vision did that for me—and from constantly viewing distant vistas, my eyes had developed a "three-mile stare." It wasn't the map that now told me where best to head, but the colors and patterns of the vegetation and landforms three miles ahead. I felt as if I were migrating, like the caribou, through the land.

The Eskimo elders kept asking me when I was going to leave. I had stayed in the village of Anaktuvuk Pass for three weeks because I wanted to get to know the people and their culture, but the elders were beginning to worry for me about the approaching winter.

When I left the village on September 14, snow was already falling in the

mountains, and the moose and caribou were on the move. I felt the calling of the migration myself—I needed to cover nearly 700 more miles.

On October 1, 16 days and 140 miles from Anaktuvuk Pass, I stood on the shores of Walker Lake—the last major resupply point. My supplies and a canoe lay stacked on the beach, but the lodge had closed and the owners were gone for the winter.

Eight days later, after poling to the headwaters of Kaluluktok Creek, I faced the last mountain pass I would have to cross. It was my 31st, and I reached the 4,200-foot-high pass on my 31st birthday. Snows had begun to fill the pass, so I lashed some alder boughs together to make a pair of five-foot snowshoes and portaged the canoe to the top of the pass. I would toboggan the boat down the other side, then paddle down the Noatak River before it froze over.

But looking down from the pass, I could see the river had started to freeze. With 425 miles still to go, I was entering into a race against winter, something I had hoped to avoid. My odds, I figured, were fifty-fifty. I lost.

The temperature dropped to 20 below, and I often had to drag the canoe over the ice. Three times I punched through into muscle-numbing water, and my wet clothes, once removed, froze solid. Above the timberline, with no trees for fuel, I had to spend a day each time gathering enough grass and twigs to build a bonfire to thaw and dry them. Food began to run low. After I struggled for 120 miles, the river froze solid, and I abandoned the canoe. I would have to walk to the coast.

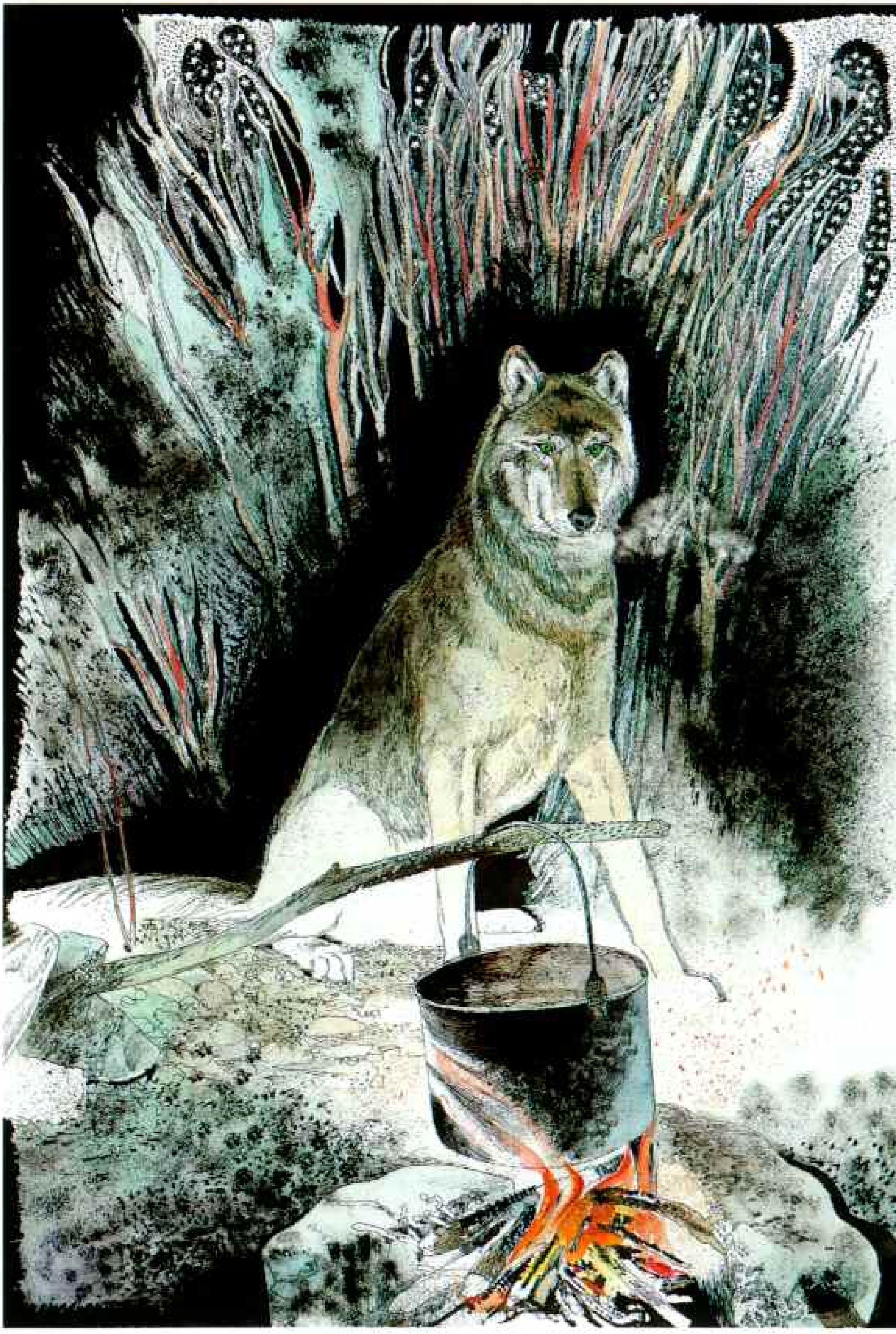
Fox scratchings on the frozen Noatak River led me to food—dead salmon I hacked from the ice with my knife. Smoke's keen nose helped track down the remains of ptarmigan killed by owls. The scraps made a grim soup—feet, feathers, and all. Knowing that every calorie was essential for our mutual survival, I began sharing Smoke's dwindling supply of dog food.

One thing had kept my spirits up: the wolves. From the river one day I had spied a black female wolf with two pups along the shore. When the moon came up that night, the wolves began to howl. Six distinct voices rose and fell around me in a primitive cadence, and Smoke and I howled our greetings in return. Later that night, as Smoke lay sleeping by the fire, two green eyes appeared in the darkness: a wolf, a full-grown male, perhaps 120 pounds.

He paced back and forth, coming closer and closer. I wasn't afraid—his tail was down, his eyes questioning. I began to talk to him in a soothing voice. Smoke, my faithful watchdog, never woke. Eventually the wolf edged into the ring of firelight, just a few feet away. He sat down and stared at me. To look into the eyes of a wild wolf, to see the gold specks in its luminescent green eyes as they reflect the light of the fire, is to realize the ancient interconnectedness of all things. After he disappeared back into the darkness, I felt a renewed sense of belonging.

A week later the blizzard struck and buried me beneath the snow. When I surfaced, the temperature hovered at 40 below. Smoke was nowhere to be seen. Minutes later a patch of snow started to move, and out he popped. A quick check showed he had a small patch of frostbite under his tail.

We had to reach tree line. In the trees there would be game to hunt and wood to build a shelter. My real hope, though, was that I might find a cabin there. Still, tree line was a hundred or more miles away.



Smoke and I were starving. We shared what little food was left: A cup of rice a day and two cups of gritty dog food mixed with a little home-style gravy mix. Occasionally, fox tracks led me to dead salmon beneath the ice. Into the soup pot they went.

Fire was crucial for warmth and to melt snow for water, so I had to camp where there were enough dead shrubs to last me through the night rather than push on and risk being without. Often I'd only walk three or four miles before I had to stop.

Day by day I became weaker. My muscles began to cramp. My fingers felt like blocks of wood, but I had to resist the urge to thaw out my frozen fingertips. If they were to freeze again, they could be permanently damaged. Over and over I repeated my mantra: "Things could be worse. At least I'm still alive."

Finally, after 16 days, I walked into tree line and there, at the edge of New Cottonwood Creek, was a cabin, complete with oil heat, propane range, AM radio, and a fully stocked kitchen. Earlier that day a Super Cub on skis had flown over, spotted me, and landed. It was Ron Sutton, from the National Park Service, and his pilot, Andy Greenblatt. Almost disbelieving my senses, I had walked up to the plane. It had been 54 days since I had seen another person.

"Are you guys looking for me?" I asked. They had been. It was common knowledge that "some guy and his dog" were traversing the Brooks Range and expected to exit via the Noatak River. But I was overdue, and they had come searching for me—or my body.

I told them about my frostbite, and they told me about the cabin that was just a short distance away. I asked if they could contact my family and tell them I was still alive. I also asked if they could let the owners of the cabin know I would be staying there for a while. They agreed, and within an hour of landing they were on their way again. Before they left, I asked how cold it was. Ron replied it had been 40 below at the Bettles airport that morning.

My first week in the cabin I felt torn in two. Word reached Kotzebue that I was still alive; and twice people flew out to check on me. Admittedly, I felt a strong urge to fly out with them and end the expedition. The possibility of gangrene weighed heavily on my mind, and I had hoped to spend Thanksgiving with my family, but the urge to fulfill my commitments to myself, my dreams, and my sponsors was stronger. I stayed.

My fingers burned as the frostbite healed. I'd also lost a filling in a wisdom tooth, and in the warmth of the cabin it abscessed. The pain in my fingers was nothing compared with that. Taking a sterilized needle, I pierced four holes under the gum and drained the abscess.

While I recovered, I spent hours writing and listening to the radio. I heard the Berlin Wall come down and the Cold War end. This gave me new hope and helped alleviate some of the growing dread I was feeling about the world I would reach at the end of my trip.

On Thanksgiving Day the owner of the cabin, Warren Thompson, flew in with some turkey and pie, and after he left, I spent the rest of the day

Wildness was distilled in the eyes of a wolf that visited my camp one night on the river (facing page). His pack kept me company for days and broke trails that I followed out of the mountains. I felt sure I was safe; no wolf attacks on humans have ever been confirmed in Alaska.

contemplating all the things in my life to be grateful for. With a survivor's clarity, I saw just how many there were.

The winter sun had completely disappeared below the horizon, and the "days" now were only a few hours long. To compensate for the darkness, Smoke and I waited until December 3, and the light of the moon, to leave the cabin. I remember thinking: "Only 200 more miles to Kotzebue."

As I walked toward the village of Noatak, I saw the Arctic in a whole new way, with its twilight days and auroral nights. Before the start of the trek I'd been afraid of being caught by winter above the Arctic Circle—I'd never experienced that before. Surviving the ordeal had given me a new perspective. Even at 60 below—when your breath freezes into an icy mask and the air is so cold and dense you can hear a moose walking on the ice a mile away—the Arctic remains an enchantingly beautiful place.

Arctic veterans, Smoke and I left Noatak village for our closing hike to the coast, only 60 miles away. What had I gained from my ten-month adventure? A bad case of frostbite (above) and legs of steel. But more important, the Brooks Range offered a blessing—the peace of open spaces and the strength of solitude.

On the evening of December 20, the eve of winter solstice, the villagers of Noatak welcomed me as the "man from Canada" they had heard about. I was invited to stay and celebrate the season's holidays, and the feasts and games that took place between Christmas and New Year's Eve were a welcome end to three months of solitude. I was often greeted as Pisruuktii—the "walking man." The children called me Walkman.

When I left Noatak, my trek was all but over. On January 9, a little more than 1,400 miles and 303 days since leaving Fort McPherson, I walked out onto the frozen waters of the Chukchi Sea. Kotzebue was only four miles away.

There was a pale phosphorescent intensity about my last night on the trail. The full moon cast vivid shadows, and all but the brightest of stars were invisible. The air was clear and calm, with the special stillness of an Arctic winter. In the distance, red lights gleamed from radio towers, surreal and alien. They signaled my return to the 20th century.

I lay awake all night, unable to sleep. I felt confused, disembodied—divided in spirit. Part of me lay huddled in a sleeping bag on the shores of the Chukchi Sea; part of me was drawn to the lights, trying to accept the inevitable transition I had to face; and part of me stretched back through time and distance, remembering the events, the places, the people, and the feelings of all that had been the Trans-Brooks Arctic Expedition. The last entry in my journal reads:

"Being my last night on the trail, it's hard not to reflect on all that I've experienced. I've known much solitude on the journey, but what truths have I found in the silence of the wilderness? I've found that one's dreams are worth pursuing, and when done so with patience, perseverance, and the hope and optimism out of which those dreams arise, they can and will come true. That it is important that we believe in ourselves and believe in our dreams. I've found that in silence one comes to know oneself. That by divesting ourselves of the general mayhem of the modern world, we can once more hear, and learn to listen to, that guiding voice within us all; and by seeking that silence in nature, not only will we learn about ourselves but of the patterns of peace as well.

"There are other treasures and truths I've found, many I can't as yet put into words; others I think are best and most meaningful only to those who find them for themselves. If one is interested in what these might be, then seek those silences for yourself. As long as we have wilderness to retreat to, they will be there." □

GIANT CROCODILES

Deadly Ambush In The Serengeti

Text and photographs by
MARK DEEBLE and
VICTORIA STONE

All teeth and terror, a huge crocodile lunges at a herd of thirsty wildebeests crowding the river's edge (previous pages). Seconds later, crushing jaws clamp onto a panicked calf (following pages). For the giant crocodiles of Tanzania's Grumeti River—some of the world's biggest—the attacks signal the start of an annual feast.

LONG BEFORE we smell the first hint of dust in the air or hear the distant thunder of hoofs, the giant crocodiles of the Grumeti River somehow know a wildebeest herd has arrived. Like shadows the crocs slip from the riverbank into the water, leaving golden telltales on the surface.

The wildebeests, migrating northwest as the dry season progresses, are returning to a ten-mile stretch of the lower Grumeti visited by herds every year. As always, the most dramatic collection of Nile crocodiles in Africa is lined up along the shore to ambush them.

As many as a thousand crocs live along this part of the Grumeti, a seasonal river that flows a hundred miles in and out of Tanzania's Serengeti National Park and into Lake Victoria. As the weeks progress, the river shrinks to a series of pools, where myriad animals come to drink and sometimes to die.

For the past five years we too have waited here for the wildebeests on the advice of Kenyan filmmaker Alan Root, with whom we collaborate, and with the cooperation of Tanzania National Parks.

Hidden in blinds dug into the riverbank, we wait weeks for the crocs to accept our presence. At first they swim by underwater, but after they become accustomed to us, they come within a few feet of our cameras.

The largest measure 18 feet, weigh almost a ton, and leave footprints the size of divers' fins. More than 70 years old, they are among earth's biggest carnivores. We are not deceived by their enormous bulk and sluggish motion. We have seen them launch themselves with deadly speed.

Nile crocs will eat anything they can scavenge or catch, from weaverbirds to buffalo. Like other large cold-blooded reptiles with slow metabolisms, however, they can survive for long periods—six months or longer—without eating. Many of the Grumeti crocs will not enjoy a feast such as this until the herds return. Appreciating their hunger, we have only admiration for them as hunters.

The impalas, baboons, and warthogs that live here year-round have learned not to approach the crocodiles as they lie silent and submerged in the river, only their nostrils, eyes, and ears above the surface. Yet many of the migrating wildebeests are calves that have never seen a crocodile before.

The herd is nervous as it approaches the river: Drinking is always a dangerous time. Adults mill about, and calves bleat. Then an old bull, tired and thirsty from the rut, which takes place during the migration, makes a move to drink. Seven pairs of reptilian eyes vanish without a ripple.

Once the bull commits himself, other wildebeests also move down to drink. The bank across from our blind becomes a row of bowed heads. In among them glides a bony ridge with an eye, a vertical slit for a pupil.

Wedged between its mother and another adult, a calf steps forward into the water. Then the river erupts, and the crocodile feast begins.

Tenuous lifeline for game, the Grumeti River is born in the thunderstorms of September and all but expires in the heat of the following August (right). When the wildebeests arrive in June, numerous pools remain. Then, within weeks, most of the Grumeti becomes a river of sand.

Grabbed by its sensitive lip, a 400-pound wildebeest gives little resistance to the half ton of hungry reptile pulling it into the river. Though the

crocodile's teeth are formidable, it can only grip and rip with them, not chew. Death for prey usually comes from drowning.

One that got away: A calf, seized by its leg (right), escapes by a stroke of luck. Calves are often the first to venture deeper into the river or are pushed to the front of the crowd. Even if an adult is closer, a crocodile will frequently pass it by for a chance at a calf.

Dragged into the river (below), the calf is pulled beneath the surface, its strangled bleats silenced. But the attacker is ambushed underwater by the pool's dominant male crocodile. Let go in the foamy melee between crocs, the calf bobs up and scrambles back to shore (below right) to rejoin its mother.

Struggling to a temporary draw, an adult wildebeest and a crocodile thrash in shallow water for 20 minutes without resolution. Though crocodiles are

immensely powerful, they tire quickly. Then the impasse is broken. Other crocs, attracted by the splashing, join to pull the wildebeest down.

Converging on a carcass, crocodiles twist meat from a wildebeest (above) by spinning in the water. Pieces too large to swallow are beaten to size against the surface of the water (left) before being tossed down the throat.

In a week or two the restless herds will move on, and another feast on the Grumeti River will come to a close. □

Jumping with the energy that has brought their nation an

Mauritius Island of

By JOHN McCARRY

economic boom, young Mauritians leap into the warm waters of the Indian Ocean.

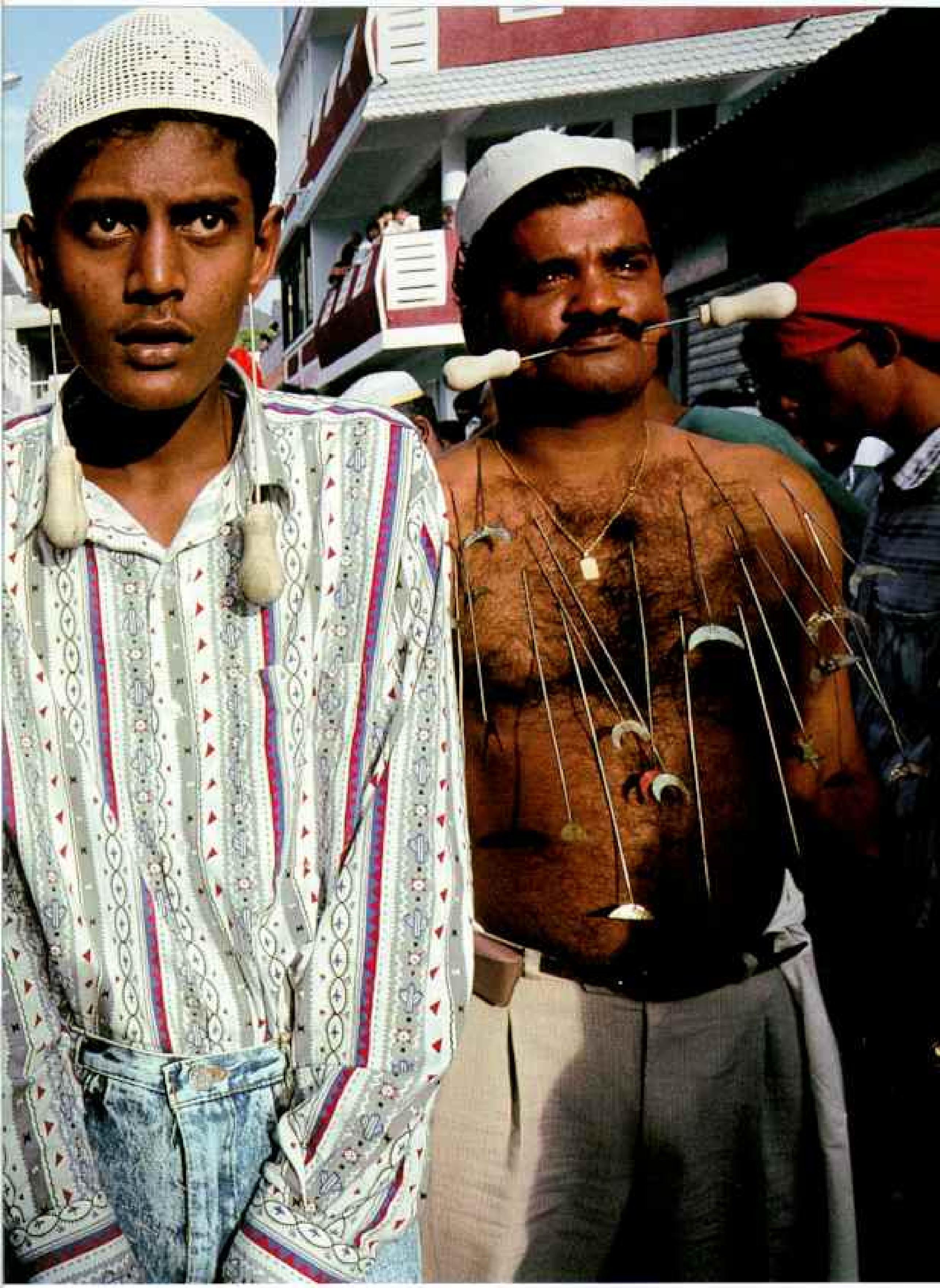
Quiet Success

Photographs by JOSEPH RODRIGUEZ

Black volcanic rubble, a reminder of eruptions that created the island nearly ten million years ago, was heaped into piles to make room for sugarcane, the top export crop. Where the sweet stalks now sprout, the flightless dodo bird

roamed until hunted to extinction within 50 years after the Dutch settled the uninhabited island in 1638. Later arrivals from Europe, Africa, India, and China have learned to live in amity for common goals.

Procession of pain: Moving slowly so hooks and needles dig no deeper, pious Muslims parade through the capital city of Port Louis to mark the anniversary of a battle that claimed the life of the Prophet Muhammad's grandson



Husayn in A.D. 680. Typical of the Mauritian spirit of religious tolerance, Hindus, Christians, and Buddhists line the streets to watch the yearly spectacle, end of the ten-day Yamse festival.

THE NATION OF MAURITIUS shouldn't work. This tiny island country some 1,200 miles off the east coast of Africa is overcrowded and virtually without natural resources. Except, as every Mauritian will remind you, one—its people.

An island patriarch, whose family came here from Normandy more than 200 years ago to make a fortune in sugar, explained the Mauritius success story with a parable. "I was taking a walk the other day, and I passed a stone wall," he said as we sat on the terrace of his villa, staring into the turquoise sea. "This is a wall that I've passed practically every day since I was a boy, yet for the first time I stopped to look at it. And it occurred to me that Mauritius is like that stone wall. Each stone depends on the other for support. You remove one stone, and the whole wall falls down."

His analogy is apt: The Mauritian population is made up of about 750,000 Indians, 300,000 Creoles—the descendants of white colonists and slaves from Madagascar, East Africa, and Asia—30,000 Chinese, and 20,000 whites; and they all live together in peace.

The police, who smilingly roam the island on bicycles, don't carry guns. Muslims celebrate Divali, a Hindu holiday; Hindus celebrate Id al-Fitr, a Muslim holiday; and everybody celebrates Christmas.

Twenty-five years ago, when Mauritius gained independence from Britain, this nation of 1.1 million seemed like anything but paradise. With chronic unemployment and one of the fastest growing populations in the world, Mauritius looked as if it were headed irretrievably for disaster. Yet over the past decade the island has witnessed an extraordinary economic boom. Unemployment has fallen from more than 20 percent to about 3 percent, per capita income has doubled, and the economy continues to grow at about 6 percent a year. Mauritius today is a success and one of the few functioning democracies in Africa.

Or sort of in Africa. For such statistics as these make Mauritius different from any other African country. And unlike the citizens of the nations on the African continent, Mauritians are descended from immigrants. English has been the official language for almost two centuries, but everyone prefers to speak French or Creole. Money is counted in rupees, and land is commonly measured in arpents, French units that haven't been used in France since the days of Napoleon.

The landscape of this nation two-thirds the size of Rhode Island is equally surprising. Volcanic hills in the center of the island have the profiles of alps but rise to no more than a few thousand feet. There are a dozen microclimates—on a long drive the weather can change every five minutes from fog to sunshine to drizzle to sunshine again. Palms grow near the coast, pines in the impenetrable gorges of the interior, and sugarcane everywhere else. Ninety percent of the arable land is planted with sugar, arpent after arpent of thick cane dotted with pyramids of volcanic stone painfully excavated by generations of African slaves and indentured Indian laborers who cleared the land for their French masters.

Mauritius has no delusions about being a melting pot. Harmonious separatism is the unwritten law of the land. While Creoles may be found in a variety of occupations, the Chinese are invariably merchants; the Hindus manage the country's political life; and the whites, most of whom are of French origin, still run 16 of the 19 big sugar plantations.

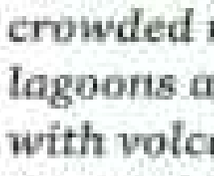
At Café de la Plage, a popular seaside hangout in a touristic enclave in the north where hotel rooms can cost as much as $500 a night, Indians, Creoles, Chinese, and whites routinely gather to watch the sunset—but at separate tables.

The races of Mauritius may rarely play together, but they do work side by side. In a complex of factories on the outskirts of Port Louis, the capital, I found some Mauritians on their lunch break. Clouds hovered above the mess of featureless buildings, washing the stark industrial landscape in a watercolor gray. Some Chinese people had just thrown open the shutters of a small shop and were selling bottles of Coke and plates of curry to workers.

Indian, Creole, and Chinese men and women sat down to eat their lunch and stare blankly into the distance. I introduced myself to a couple of young Chinese women, who were

Paradise against all odds

"A perfumed country caressed by the sun," wrote French poet Charles Baudelaire of this crowded nation ringed with coral lagoons and crowned with volcanic peaks. But problems lurk in surrounding waters, where waste was dumped during a furious buildup of tourism and manufacturing in the 1980s. A Ministry of the Environment was created in 1990 after the World Bank slammed the island's lax pollution control.



AREA: 788 sq. mi. (with Rodrigues and smaller islands). **POPULATION:** 1,100,000. **CAPITAL:** Port Louis, pop. 142,000. **GOVERNMENT:** Parliamentary democracy. **ECONOMY:** Sugar, textiles, tourism.

hunched over bowls of soup. They were big-boned and mannishly dressed in baggy jumpsuits. I asked them how the lives of Mauritians had changed over the past ten years.

One of the women widened her eyes and said in halting French, "I don't know. I've only been here for six months."

"You're not Mauritian?" I asked.

The woman looked at her friend, said something in Cantonese, and they both began to giggle, shyly covering their mouths like little schoolgirls.

"We're from China," her companion said. "We're guest workers."

The first woman saw my bewildered expression and explained, "Nowadays, too many jobs, not enough Mauritians."

TEN YEARS AGO there were too many Mauritians and not enough jobs, and one out of five people was out of work. But now the nation faces a labor shortage, and some factories have to import guest workers. Like tens of thousands of Mauritians, the Chinese women work in the export processing zone, or EPZ, the centerpiece of the country's economic plan to achieve growth through exports. The program has been so successful that textiles have replaced sugar as Mauritius's biggest export.

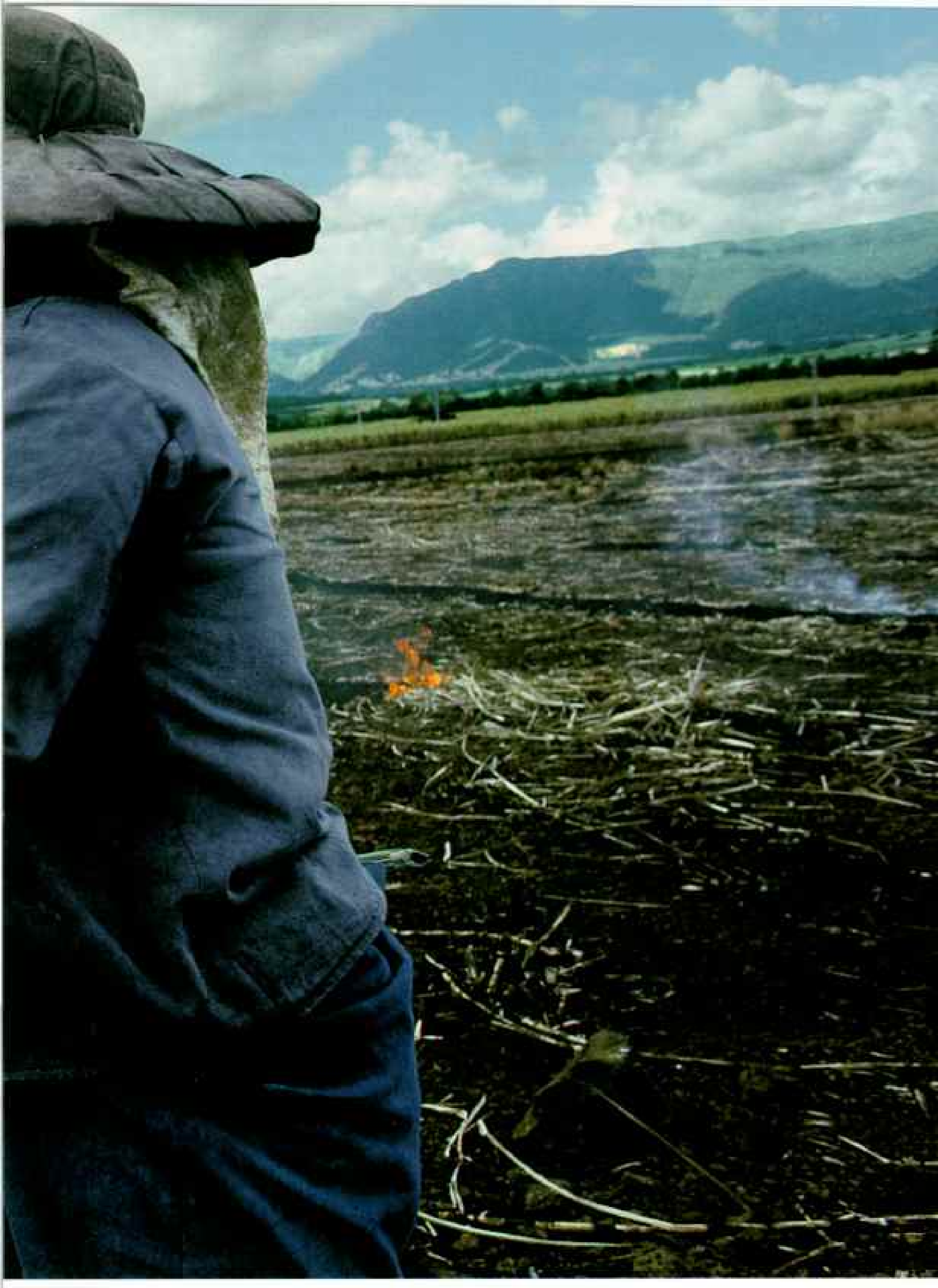
Attracted by the ready supply of cheap labor and by generous tax breaks, businessmen from Hong Kong began to invest in the scheme in the 1970s. They recruited women to work on the assembly lines because they could pay them less than men, which is why two-thirds of the 90,000 Mauritians employed in the EPZ are female. I met one of these women at the Port Louis bazaar, a pretty area with cobbled lanes and ornate ironwork. Dressed in a sari and carrying a baby on her hip, she was going through a bunch of tiny Mauritian tomatoes, called *pommes d'amour*, or love apples. About 12 years ago, she said, she began working at a sweater factory that a group of Hong Kong businessmen built near her village.

I asked if she had wanted to work. She stared at me with frank, black eyes. "Of course," she said. "For a Mauritian woman, to work is to be free. Before, a girl could not leave home until her parents found a husband for her, and then she moved into her husband's family's home and spent the rest of her life having babies." She jounced her hip to shift the position of her child, who was playing with the flowers in her hair. "I met my husband at work, and it was my decision to marry him. Now we live in our own house."

For a family with exotic tastes, tortoises make amusing pets. Alicia Rountree finds riding in the family paddock more fun than a luncheon hosted by her mother at Bel Air Sugar Estate. Although only 2 percent of the population, Mauritians of European descent control the sugar trade, and the wealthy among them look to Europe for culture and furnishings.

JOHN MCCARRY, a free-lance writer, covered Milan for the December 1992 issue. Photographer JOSEPH RODRIGUEZ is a free-lancer based in California. His first assignment for NATIONAL GEOGRAPHIC, "Growing Up in East Harlem," appeared in May 1990.

Harvest over, a cane worker burns straw to make way for the next planting. Before the Dutch introduced sugar 350 years ago, rich ebony forests blanketed Mauritius. Today's growers, nervous about world sugar prices,



plant new export crops, such as tea, tobacco, onions, and cut flowers. Large estates account for about half the nation's farmland; the rest is owned by small planters, most of them Indians working plots of less than five acres.

Like most Mauritian women who work, she doesn't have time to raise a large family. This was not the case at the time of independence, when the population was expected to reach three million by the end of the century. Alarmed by the inevitable consequences of its citizens' fecundity, the government began a family-planning campaign. The program paid off: Recent years have seen a population growth rate of about one percent—a third the annual increase of the 1960s.

Still, Mauritius remains crowded—1,390 people are obliged to share each square mile, making it almost as densely populated as Bangladesh. And Port Louis is as congested as any Asian capital. One hot afternoon I bumped my way through crowds streaming past nondescript government buildings and unkempt storefronts. I spotted a shop with a sign that read: Magasin Lee Voon Ah Cheung, Articles de Luxe. Inside, I surveyed such luxury items as Tupperware containers, plastic laundry baskets, and bottles of baby oil. A shrunken old man, perhaps Lee Voon Ah Cheung himself, was propped behind a cash register. Bowing politely, I asked him where I might find the city's more picturesque neighborhoods.

After a long pause, he said, "There are no picturesque neighborhoods."

Mauritius possesses some of the loveliest landscapes in the world, but they have not inspired its architects. Many of the pretty, shuttered houses built by the French have been replaced by factories—hastily constructed blocks of concrete surrounded by acres of asphalt. With zoning restrictions largely ignored, these factories have proliferated, and resort hotels clog the northern coastline, making it almost impossible to find a corner of the island that has not been developed.

THE DEVELOPMENT has been fast, obsessive, and almost entirely without planning. Not surprisingly, it has harmed the island's fragile environment and wildlife. "Today only about one percent of native forest remains," said Yousoof Mungroo of the Ministry of Agriculture's Conservation Unit. "This has jeopardized the already slim possibilities of survival for the rare endemic kestrel and pink pigeon."

In 1990 the Mauritian government set up a Ministry of the Environment to stave off further destruction. But some of the damage will be hard to reverse, especially the damage to coral reefs and marine life off the northwest coast, which was caused mainly by effluent from the big hotels around Grande Baie.

Development might harm more than the island's wild creatures and places. Although most Mauritians have benefited from their country's rapid change, some find it difficult to adjust. "Stress" is a word that only recently entered their vocabulary. And like many people in successful Western nations, some Mauritians are turning to drugs to relieve the pressure of living in an increasingly competitive, fast-paced society. Still, many citizens were shocked to learn that drug abuse had become a problem, and they demanded strict enforcement of drug laws. Since 1985, when four Mauritian parliamentarians were arrested at Amsterdam airport after their luggage was found to contain 21 kilos of heroin, the government has cracked down on drug trafficking. Today anyone caught transporting or dealing drugs can be sentenced to death by hanging, though no one has yet been executed.

Walking through the marketplace in the city of Curepipe, I encountered a young man who offered to sell me some dope. I declined, but persuaded him to discuss his trade.

Dressed in jeans and fashionable dark glasses, he told me he was a Muslim. I asked about his clientele. "I sell to everybody," he said. "But mostly to young people."

Dropping a spent cigarette onto the pavement and crushing it with the heel of a black cowboy boot, he said, "It's the new Mauritian reality, man. *Si t'as du pognon, t'as du pouvoir*—If you got bucks, you got power."

I was surprised by such cynicism, for so many Mauritians had told me in the most unequivocal terms that their country was a paradise. The drug dealer's comment suggested that a certain innocence has been lost—that in the new Mauritius, money means more than anything.

And, in fact, you can see this not only in the way Mauritians make money but also in the way they throw it away. Gambling is a nationwide obsession. Casinos are everywhere, but probably the most enthusiastic bidding takes place in Port Louis at the venerable Champ de Mars. Inside, mobs of people eat lentils wrapped in chapati and queue up in front of a line of bookie stalls. The crowd hums with tips, for everyone claims to know someone who knows a jockey who has received an enormous sum from someone else to rig a race.

Venerable descendant of Chinese immigrants, a retired shopkeeper confirms what one diplomat said of Mauritius: "It's magnificent, but it's not Africa." Port Louis (below) was landfall for Asian workers and merchants as well as Africans and Asians imported as slaves. Today most of the two dozen vessels that pass through each week carry farm products or manufactured goods.

The night I was there, a waiter from the restaurant in my hotel told me he had just lost 2,000 rupees (about $130) on a bad tip. When I told him not to feel bad, he shrugged.

"At least I have money to play with," he said, nodding his head at the stands above us. "Just like them."

Up there, far above the crush of people, the Franco-Mauritians gambled in private. I went up to take a look and saw men in finely tailored French suits and silk ties and women in stylish French frocks and floppy hats peering through field glasses while waiters in white coats silently circulated among them with silver trays of champagne.

Although everyone is beginning to live a little better in Mauritius, the Franco-Mauritians have always lived better than everyone else. Mauritian whites still own most of the sugar, and own most of the new factories as well.

I had a chance to see how these people live when I was invited to a luncheon at a villa on a stretch of beach lined with the retreats of wealthy Franco-Mauritian families. I sat in a large wicker chair on the lawn, chatting with the sons of some sugar barons. They had been on a stag hunt the day before and were telling stories of pursuing deer on horseback through the hills of a sugar estate.

I struck up a conversation with a strapping, suntanned youth. He had just returned from England, where he is working on a degree in finance. I asked him if he planned to stay in Europe after he completed his studies.

His eyes widened. "Of course not," he said. "I'll come back home." I asked him why.

Day care, Mauritius-style, finds a child close to her mother at a textile mill. The worker can earn a government-mandated monthly bonus for perfect attendance. Unemployment has virtually disappeared, thanks primarily to textile plants owned by local and Hong Kong investors. Tropical Mauritius is now one of the world's largest producers of wool sweaters.

He smiled and gestured toward the beach before us.

"Because Mauritius is a paradise?" I asked.

"Exactly," he replied with a laugh.

But I had grown impatient with this answer and asked him to elaborate.

After taking a long sip from his Campari and soda, he said, "The world is in an economic slump. Everywhere, except in Mauritius. This is where the money is to be made."

Even a Franco-Mauritian would admit that their paradise is crowded. Like Japan, Mauritius is an island where too many people share too little space, and physical intimacy seems to have encouraged an exaggerated sense of etiquette. Greetings, even with strangers, are extravagantly intimate. Ask a cop for directions, and you have to shake his hand first; go into a pharmacy to buy some aspirin, and you must first touch palms with the pharmacist.

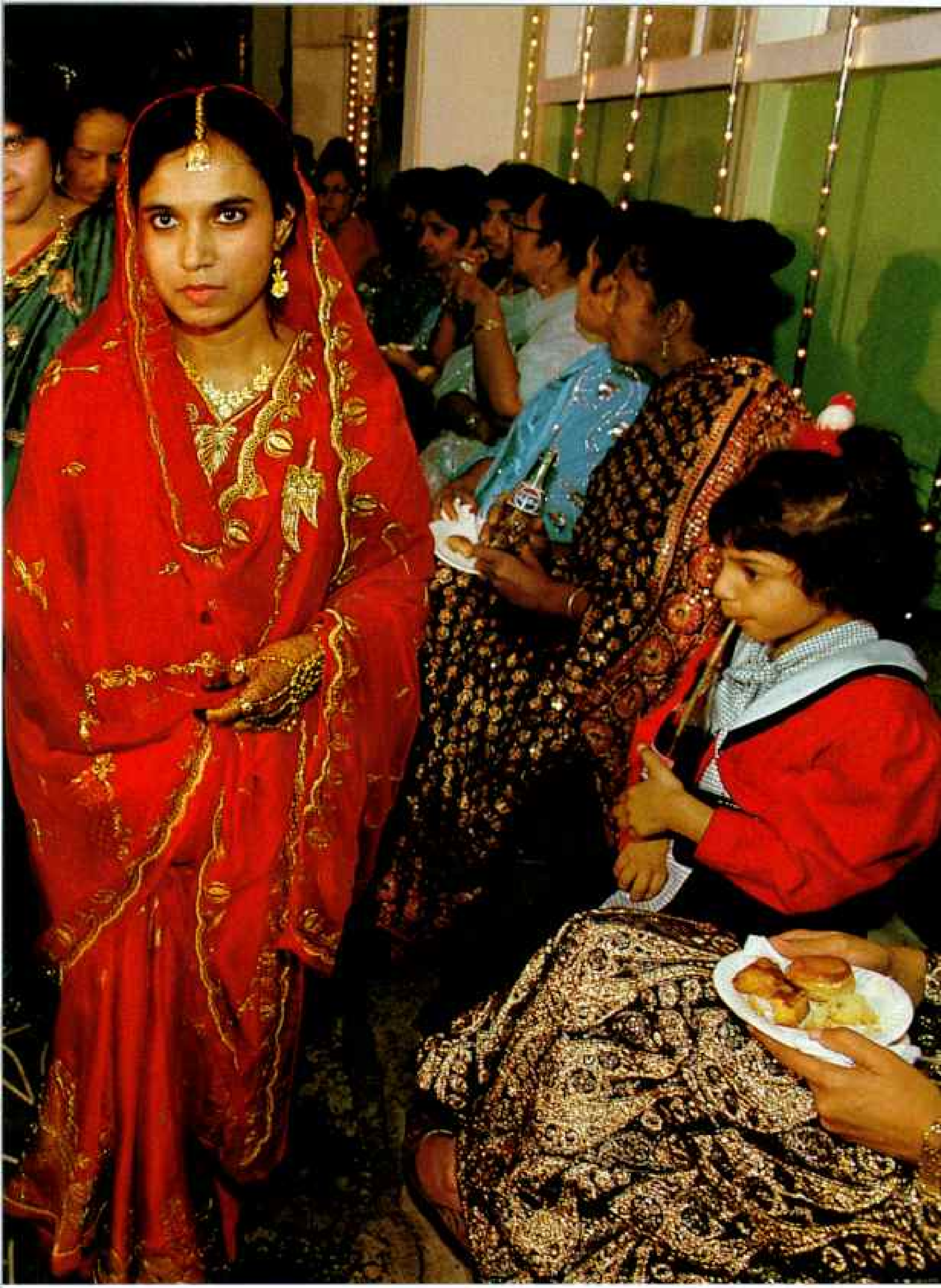
THE MAURITIANS' OBSESSION with etiquette might also explain their commitment to the democratic process, for of all the African countries to gain independence in the 1960s, Mauritius is the only nation with an uninterrupted history of democracy. Rampersad Mookesh, foreman at a sugar estate and a candidate in the nationwide village elections last August, explained, "Mauritians are democratic by nature. There exists a certain feeling of *laisser-aller* here, a sense of live and let live. Mauritians respect one another, and when a man respects another, he allows that man's voice to be heard."

I met up with Rampersad in the village of Laventure to hear the voices of politicians. A decrepit car with elephant flags fluttering from its hood inched through the streets. Indian film songs blared from speakers affixed to the roof, and on the back window a banner read: *"Votez 12 éléphants!"* An informal procession of villagers followed the car to the town hall, where a dozen chairs had been set in a row for the candidates for the village council.

These 12 men called themselves the elephants so that people who couldn't read would remember to vote for them. They had invited their 12 opponents, the "lamps," to a debate, but they hadn't shown up. This pleased the elephants no end because, as Rampersad told me, "It just goes to show that the incumbent lamps are a bunch of shiftless incompetents."

One by one the candidates rose and spoke into a microphone. Speaking in a mixture of Creole, French, and an Indian dialect known as Bhojpuri, they lobbed biting personal attacks at their absent opponents and offered such stirring slogans as "Vote for the elephants! The lamps have no light!" One candidate raised his arms with a flourish, shouting, "Together we can raise the elephants!" as the audience roared with approval.

Resplendent in a scarlet garara and with henna-stained hands, Aktar Bibi Hamod welcomes well-wishers to the traditional Muslim mendhi celebration the night before her wedding. Families of the betrothed exchange gifts



and hurl playful insults at each other, feast on the rice dish biryani, *and sing late into the night. The merriment increases the next day, as nearly a thousand guests jam into two separate halls for the reception.*

MAURITIAN INDIANS monopolize all levels of politics, and I wondered if Indian culture permeated other aspects of life on the island. I had an opportunity to find out when a young Hindu dressed in Paris street fashions invited me to his cousin's wedding. I had been to numerous weddings in India, but this was unlike any Indian wedding I had seen.

A Hindu priest dressed in white performed the ceremony while squatting on a stage. The groom, wearing a Nehru coat and turban, and the bride, in a red silk sari, walked three times around the priest.

That afternoon we waited silently in a large rented hall for the bride and groom, who had changed into a puffy white wedding dress and a powder blue tuxedo. The Madonna song "Like a Virgin" blared from a loudspeaker, and grumpy adolescent cousins of the bride passed around plastic cups of ice cream.

And then they started serving rum. The affair, called "le cocktail party," lasted until 3 a.m. By midnight my friend and all his friends were dancing wildly and singing along to British and French dance tunes.

Shouting above the raucous crowd, I asked him if traditional week-long Indian weddings were ever held in Mauritius.

He laughed and, handing me a glass of rum, said, "Oh no. Mauritius is a modern country. We prefer to do things the modern way."

By modern, my friend meant European. Yet I found it odd that in a country where 98 percent of the population claims ancestors from continents other than Europe, European culture remains the hardiest. Some argue that this is because of the island's colonial history: Before the Dutch settled in 1638, no one lived here.

The Dutch abandoned Mauritius in 1710, and the French moved in five years later, eventually setting up a successful sugar colony. During the Napoleonic Wars, Mauritian corsairs routinely attacked and looted British merchant ships on their way to or from India by way of the Cape of Good Hope. This annoyed the British, so in 1810 a British fleet forced the islanders to surrender.

A variety of creeds and calendars means the New Year is feted several times. An Indian father hoists his daughter at February's Chinese parade; seven months later, a Muslim holy man marks the end of Muharram by running a sword across his lips. Islanders use Creole for daily communication across ethnic lines and French and English in formal conversation.

Hanging out in the Black River district, young Creoles—whose forebears were imported as sugar-plantation slaves—face life at the bottom of the country's socioeconomic pyramid. Other Mauritians are more likely to profit from the country's next economic wave, which may crest with opportunities in offshore banking—a chance for the island to solidify its place among Africa's most prosperous nations.

But the British made generous terms with the French. According to the capitulation agreement, called the Treaty of Paris, the Roman Catholic Church would be safeguarded; the French plantocracy could retain all its privileges; and the French language would coexist with English. The British did, however, manage to leave their own legacy, most notably a parliamentary democracy.

In many ways Mauritius's connection with Europe has been a boon. But in other ways the island's affinity for things European has alienated Mauritians of non-European descent from their cultural past. By all appearances Indian culture seems to be thriving, yet, in truth, few Indians retain much connection with the land of their ancestors.

Grand Bassin, a lake in the southern hills, is a holy place for Mauritian Hindus, who believe that when the god Siva went to India to create the world, he let some of the water of the Ganges spill here. Once a year pious Hindus make a pilgrimage to the sacred lake. Even on an off day, when the sky was gray and the winds damp, I saw several women kneel at the paved edges of the lake and launch leaves bearing candles, flowers, and incense into the water.

Raju, a young man I met near Grand Bassin, told me he liked to go there on his days off from work at a T-shirt factory. I mentioned that I had lived in India. "Do you have any friends there?" Raju asked with interest.

"I have some," I replied.

He paused and hesitantly asked, "Could you give me their addresses so that I can write to them? I doubt I'll ever have the chance to go to India. But I'd like it very much if I had some people there who could write to me and tell me what it's like."

I wrote down a few addresses for him and asked where in India his family was from. He looked a little embarrassed and said, "I don't know. My family has been here a long, long time. Maybe a hundred years."

Like Raju, most Mauritian Indians have no idea where their families came from because they are descended from the 450,000 indentured laborers that French sugar barons brought to the island between 1836 and 1910. Slavery was abolished in 1835, when Mauritius's slave owners were paid an indemnity by the British government for freeing 66,000 slaves. The following year, the sugar barons, desperate for a fresh source of labor, began to import field workers from India.

But the Indians' circumstances were not much different from those of the African slaves they replaced. They were paid five rupees (about a dollar) a month, and the planters deducted heavy penalties from these low wages for any missed days of work.

ONE SUNDAY at Mont Choisy, a beach town in the north, a crowd of mostly Creoles sprawled across the blondish sands. Families picnicked on baguettes and rum; shrieking children waged netless games of badminton; young men gathered beneath the shade of palms and played *séga*, the calypso-like Mauritian music, with drums, flutes, and guitars.

Farther along the beach a stage had been erected and another band was offering a more formal séga concert, the kind tourists can hear in the big luxury hotels, with electric guitars and dancing girls in sequined costumes. I listened for a while but soon was drawn back to the other part of the beach, where women swayed to the séga from the tape decks in their vans, and men with more traditional drums and guitars sang for their friends.

A shirtless man from the chorus approached me with a large brown bottle of beer. He offered a swig from the bottle, which was warm and had lost its label.

"You like séga?" he asked.

I nodded and handed the bottle back.

Grinning at me with ruined teeth, he said, "Well, you should listen closely to the old man singing now, because his is the old style of séga—the way Mauritians used to sing it during the days of slavery, when séga was a form of protest and not a tourist extravaganza."

We listened to the old man singing in a Creole so removed from French that I understood very little of it. My companion, however, was very moved by the song: He shut his eyes, tossed his head back, and began to shift

his feet with lethargic elegance in the sand.

He opened his eyes and told me, "Séga is not just our music. It is our African culture. But we are losing the true music, and this is a sad thing. A people's culture is its soul, and without a soul how can a people go forward? For a country to be great it must keep its culture."

Naturally, some Mauritians have found ways to profit from such nostalgia. For a fee, a black man in a straw hat will take you in a horse and buggy to watch sugar being made the way it was 200 years ago. Inside the colonial sugar mill, you can peer at an ox walking in a circle, turning a set of grinding stones that are fed stalks of sugarcane by an Indian in a period costume. Before you leave, you're treated to a swallow of rum made the way it was in the days of the French, offered in a cognac glass by a beautiful Indian girl dressed in what looks like a stewardess's outfit.

"It's absurd," an Indian woman in a field of sugarcane told me, as she gestured with a fierce-looking machete. The sun had just risen, and small orange fires glowed all around us in the pink dawn. It was August, midseason for harvesting sugarcane. The woman knew of the colonial theme park, but she had never been there. "If tourists want to see how sugar is made," she said, "they don't have to go to that place to see it."

She whacked at the thick stalks of cane with her machete. Like many sugar workers, she started her day at 4:30 a.m. and worked until 10 a.m. or so.

I asked her why the harvesting hadn't been mechanized, and she laughed and pointed to a nearby pyramid of volcanic rock about 20 feet tall. The fields were filled with them.

"The sugar barons talk about mechanizing," the woman said. "And they're starting to take all the rocks away, so the machines can come in. They say they'll save money."

She started to bundle up the cane, her small hands protected from the razor-sharp leaves by thick gloves. "I guess things will change then," she said sadly. "They won't need me, I suppose. But then maybe I can get a job handing out glasses of rum to the tourists."

FEW MAURITIANS REALIZE that not all the islanders live in a paradise, but Sarojni Jugnauth is one. Dressed in a cotton sari, she greeted me at the door of a modest bungalow on the beach. Stepping inside, I nodded to a man in his shirtsleeves, who was eating breakfast and reading the paper. Jugnauth, who is a teacher, poured me a cup of coffee, and I told her how extraordinary I found Mauritians' commitment to education. She replied, "Well, yes, but just because 60 to 70 percent of our children are passing at the primary level doesn't mean that we should be satisfied. We have to keep up with Western academic standards."

She turned to the man behind the newspaper to ask what he thought. That man, Mauritius's prime minister, is responsible for his country's economic miracle. Wiping his mouth with a paper napkin, Sir Anerood Jugnauth said, "Yes, of course, we must provide better services, better education. But to do all this, we must have the means. Now we must create those means."

There is a lot of heady talk in Mauritius these days about turning the country into another Singapore. Prime Minister Jugnauth, for one, believes that Mauritius can become an entrepôt between Africa and Southeast Asia and is trying to establish his country as a regional headquarters for multinational companies as well as offshore banking and financial services. It may take a long time. Sub-Saharan Africa's share of world trade is only about 3 percent, and the economy of the Republic of South Africa is likely to remain sluggish for the next several years. And the offshore banking scheme is off to a slow start; Africans with money still prefer to bank in Europe.

Philip Ah Chuen, a wealthy Mauritian entrepreneur, had plenty to say about Mauritius's prospects for the future when I called on him at his office in the capital.

We talked about Singapore and discussed figures. After a while, Ah Chuen said, "I want to show you something."

He took me to a corner of the room to see a painting of a storefront on what looked like a Port Louis street. "I keep this here to remind me," he said. "This is a painting of my grandfather's shop. My grandfather came here from China as a coolie. He worked, and he saved, and eventually he opened this shop. This is where I grew up."

He put his hand on my shoulder. "I want this picture to remind you of something too. Every Mauritian—and I mean every Mauritian, not just the Chinese—came here, a dot in the middle of the Indian Ocean, and survived. If I were you, I wouldn't worry about Mauritius's future. Survival is in our genes." □

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Ergonomically Designed Instrument Panel With Column-Mounted Shift.

New this year are optional integrated child safety seats that actually incorporate a 5-point

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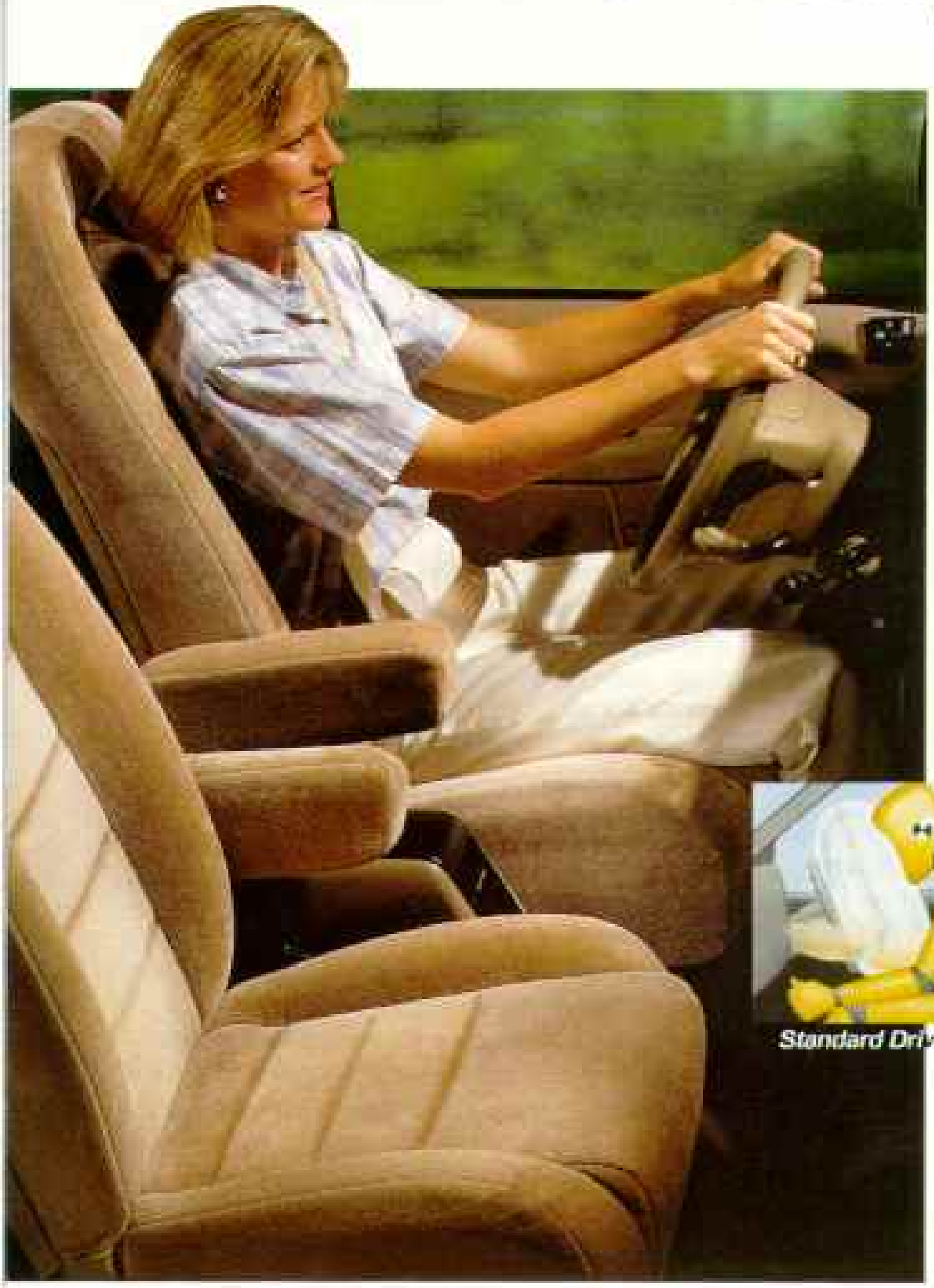

belt system.** There's a driver air bag to supplement lap and shoulder restraints.† Every outer seat has a 3-point safety belt. Rear anti-lock brakes also come standard. And you can even have your Aerostar equipped with available electronic "full-time" four-wheel drive for added traction and control.

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*When properly equipped.
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†Air bag effectiveness depends on wearing your safety belt, so always buckle up.

Forum

Route 93

I have read the GEOGRAPHIC for 20 years and never been so touched as by your December story. An article that provides both solid geographic information and poignant emotional recollections is rare. It proves that geography is the means by which we learn of the places where people and animals live out very interesting lives.

DEBORAH L. E. GREEN
Grosse Ile, Michigan

I own a small sheep ranch in Big Arm, Montana; Highway 93 passes right by my place. It is the kind of highway that will bring back memories and make you want to go see friends you haven't seen in a while. It is a great road, and I will always love it. It is the essence of America.

ASIA WHITING
Big Arm, Montana

I judge the subject matter—the ever changing face of America—very worthy of inclusion in the Society's agenda. And I recognize Michael Parfit's skills: He writes well and interestingly. But I am disturbed to find this journal giving space to a chatty, folksy, highly personalized recital.

NELSON OHMART
Hanson, Massachusetts

Your readers might like to know that the ditty quoted on page 48 is from a full-fledged eight-stanza poem by Badger Clark. Clark's poetry became popular in the decade of 1910-1920, when he was nationally known as the "Cowboy Poet." Our society sells *Sun and Saddle Leather* and other books of his poetry; proceeds are used to maintain Clark's cabin homes in Custer State Park. One thing Parfit obviously has in common with Clark is an appreciation of his fellow man and the Western scene.

JESSIE Y. SUNDSTROM
Badger Clark Memorial Society
Custer, South Dakota

I drove up 93 from Phoenix to Las Vegas last October, and in my judgment the most significant features of the route are the hundreds of small white crosses along the roadsides. Each marks the location of a traffic fatality, dramatizing the dangers of the route.

JAMES W. BENEDICT
Sequim, Washington

Volcanoes

Your feature was fascinating for its insight into the driving forces behind volcanic action but frustrating for the lack of information about the theoretical effect of gas emissions on the ozone layer. Charts showing the extent of the Southern Hemisphere ozone hole overlook the fact that Mount Erebus is located below the center. Given the volume and variety of gas emissions from an active volcano, one cannot help wondering whether ozone depletion is not attributable to natural causes rather than to the widespread use of CFC propellants and refrigerating gas.

ROBERT ROBINSON
Crawley, Western Australia

If volcanic emissions created ozone holes, the atmosphere would be riddled with openings above the more than 500 active volcanoes in the world.

The prisoner who survived the 1902 Pelée eruption was not "safely" imprisoned in his cell. Auguste Ciparis (1877-1929) was indeed saved by the robust construction of his jail cell, but he was severely burned. Due to be hanged for murder, he was reprieved but spent the rest of his life as a circus sideshow attraction, billed as the "Prisoner of St. Pierre."

ROBERT DUFFY
Hacketstown, Ireland

As newcomers to the Big Island of Hawaii in 1953, my wife and I eagerly climbed onto cooling lava cutting across a well-traveled road near Kilauea. A Hawaiian nearby shouted "Madame Pele no like." Disregarding his warning, we danced around on the smooth *pāhoehoe* and rough *'a 'ā*—very exciting. That night our lungs were on fire, aching from the fumes. We now have great respect for the Hawaiian goddess of the volcano.

REVEREND DAVID M. PAISLEY
Camarillo, California

Milan

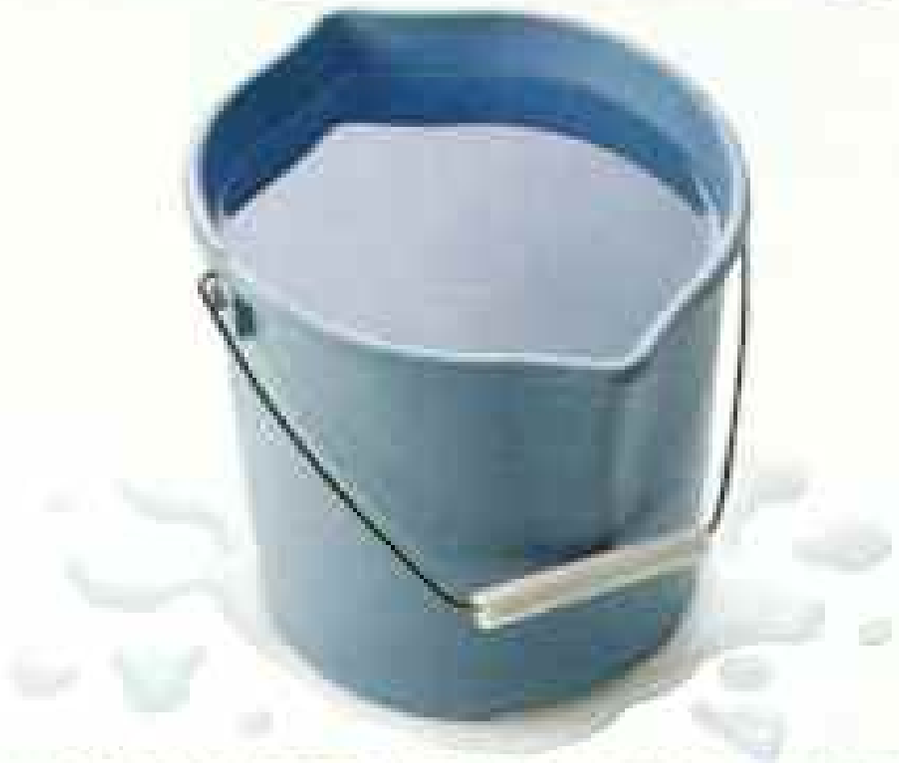
As a northern Italian, I appreciated your discussion of this wonder city. As a Milanese, I would have mentioned the golden statue of the Madonna atop the duomo as the real symbol of Milan.

PIER GIORGIO BERTOTTO
Biella, Italy

I am a high school student of Italian origin, who has had the opportunity to spend my summers in Italy and become well acquainted with the people and political system. Describing the leader of the Lombard League, Umberto Bossi, as "raucous" did not, in my opinion, fully describe the man, nor did the article depict his party's ideology. The party is racist. Bossi has threatened to mobilize northern Italy in an attempt to secede from the rest of the country if he does not get his way.

Milan and Rome must act together as one to find

ONE GALLON PER SECOND.



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*Which awards? *Popular Science*, 1991 Best of What's New; *Popular Mechanics*, 1992 Design & Engineering Award; *Fortune*, 1992 Product of the Year; Industrial Designers Society of America, Gold Industrial Design Excellence IDEA Award; *Discover*, Discover Award for Technological Innovation.

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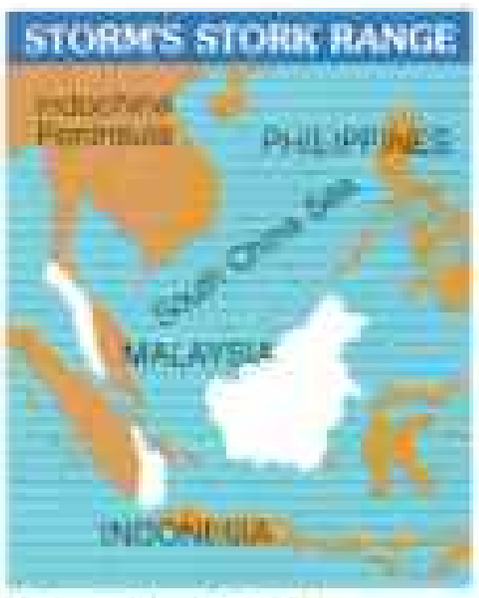
GOODYEAR

WILDLIFE AS CANON SEES IT



Storm's Stork
Genus: *Ciconia*
Species: *stormi*
Adult size:
Stands 85 cm tall
Adult weight:
Approx. 1.5–2 kg
Habitat: Lowland forests in Southeast Asia
Surviving number:
Unknown
Photographed by
F. Danielsen &
R. Kadarisman

A pair of Storm's storks tend to their young at one of the few known nest sites of this species. The parents build a platform of branches lined with leaves near a river or a swamp. Several times a day they bring fish to the nestlings, and then sleep in or near the nest at night. This solitary bird needs protected areas to survive the destruction of its forest habitat and also hunting. To save endangered species, it is essential to protect their habitats and understand the vital role of each species within the earth's ecosystems. Photography, both as a scientific research tool and as a means of communication, can help promote a greater awareness and understanding of the Storm's stork and our entire wildlife heritage.

a common solution to the many problems that plague the nation, if Italy is to continue being a dominant force in Europe.

ANTONIO MORENA
Maspeth, New York

I disagree with the way you presented the Lombard League. What we ask is to transform Italy into a federal republic and have our economic independence from Rome. I mean independence for everyone who contributed to the prosperity of this region, including southern people who have spent their lives working here. We just want to keep most of our money for us. Is this racism?

EMANUELE POGGI
Milan, Italy

Map of Europe

Even in Munich it is not easy to get such an up-to-date map. Unfortunately, since yesterday [January 1, 1993], when the Czech-Slovak separation became official, your wonderful map has to be redrawn again! Political stability is a fragile phantom.

RAINER PÜRKNER and GERHILD SCHULZE
Munich, Germany

The map alone is worth the membership fee for the whole year.

ALFRED SCHWARZ
Düsseldorf, Germany

We notice the omission of Turkey from the list of countries in the new Europe. Turkey is a founding member of the European Council, an associate member of the European Community and of the Western European Union. Your inclusion of Russia makes this omission more notable, since Turkey also straddles Europe and Asia.

AYDIN SAHINBAS
Minister-Counselor, Turkish Embassy
Washington, D. C.

Geographers traditionally put Turkey in Asia because the bulk of the nation lies in that continent.

The map shows the former Yugoslav republic of Macedonia as an independent state under the name "Macedonia." This is the only state on that map that is not recognized by the United Nations, the European Community, and the U. S., because neighboring Greece claims the name and the coat of arms of Macedonia as Greek national historic symbols. You should add a special note about that.

GEORGE CHRISTOFORIDIS
Kirkland, Washington

I congratulate you on recognizing Macedonia as a separate country. I speak the various languages of the region and have spent over 20 years studying published sources and researching in Macedonia. Greek objections to the Macedonians' use of the name are unjustified. Names change over time. Regardless of what language the ancient Macedonians spoke, the name now is used by a Slavic-speaking people. Given that Luxembourg serves as the name of both an independent country and a province of Belgium without fears of territorial pretensions, why should Macedonia be denied the same status as both an independent country and a part of Greece?

VICTOR A. FRIEDMAN
Chair, Department of Slavic Languages
University of North Carolina, Chapel Hill

Gatekeepers of the Himalaya

As a Nepalese Sherpa studying in the U. S., I am pleased to see this article. Many Westerners still think that "Sherpa" refers only to those who assist climbers in the Himalaya rather than to one of many peoples living in eastern Nepal beneath the world's highest peaks. Tourism has improved our standard of living but has also brought negative impact. The litter was not created by Sherpas but by tourists.

NIMA WANGCHU SHERPA
Bozeman, Montana

Whale Sharks

As Shell Oil employees on an offshore platform in the Gulf of Mexico, we are continuously exposed to a wide range of fish and mammals. As impressive as the vast schools of lings, jack crevalles, barracuda, porpoises, and other animals are, none compare to a solitary whale shark as it circles the platform. Sightings are becoming increasingly common. As many as four have been sighted at once at the ST 295 platform. Your article has increased our knowledge of their feeding and migratory habits.

VERNON OVERTURF
ST 300, off Louisiana

Eugenie Clark's article noted that whale sharks are protected at Ningaloo Reef, Western Australia's biggest marine park. True, a management plan was approved by the W.A. Parliament in 1988, but it was never implemented. My wife and I spent much of the past year trying to persuade the W.A. government to limit whale shark harassment by tourist boats in the park. Proposed regulations indicate the intention to prohibit tourists from touching and riding whale sharks. Dr. Clark's evident enthusiasm for whale shark riding and the inclusion of two photographs showing this practice were unfortunate because they encourage others to handle marine wildlife.

HOWARD A. LATIN
Rutgers University School of Law
Newark, New Jersey

Letters should be addressed to 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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CHRYSLER
Plymouth

Geographica

The Nation "Poses" for an Aerial Portrait

If you live in the continental United States or Hawaii, look skyward and smile. Someone 20,000 feet up may be taking your picture.

Actually, you won't be visible in the startlingly detailed images produced by the National Aerial Photography Program (NAPP). But your house will, and so will your barn and your street. For example, this color infrared view of Antioch, California, clearly profiles a bridge crossing the San Joaquin River. Such images cover 33 square miles, with areas of growing vegetation appearing red and dormant growth dark brown.

The views will help government agencies and private planners with erosion studies, topographic mapping, water-quality analysis, storm-damage assessment, and other research.

Managed by the U. S. Geological Survey and jointly funded by several federal agencies and states, the program began in 1987 to photograph the U. S. landmass at a uniform scale with six-inch-focal-length cameras. When it ended last year, another five-year series of flyovers began, to provide a continually updated view of the United States.

NATIONAL AERIAL PHOTOGRAPHY PROGRAM, COURTESY USGS

Bacteria Survive—in Mastodon's Stomach

The mastodon was munching away at the edge of a lake near Newark, Ohio, just before he died. Humans apparently butchered him and stored the meat and bones in the lake, now a chilly bog. There they lay until 1989, when a golf course construction crew, creating a water hazard, found the collection of bones.

Further investigation produced an array of unexpected results. Most amazing—"almost like science fiction," says one scientist—was the discovery of bacteria in the mastodon's gut. When Gerald Goldstein, an Ohio Wesleyan University microbiologist, cultured the bacteria, they began to grow. They had survived in the oxygen-free bog for 11,600 years, according to carbon dating of the bones. The butchering marks and the separated bones—signs of human activity—are evidence that humans preyed upon mastodons in North America, says Bradley Lepper of the Ohio Historical Society, leader of the investigation.

The intestines also contained the mastodon's last meal, according to Dee Anne Wymer of Bloomsburg University in Pennsylvania, an expert on ancient plants. Mastodons are known to have eaten spruce branches, but this one had devoured water lilies, pondweed, and swamp grasses. "That's a very rich, nutritious diet," Wymer says. "This guy was focusing on yummy stuff."

STEVE KIRK, DISCOVER MAGAZINE

TO PROVE THE NEW JENN-AIR WALL OVENS HAVE LARGER INTERIORS, WE CONSULTED THIS PANEL OF EXPERTS.

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Geographica

Dehorning Rhinos to Give Them a Future

Alarmed by continued poaching of rhinoceroses, whose horns are valued in the Far East for purported medicinal qualities and in the Middle East for dagger handles, wildlife officials in Namibia and Zimbabwe are sawing off and storing the horns of tranquilized live rhinos. Some 500 have lost their horns, which grow back at a rate of several inches a year. Poachers have gotten the word: Few dehorned rhinos have been shot since the program began in 1989.

NATIONAL GEOGRAPHIC reported in March 1984 that the number of African rhinos had dipped below 20,000. The continuing slaughter has sent the total plummeting to an estimated 8,200 today. Zimbabwe's black rhinos "have been taking a major hammering," says Richard Emslie, an Africa-based rhino researcher. They now number 430, down from more than 1,500.

Rhinos seem to get along well without horns, but long-term effects are unknown, says Joel Berger of the University of Nevada at Reno, who is studying the mammoth beasts in Namibia with a National Geographic Society grant.

MICHEL GUNTHER, WORLD WIDE FUND PHOTO LIBRARY

Climate, Microorganisms Color Acropolis Marble

For years air pollution was blamed for the deterioration of ancient marble monuments of Greece and Rome. But German scientist Wolfgang Krumbein says the true enemies are microorganisms like algae, lichens, and fungi, whose growth ebbs and flows as the climate changes.

Hot, dry weather prevailed in the mid-19th century, when this view of the Acropolis of Athens (below) was painted. That favored the growth of lichens, whose excrement produced the reddish patina, says Krumbein, a geomicrobiologist and member of UNESCO's Acropolis advisory group. By the end of the century, algae and fungi grew rapidly in a cool, damp climate, turning the monument blackish green.

In recent decades, as the region's weather became more variable, the microorganisms burrowed beneath the surface, says Krumbein, making the Acropolis—though almost pure white—vulnerable to destruction from within. Krumbein is seeking ways to kill the organisms without damaging the marble.

BRIDGEMAN ART LIBRARY

Off Israel, a Mystery Ship From 400 B.C.

Likely on her maiden voyage, a merchant ship sank in the Mediterranean Sea around 400 B.C. off the coast of what is now Israel. She carried an unusual one-armed anchor but little cargo other than personal effects—violin-shaped wood boxes, ceramic goods, and a collection of woodworking tools. The most important thing about the discovery, though, is the ship itself, one of the best preserved

DANNY SYON

wooden-hulled vessels of the time.

Divers found her in less than six feet of water near Kibbutz Maagan Michael, about 20 miles south of Haifa, in 1985. Since recovering the remains, including 40 feet of hull, the excavators have been trying to determine where she sailed from. Stone ballast and pottery may indicate Greek or Phoenician origin.

There was irony in the find for Elisha Linder of the University of Haifa, who led the excavation. "I had just returned from Sardinia, where I was looking for Phoenician ships, when this ship was discovered at the doorstep of my home."

National Geographic, April 1993

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Geographica

Beware the Pitohui, Bird With a Poisonous Streak

A hooded pitohui, a common New Guinea bird, scratched and pecked John Dumbacher's hand as the University of Chicago researcher freed it from a net. When he licked his wound, his mouth grew "numb and tingly." He wondered why and began a study that brought the first proof that a bird can be poisonous.

Dumbacher sent pitohui feathers, skin, and other tissues to the National Institutes of Health, where the poison was extracted, identified, and injected into mice. "The mice just keeled over," says Dumbacher. The same neurotoxin is known in only one other group of animals: poison dart frogs from Central and South America.

Research revealed that two other pitohui species also produce poison. Dumbacher wants to learn how they do so, how they keep from being affected by it, and whether they use bright colors to warn potential predators that it is dangerous to attack them.

Dumbacher had gone to New Guinea with Bruce Beehler to study birds of paradise on a National Geographic Society grant.

"Here you have one of New Guinea's better known birds, and we didn't know the most remarkable thing about it," muses Beehler.

W. S. PEDROVER, VIREO (LEFT); DAVID ROBERT AUSTEN

National Park Protection for Australia Fossil Site

They constituted a strange menagerie even by Australian standards: carnivorous kangaroos, marsupial lions, giant flightless birds, even a rabbit-size creature with huge projecting incisors and sharp cheek teeth. They all roamed a dense rain forest millions of years ago.

Now the site where their remains litter the landscape has become part of a national park. Australia's most important fossil field, 190,000-acre Riversleigh Station in the arid northwest highlands of Queensland (NATIONAL GEOGRAPHIC, January 1986) was added to Lawn Hill National Park last year as part of a major expansion of Queensland's protected reserves.

With the discovery of at least 150 new mammal species, Riversleigh is rewriting the fossil record of Australia over the past 25 million years. One scientist likened the deposits to the Rosetta stone in the way they help explain the continent's diversity and rate of evolution.

Did American Clams Sail to Europe on Viking Ships?

That American seafood favorite, the soft-shell clam, provides new support for the idea that the Vikings reached America before Columbus. Last spring, on a beach off northern Denmark, scientists found shells of *Mya arenaria*, carbon-dated as early as 1245.

They didn't get there by themselves. The clams are unable to attach themselves to other objects and exist in the free-floating larval stage for only three weeks, not long enough to be carried across the Atlantic by sluggish ocean currents. But Viking ships made brisk transatlantic voyages in as little as three weeks, says Kaj Strand Petersen of the Geological Survey of Denmark. He believes the clams arrived in Europe with returning Vikings, either as food or as larvae that hitchhiked in the bilge water or on the decks of wooden ships before burying themselves in the sandy Danish sea bottom.

—BORIS WEINTRAUB

RICHARD THOMPSON

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NAMIBIA'S SKELETON COAST

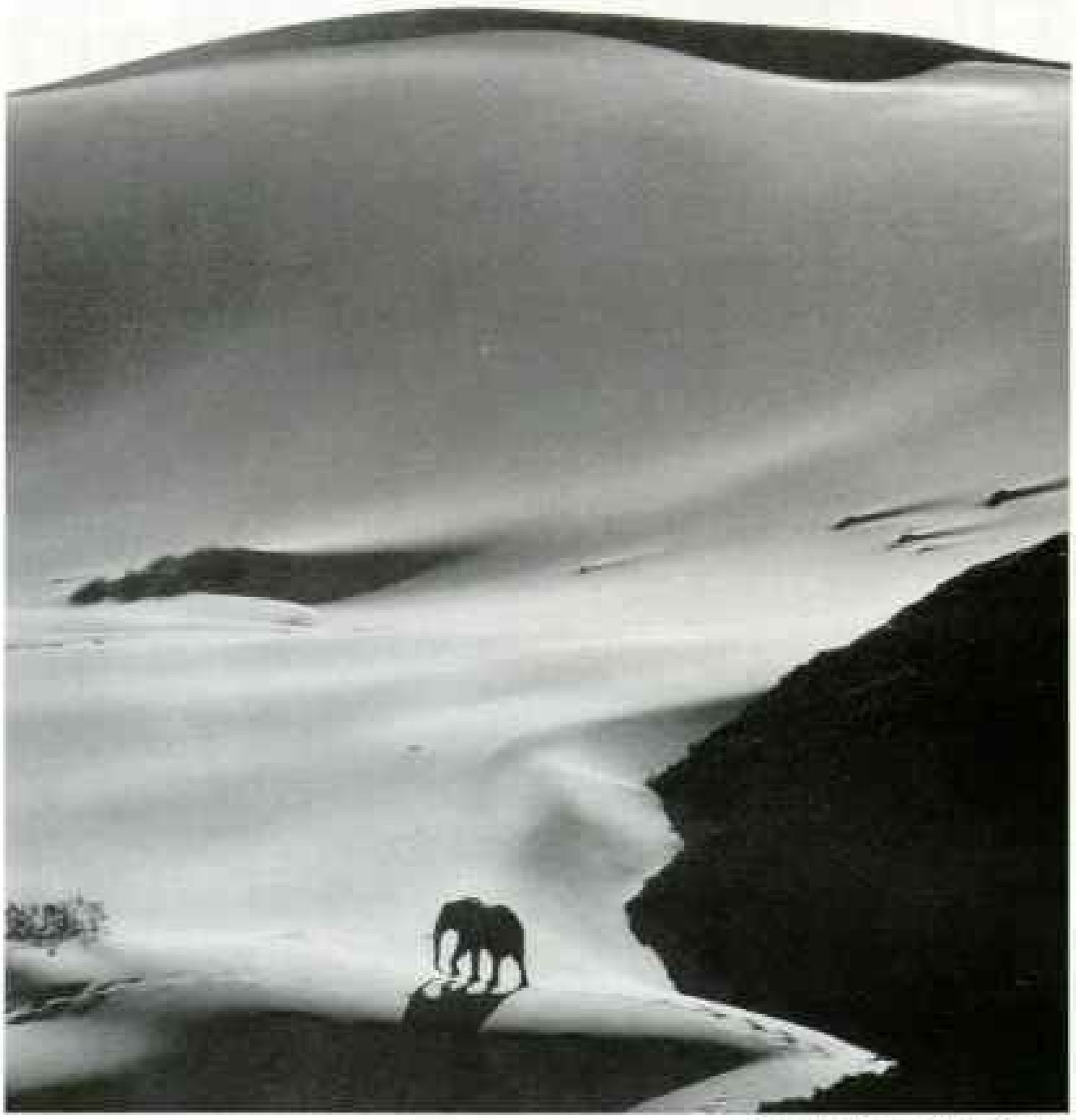

Photo by Des and Jen Bartlett

Vast. Unforgettable. Shimmering horizons.
Desert-dwelling elephants.
Magnificent wildlife struggling for survival.

These are the images of "Survivors of the Skeleton Coast," a *National Geographic* T.V. Special produced by Des and Jen Bartlett, who have already dedicated nine years of their lives to filming this amazing land.

World Wildlife Fund is working in cooperation with the Namibia Nature Foundation to protect Namibia's spectacular wildlife and wondrous landscapes. For information, write World Wildlife Fund, Department ZG32, 1250 Twenty-Fourth Street, NW, Washington, D.C. 20037.

WWF

The "Survivors of the Skeleton Coast" will air April 14, on PBS, at 8:00 p.m. EST.

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But Actually, It's The

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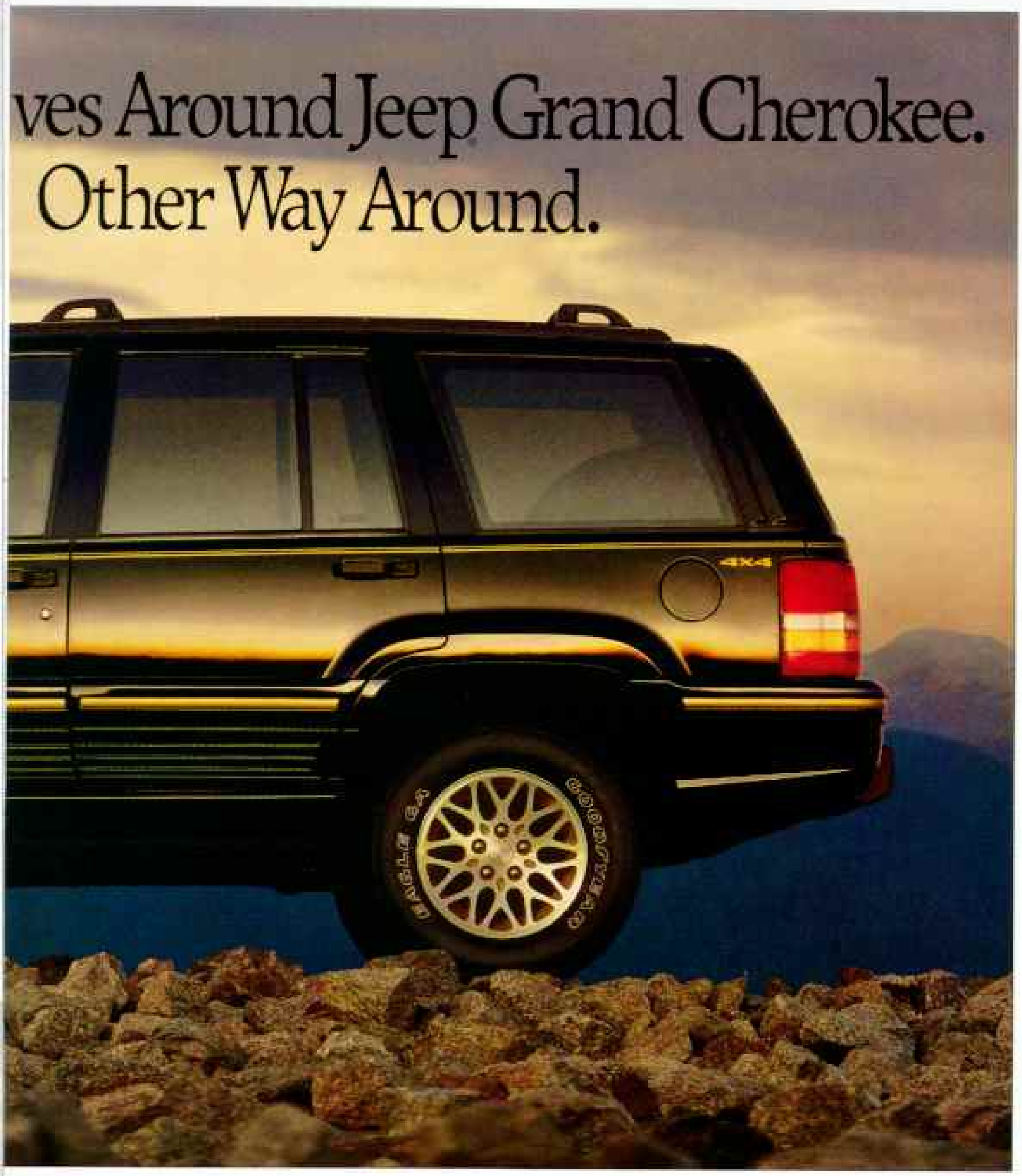

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Rivaling outer space as man's most impenetrable final frontier is the deep sea. It prohibits human access with water pressure too vast while resisting both light and electric waves with depths too great. In fact, explorers are left with acoustic waves as their only means of gathering information.

NEC and the Japan Marine Science and Technology Center have jointly developed a digital acoustic transmission system able to instantly send color images to a monitor on the water's surface from 6,500m under the sea.

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As a further safeguard, the standard driver-side air bag is set to deploy instantly in a frontal collision, supplementing the protection of your seatbelt. While the car's chassis gradually absorbs impact, cushioning the rigid passenger safety shell.

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MITSUBISHI
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The biggest concern parents can have is creating a safe environment for their children. Which is why we equipped the Previa with safety features like a roof that meets federal strength standards for cars, available anti-lock brakes and a child-protector side door lock. There's a standard driver-side air bag, too. Because when it comes to your family's safety, no detail is too small.

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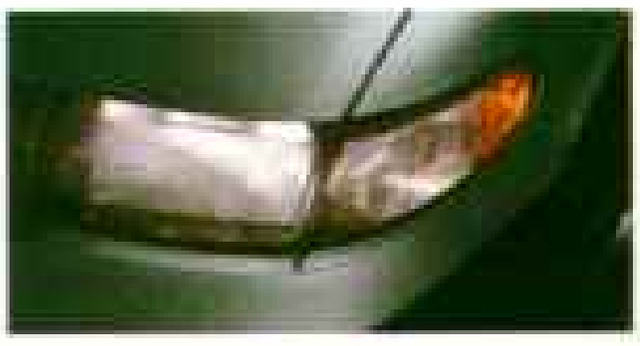
*Except models with optional privacy glass due to window tinting. Call 1-800-GO TOYOTA for a Previa brochure and location of your nearest dealer. Buckle Up! Do it for those who love you.

You hold your child's hand when she crosses the street, you won't let her climb to the top of the jungle gym and you make her wear a life preserver in the kiddie pool.

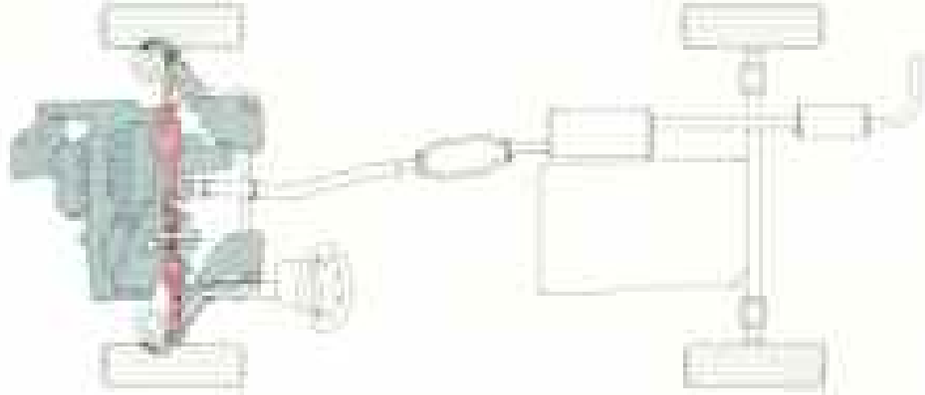
Have we got a minivan for you.

*Think of us as very over-protective parents. The Nissan® Quest™ is one of the few minivans to meet 1993 Federal passenger-car safety standards.**

We took a very level-headed approach to safety. A front stabilizer bar helps keep the Nissan Quest level during cornering or lane changes.



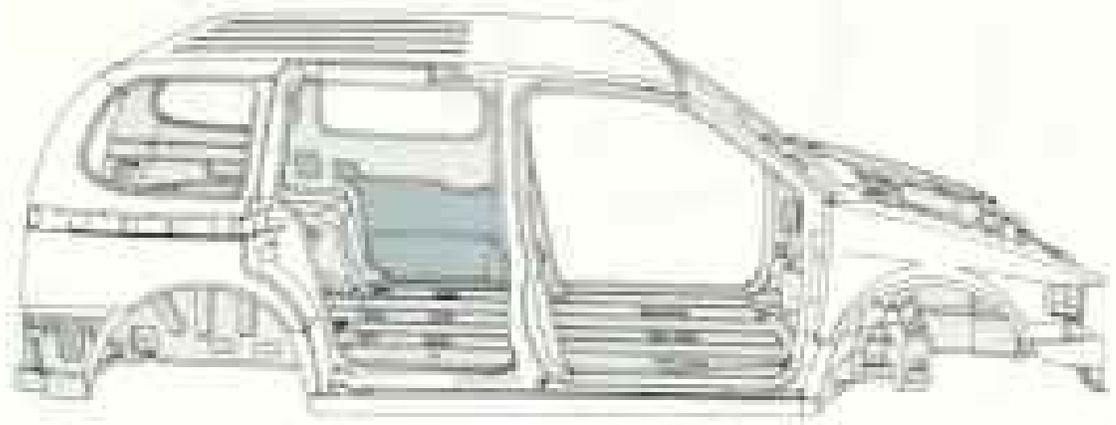
Front cornering lamps provide added side-view illumination when turning at night.



By placing the engine weight over the drive wheels, our sophisticated front-wheel drive provides added traction.

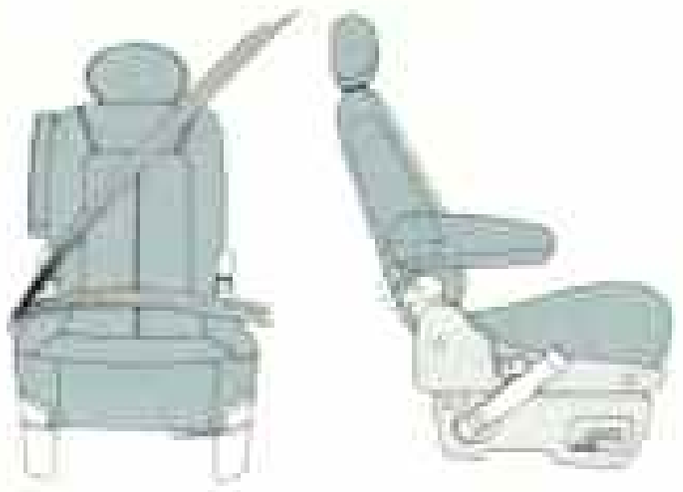
NISSAN

At Nissan we believe the more durable a car is, the safer it is. For instance, to test its durability, the Quest logged nearly one million miles.



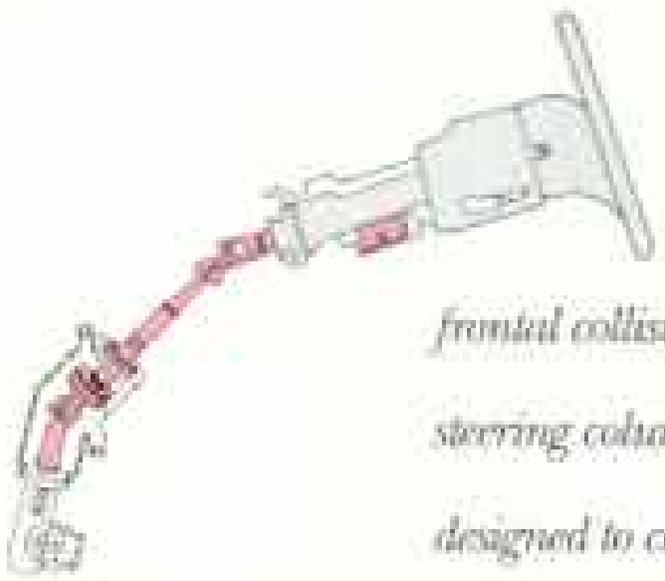
Did we mention the Nissan Quest comes with its own body guards? Steel side door guard beams provide added protection in case of a side impact. And pillar/roof reinforcements increase body rigidity.

When it comes to braking we didn't stop with our power-assisted brakes. An optional 4-wheel anti-lock braking system is also available.



To us concerns about safety are automatic, which is why we've included front automatic motorized shoulder belts. And 3-point seat belts are found in outside positions in second and third row seats.

A child safety lock has been wisely included on the sliding side door.



A few items on the Nissan Quest are actually designed to break down. In a frontal collision, the steering column is designed to collapse to help prevent it from intruding into the passenger compartment.

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On Television

Life on the Fringe: Africa's Skeleton Coast

On a perpetual trek, two bull elephants of the Namib Desert on the southwest coast of Africa trudge to the next water hole, perhaps 50 miles away.

Strange tales of desert-dwelling elephants lured Des and Jen Bartlett, veteran Australian naturalists (bottom), to Skeleton Coast Park, a 300-mile-long, 25-mile-wide strip of the Namib, one of earth's driest deserts. In this wind-whipped land of sand and gravel, they also found lions, antelope, giraffes, and ostriches.

"Survivors of the Skeleton Coast," a National Geographic Special, was produced by the Bartletts, who devoted nine years to documenting the Namib's surprising diversity. They shared their experiences in NATIONAL GEOGRAPHIC's January 1992 issue.

In this desert, sands literally roar; elephants surf down dunes; lions scavenge seals and whales stranded on isolated beaches. Sadly, the lions have been decimated, most shot by herdsmen beyond the park's narrow boundaries. Des and Jen are hopeful that the Namibian government will approve a proposed game reserve adjoining the park.

Aloft in lightweight aircraft, the Bartletts soar over the 19,000 square miles of the northern Namib. Their quarry: intimate images of desert life rarely glimpsed by others.

"Survivors of the Skeleton Coast," Special on PBS TV, April 14, 1993.

DES AND JEN BARTLETT (TOP); MARK STOUFFER

Not Your Mother's Chicken Soup

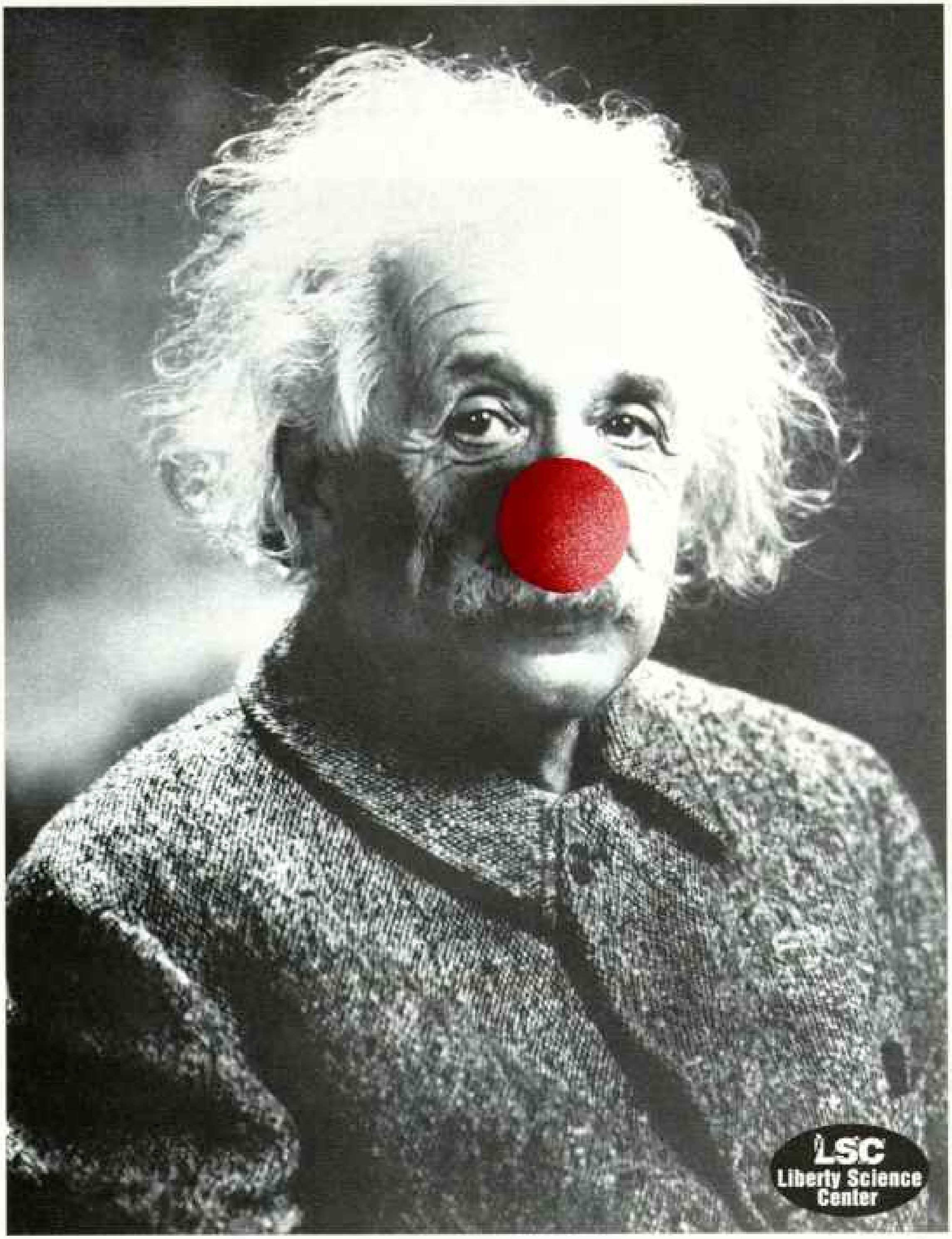
Americans make no bones about their love for *Gallus domesticus*—the broiler chicken. In 1992 we each consumed 69 pounds of them. Though poultry is both nourishing and affordable, raising and processing chickens levies steep environmental costs. Last year 30 billion gallons of water was used to prepare six billion chickens, most for U. S. supermarkets and restaurants.

The film "Fowl Water" takes an eye-opening look at the poultry industry's impact on water; it is an EXPLORER contribution to the Society's Fresh Water Initiative (President's Report, January 1993).

The fractured limestone of northwest Arkansas, a region with one of the highest concentrations of poultry producers in the U. S., allows chicken waste to leach into groundwater, polluting wells, streams, and lakes.

Film producer John Bredar, assisted by Amy Bucher, looks at solutions, such as composting to dispose of carcasses and a "marsh scrubber" method that uses plants and ponds to make putrid water clean again.

"Fowl Water" airs April 4 on EXPLORER, TBS SuperStation, 9 p.m. ET.



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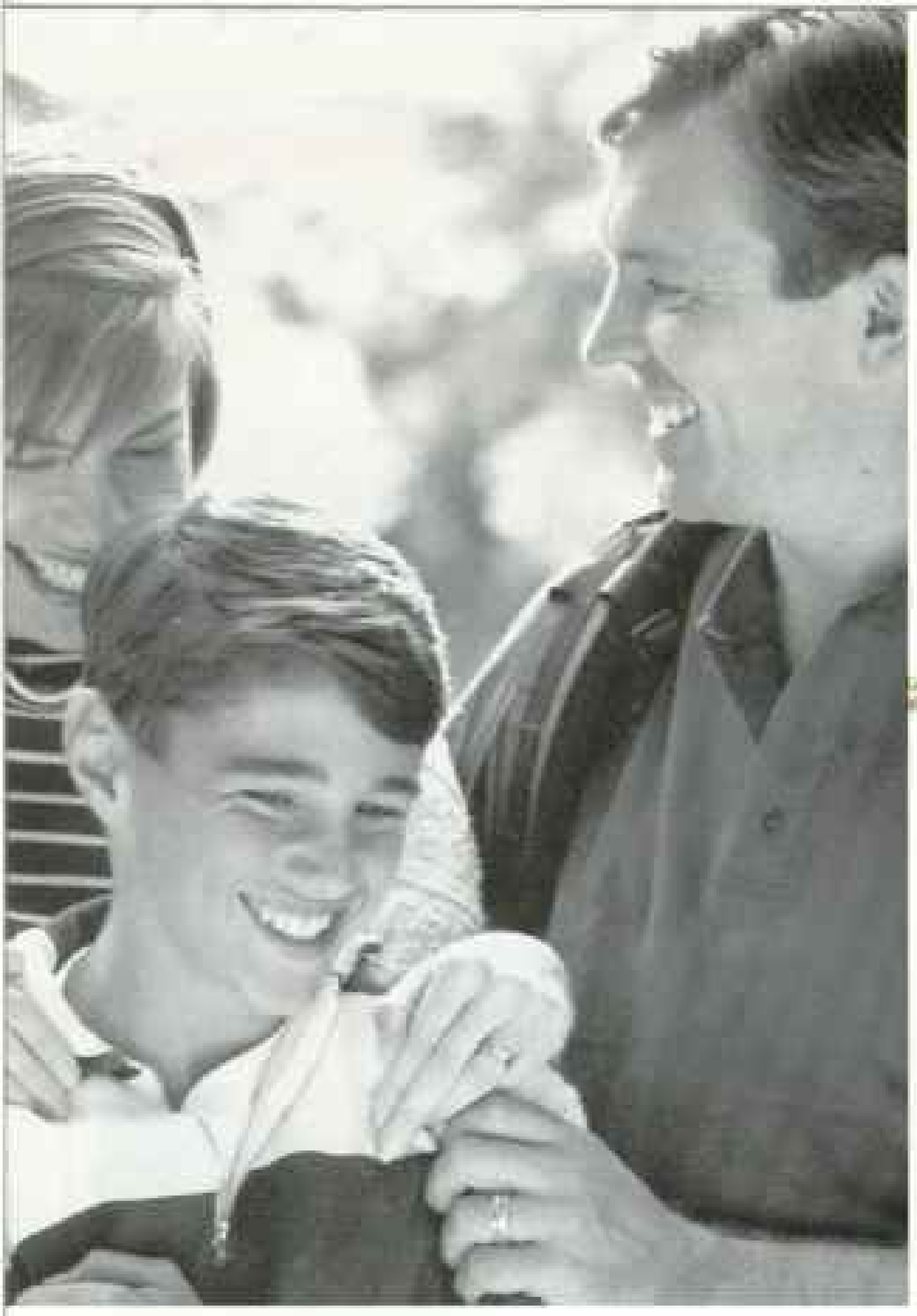

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Earth Almanac

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Why Are Frogs and Toads Knee-deep in Trouble?

The sleepy croaking of pond music is growing faint. Frogs and their kin are mysteriously vanishing, and scientists suspect human alteration of ecosystems is partly responsible. On five continents 19 countries have found massive die-offs among amphibians.

"Frogs are good indicators of environmental change. With highly permeable skin, they are very susceptible to toxic substances on land and in water," says James Vial, international coordinator of the Declining Amphibian Populations Task Force.

Costa Rica's golden toads once gathered to mate en masse (above) but have not been seen since 1989. Decreasing rainfall may be a factor.

Discovered in 1973, one of two species of Australian gastric brooding frog vanished seven years later; the other disappeared in 1985. The female swallowed her fertilized eggs and incubated them in her stomach until the froglets hopped out (far right). While brooding, she stopped producing stomach acid—an ability that interests ulcer researchers.

MYLA ARDERSBERG, DOUG WECHSLER, ANIMALS ANIMALS

Its numbers plunging, the northern leopard frog (bottom left) suffers as wetlands are drained in North American prairies. Habitat loss threatens the Pine Barrens tree frog (left) in New Jersey.

Scientists are examining suspected causes. With support from

ANNA PIPERNO, S. DALTON, OXFORD SCIENTIFIC FILMS

RHACOPHORUS SILUS, M. J. TYLER, AUSTRALASIAN NATURE TRANSPARENCIES

the National Geographic Society, Andrew Blaustein of Oregon State University is investigating whether increased ultraviolet radiation due to ozone depletion is killing western toads in the Cascade Range. Last year he found 2.5 million eggs; 95 percent of the embryos were dead.

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Earth Almanac

Root of a Dispute, Oilseed Fuels Cleaner Engines

Verbal pitchforks flew across the Atlantic last year when European and U. S. farmers nearly went to war over golden fields of the rape plant, one of several crops collectively called oilseed. American soybean growers charged that they were losing two billion dollars a year in exports because European governments heavily subsidize oilseed, whose products compete with those made from American soybeans. A November compromise limited the amount of land planted in subsidized oilseed.

The plants yield oil used in making detergents and lubricants; when treated, rape also produces an environmentally friendly fuel known as rape methyl ester (RME). It serves as a clean alternative to diesel fuel and is now powering buses, taxis, and tractors in Britain, Austria, Italy, France, and Germany. "It produces almost no sulfur dioxide, so it's gone off with a bang in the dirtiest cities," says David Koch of Novamont, a major maker of RME. The fuel is costlier to produce than diesel, however. It also serves as a heating fuel, warming such expansive buildings as Milan's La Scala.

ROBERT HARDING PICTURE LIBRARY

MICHAEL FREEMAN

Hands-on Approach to India's Rat Problem

Some Indians are so fed up with the army of rodents that is eating them out of house and home that they're turning the tables on the beady-eyed pests and having them for dinner.

India's 900 million people could survive for several months on the annual toll taken by bandicoot rats, gerbils, and field mice. The rodents destroy about a fourth of all grain, both stored and in the fields. In most areas officials attack with pesticides that can leave toxic environmental calling cards. But in one southern district they knew who to call—a rat-busting team named the Rodent and Termite Squad (RATS). These master exterminators, 300 members of the 28,000-strong Irula tribe, long renowned for hunting prowess, have been funded by the Oxfam international aid group and the Indian government. The hunters ferret out rats in fields, clubbing them with sticks or asphyxiating them with smoke. One hunter named Raman proudly shows off bandicoot rats that were trapped in a rice field.

The RATS team's traditional techniques proved much cheaper per rat than pesticides. In three years they caught 200,000 of the vermin. Some rats feed the Irulas themselves, but most wind up as dinner for hungry reptiles on a crocodile farm.

Scotland's Wildcats Mixing With Wild Cats

When is a wildcat a wildcat? That's an issue in Scotland, last stronghold of Britain's only native cat, numbering a few thousand and protected since 1988.

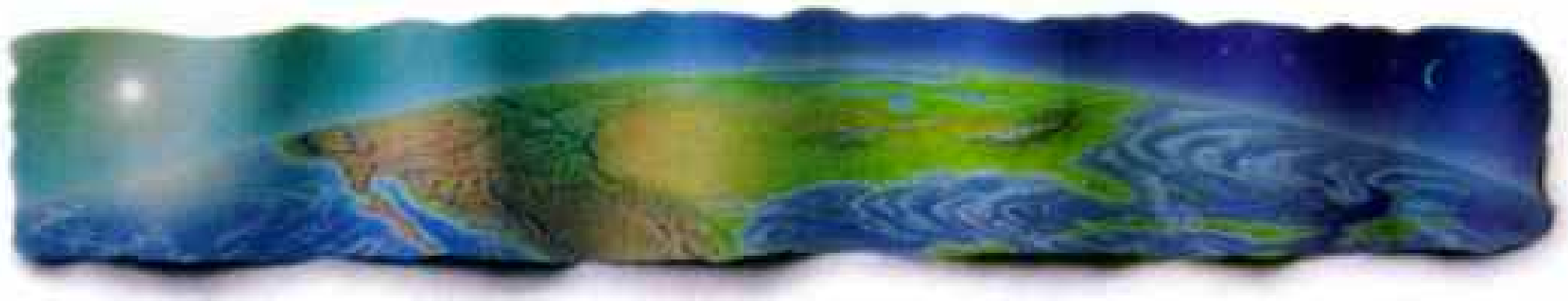
Many indigenous wildcats have interbred with feral domestic cats, confusing the offspring's identity—wildcat or overgrown tabby? And when a feline gets loose in a pen of pheasants, the gamekeeper is apt to shoot first and ask questions later. "No one has yet been successfully prosecuted," says Andrew Kitchener of the National Museums of Scotland, "but there are DNA studies under way and also a move to protect hybrid cats."

S. DALTON, NATURAL HISTORY PHOTOGRAPHIC AGENCY

—John L. Eliot

National Geographic, April 1993

Concern For The Environment Is Changing The Way We Live. It Could Also Change The Way You Paint.



From the simple, personal act of recycling, to the complex international efforts to understand global warming, there is no denying the impact that concern for our environment will have on the way we, as caretakers of the planet, live in years to come.

Just as there is also no denying the responsibility that business and industry have to take positive steps today to ensure a cleaner and healthier tomorrow.

Unlike other latex and oil-based paints, SPRED 2000 contains no petroleum-based solvents.

One company taking just such an important first step is Glidden.

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Yet, in both lab and field testing, SPRED 2000 wall paint has been shown to sacrifice nothing in terms of coverage or durability. In fact, it meets the same standards established with Glidden's best-selling SPRED Satin® wall paints.

Reaffirming the fact that environmental responsibility does not have to come at the expense of quality.

For the name of the Glidden retailer nearest you, call **1-800-367-0862**. And make the clean air choice.™ With SPRED 2000.

To learn more about what Glidden is doing to address the concerns of the future, write to: Glidden and The Environment
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SPRED 2000 is available in flat and semi-gloss finishes.

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*According to EPA Test Method 24.

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On Assignment

Up to his eyeballs in crocodiles? Photographer MARK DEEBLE hoped not. He had driven his Land Rover into a pool along Tanzania's Grumeti River to check for crocs before doing a locale shot. None stirred. But "the pool was deeper than we thought," admits Deeble, who made fast work of tying a tow rope to his sunken vehicle while his wife and partner, VICTORIA STONE, snapped a quick photo.

The British duo, debuting in NATIONAL GEOGRAPHIC this month, spent three months a year for five years crouching all day in riverbank blinds to film the Serengeti crocs. Familiarity bred sympathy and respect for the much maligned reptiles, which are "exceptionally caring parents," says Deeble.

They are "superbly adapted" to a harsh environment, adds Stone.

So are these adventurers, who scuba dive and fly small planes to chronicle everything from giant octopuses to Africa's spotted cats. A new thrill occurred in December with the birth of a son, Freddy, now in tow as his parents film Lake Tanganyika for the magazine, EXPLORER, and Survival Anglia.

Contract photographer JOEL SARTORE got his own taste of the wild side—in the Louisiana and Florida wreckage of Hurricane Andrew. "It was like a war zone. People were tense, hot, not sleeping. It was a very primal existence."

Yet Sartore found a gentler humanity at a Florida relief camp, where this little girl rode piggyback while he took pictures. "She didn't say a word, just giggled once in a while. I loved it because I was able to give comfort. It was the most rewarding day of my assignment."

Sartore shared the assignment with contract photographer Raymond Gehman and free-lance photographer Cameron Davidson.

MARK DEEBLE AND VICTORIA STONE (TOP); JOEL SARTORE

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The kids begged me to get her. They promised to brush, bathe, clean, feed and pick up after her. Of course, they don't. I do. It's like having one more kid in the house except Roxy sees a veterinarian instead of a pediatrician. And her vet insists I feed her Hill's® Science Diet.® He said just as humans have to eat the right foods to be healthy, dogs have to eat the foods that are right for them. And that's exactly what they get with Hill's Science Diet. He called it Nutrient Precision.™ So for Roxy, it's Hill's Science Diet because I want to do everything I can to keep *my* dog healthy. And if the kids still want a dog, they'll have to find one of their own.

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Geoguide

NOAA 10 SATELLITE IMAGE ACQUIRED AND PROCESSED BY HANK BRANDLI

Hurricanes

• Circular storms with strong winds like Andrew's have different names around the world: hurricane, typhoon, cyclone. Where does each occur? An encyclopedia will help you find the answers.

• Hurricanes draw their strength from warm, moist air. Where do these powerful storms form?

• In the North Atlantic the hurricane season is June through November. Why do hurricanes usually occur there at this time of year?

• Hurricane Andrew's most destructive area surrounded the eye, or center, visible in the satellite picture above. But heavy rain and dangerous wind covered a much wider area—extending an average of a hundred miles from the eye. To get an idea of how large an area would have been affected by Andrew, look at a road map of your own region and use the scale to measure a piece of string equal to a hundred miles. Hold one end of the string on your hometown and the other end against a pencil. Swing the pencil around your town so that it draws a circle showing the area of danger.

JOEL SARTORE

A SATELLITE 520 MILES OVERHEAD SHOWS HURRICANE ANDREW (ABOVE) AS IT RAGES ACROSS SOUTH FLORIDA. BENEATH THE SWIRLING CLOUDS, GUSTS UP TO 175 MILES AN HOUR FLATTEN TREES AND LEVEL HOUSES. YELLOW DOTS SHOW THE SHORELINES OF FLORIDA, CUBA, AND THE BAHAMAS. A RED CROSS MARKS THE LANDFALL OF THE EYEWALL, THE MOST DANGEROUS PART OF A HURRICANE. IN LOUISIANA (LEFT) JESSIE CURTIS AND HER CHILDREN VIEW THE PIECES OF THEIR HOME LEFT IN ANDREW'S WAKE.

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