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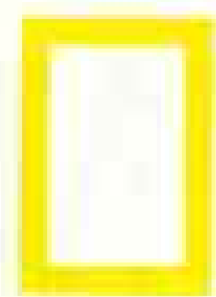

NATIONAL GEOGRAPHIC

MARCH 1991

Dispatches From Eastern Europe

By Tad Szulc
Photographs by Tomasz Tomaszewski

From the Baltic to the Black Sea, countries freed from decades of communist rule struggle toward democracy, amid outpourings of elation . . . and violence.

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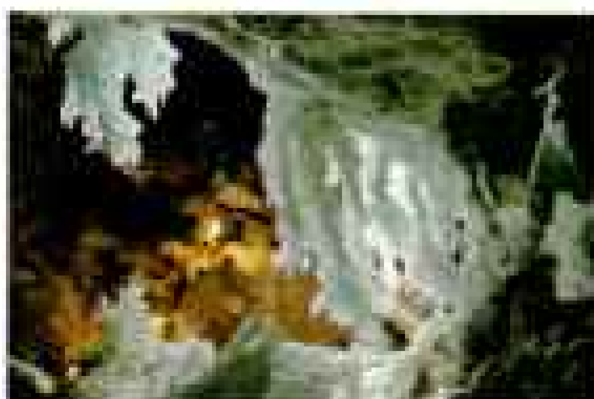
The Splendors of Lechuguilla Cave

By Tim Cahill
Photographs by Michael Nichols



With its immense chambers and astonishing formations, a recent find in New Mexico is the Grand Canyon of the underworld.

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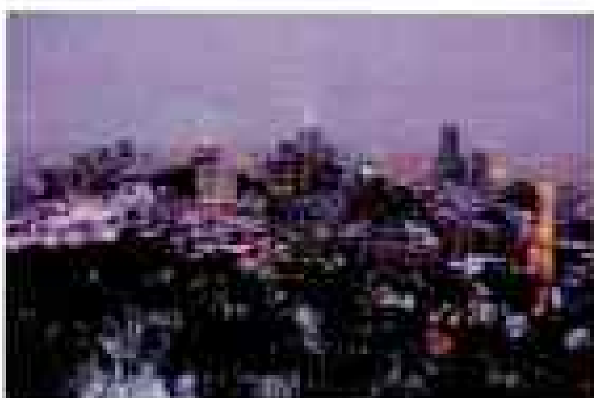
Montreal—Heart of French Canada

By Douglas B. Lee
Photographs by Sisse Brimberg



Montrealers lead the movement for a separate Quebec. A "Making of Canada" map supplement traces the history of the province.

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Eye to Eye With the Giant Octopus

Text and photographs by Fred Bavendam

To dive with the Pacific giant octopus is to learn about a gentle creature that can weigh 50 pounds and is as savvy as a house cat.

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Along the Santa Fe Trail

By Rowe Findley
Photographs by Bruce Dale

The 900-mile-long trail that served as meeting ground for Anglo, Hispanic, and Indian cultures in the 1800s thrives with new adventurers and preservationists.

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The Hard Way to the North Pole

By Børge Ousland

Crossing crevasses, pressure ridges, and open water, two Norwegian skiers reach the North Pole without being resupplied.

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COVER: A caver explores the depths of Lechuguilla Cave, a massive labyrinth of spectacular natural sculptures beneath southern New Mexico. Photograph by Michael Nichols.

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DISPATCHES FROM EASTERN

Spring-cleaning after more than four decades of bitter communist rule, farmhands in Kozłówka, Poland, carry busts of Joseph Stalin past a new cherry orchard to a warehouse. Free to follow their elected governments rather than the regimes imposed by Soviet dictators, nations from the Baltic to the Black Sea seek their own directions. They share little beyond the joy of the moment and the uncertainty of building political and economic consensus among their disparate peoples.

EUROPE

BY TAD SZULC
Photographs by
TOMASZ TOMASZEWSKI

BUCHAREST, ROMANIA

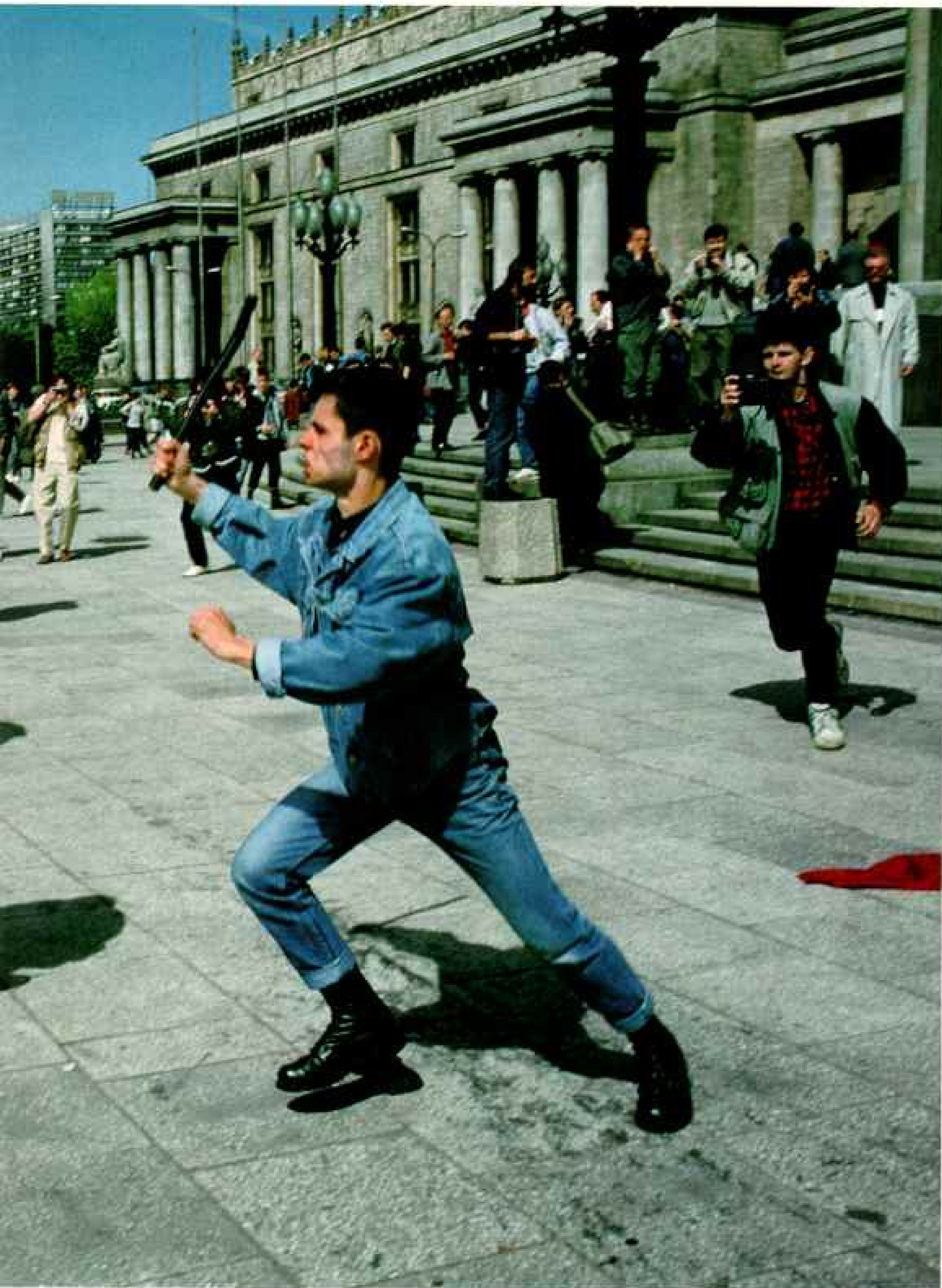
Monument to a megalomaniac, the nearly completed palace of executed dictator Nicolae Ceauşescu rises from the heart of the capital. During the past decade tens of thousands of workers slaved to satisfy Ceauşescu and his wife, Elena, by creating gold-leaf walls, crystal chandeliers, marble columns, intricate parquets, handwoven carpets. Their reward: breadlines and winters without heat. With more than a thousand rooms the palace is one of the largest buildings in the world.

The new government of President Ion Iliescu, himself a former communist, hopes to enhance the area by adding trees, shops, and cafés.

Such plans are small comfort to street sweeper Sanda Marin, who lives with her family in two small rooms. A Gypsy, she knows that despite recent political gains, including a seat in the new assembly, her people remain pariahs. "When I die," a Gypsy saying goes, "you should bury me standing, because I have been on my knees all my life."

WARSAW, POLAND

Clash of ideas draws blood in Poland, the first Eastern-bloc country to form a noncommunist, multiparty parliament. Following a convention of right-wing parties, black-booted neofascists attacked students who



had gathered in protest. Many left by ambulance. The fight, covered by the world press, erupted on May Day, once reserved for compulsory parades in honor of international socialism.

KUTNÁ HORA,
CZECHOSLOVAKIA

Adding up the day's totals, a widow and her son work in the courtyard between their home and restaurant. Their industrial town of 20,000, east of Prague, enjoys a steady prosperity. Behind them a mural asks

in Czech, "Where is my home?" That is the first line of the two-part Czechoslovak anthem. Its last line echoes a persistent Slovak dream: "Slovaks shall awaken."

THE MAY SUN is hot in the military cemetery, deserted except for two very young and very sunburned Soviet Army privates. The soldiers crouch in front of the tombstones of comrades who fell in this southwest corner of Poland nearly 45 years ago, in the battle against Nazi armies at Wrocław. Time and weather have dulled the Cyrillic inscriptions on the graves, but the troopers are remedying that, meticulously applying fresh gold paint to each headstone.

It is a final act of decency, a rite of farewell to the tens of thousands who died here, for under an accord with the new democratic government of Poland, the Soviets have agreed to withdraw all troops in the early 1990s.

"When do you go?" I ask one of the young soldiers.

"Oh, I'm not sure when we leave."

"What do you know about these graves?" I inquire.

"Nichevo," he says. "Nothing." He turns to his work again. I am startled by his response; but then I remember that these soldiers were born more than 20 years after the war. I find myself feeling a little sorry for them. Ignored by Poles and cut off from home, they face even worse conditions when they return to the Soviet Union, where their colleagues are being housed in tents and abandoned factories. I sense their alienation, recall their vacant stares, see their rumpled uniforms, and wonder: Is this the great Soviet Army we so feared?

The sun fades, a breeze rustles the shadowy oaks, and the moment is gone. But I know that I have just seen the end of an era. After four decades on Polish soil, the Russians were really going. All across this long-tormented region, the spring of 1990 would be a time of reawakening.

I had come to Eastern Europe to witness, with photographer Tomasz Tomaszewski, the rebirth of freedom. Over a period of a hundred days Tomasz and I covered 30,000 miles, from the Baltic of Poland to the Balkan Mountains of Bulgaria, from the Berlin Wall to the Soviet-Czechoslovak border.

We met hundreds of people—students and farmers, priests and factory workers—as they savored democracy for the first time in a half century. We heard the hymns and wedding songs and poetry of hope—and, sadly, the shouted curses and the crack of bones, as new freedom brought dissension and the age-old specters of ethnic prejudice, racial hatred, and nationalism. All through the season, Tomasz and I piled up these and other impressions of a remarkable moment in history. My journey began at Easter because it symbolizes, well, resurrection.

SOVIET SOLDIERS, SOON TO DEPART POLAND, GILD HEADSTONES OF FALLEN WWII COMRADES.

BIAŁOWIEŻA, POLAND, EASTER SUNDAY

Cold rain falls outside, but we are warm inside the home of Michał Bajko, an engineer of the Orthodox faith who works at a nearby factory. On the spur of the moment he and his wife, Eugenja, a surgeon, have invited Tomasz and me to join the family for the traditional Easter breakfast called *Święcone*, a feast of sausage, ham, smoked meat, fish, eggs, and cakes. The meal had been blessed the day before by a priest in black robes, black beard, and black, boxy headgear who wound his way through the neighborhood, saying a few words of grace in each home.

With the Bajkos we clink tiny glasses of vodka to keep body and soul together, another Polish tradition, and we chat about the Soviet government's admission, on Good Friday, that in 1940 Stalin's security forces had

Prize-winning American author TAD SZULC returned to his native Poland to begin his journey through Eastern Europe. With him was Polish photographer TOMASZ TOMASZEWSKI, whose most recent GEOGRAPHIC assignment, "Discovering America," was published in January 1988.

indeed executed as many as 15,000 Polish Army officers in Katyń Forest and nearby sites in Byelorussia.

It's no news to anyone, least of all Michał's father, Stefan, a lively octogenarian who remembers two World Wars fought across this stretch of eastern Poland. But it is clear that Stefan, who spent many years in Soviet labor camps, takes solace in last week's confession.

"Thank God for the truth!" he says. Michał raises a glass. "To the future!" We drink to that, and I silently wish the Bajkos well. Over the years they and other Orthodox believers in this strongly Roman Catholic country were seldom treated fairly or well. Perhaps they would fare better under democracy.

"Let's see if it really changes," Michał says. "Until now we were second-class citizens." Nobody forgets the past here. Most of the Orthodox priests I meet are friendly enough, until I ask their names. "How do I know you're not with the police?" one asks me.

The Bajkos leave for their first Easter Sunday under democracy, while Tomasz and I drive from Białowieża into the dank countryside. We stop to chat with worried farmers who cannot sell their potatoes, the region's principal crop. The Soviet Union is broke and can no longer import the spuds, and the Polish government won't buy them. Under the old system all the potatoes were sold.

One big farmer with rough hands looks exasperated: "Hey," he tells me, "we can't eat democracy."

A local priest who has been eavesdropping nods in sympathy. When I ask about his relations with the democratic government, he brightens.

"You know, we priests no longer need official permission from the police or the Communist Party to hold religious processions. We just do it. And lots of the old Reds now come openly to the church. We don't shun them. They belong here."

PRAGUE, CZECHOSLOVAKIA, APRIL 21

I am waiting for the Pope in Hradčany Square, along with thousands of other people. This is his first visit to an Eastern European nation outside of Poland. Roman Catholicism is the largest faith here, and it was savagely persecuted by the communists. I know priests who had to be ordained in secret and who worked underground until last year. So, even though the Catholic Church is not the monolith here that it is in the Pope's native Poland, today's visit represents the rebirth of religious freedom for millions of Czechoslovaks.

As I wait, mingling with the happy crowd, I recall the last time I saw Prague, more than 21 years ago, as a *New York Times* correspondent covering the Soviet invasion. These same streets were thick with smoke and fear. Soviet tanks strafed the National Museum with machine-gun fire and surrounded the Czechoslovak radio and television building to silence the resistance broadcasts. Armored vehicles chased students around Wenceslas Square, and a few of the kids managed to stuff burning newspapers up the tanks' exhaust pipes, exploding the engines.

Back then, in August 1968, the Soviets wanted to crush the reforms of Communist Party leader Alexander Dubček, whom they considered a subversive. Moscow replaced him with a hard-line puppet more to their liking, and the new regime expelled me for writing about the wave of repression.

What I see now is a different country. Prague looks peaceful and golden, spreading along both sides of the Vltava River, with the steeples and cupolas of a hundred churches caressed by sunlight. It is a city intoxicated with liberty. People walk around clutching bunches of spring flowers, and on Wenceslas Square I see that someone has scrawled a message on a wall: "IT'S OVER! CZECHS ARE FREE!" Smiling, stylish young women like to pose for photographs beside the slogan, rendered in English.

Suddenly the Pope appears, flashing by in his white Popemobile to wild applause and cheers, on his way to St. Vitus Cathedral to bless the sick and the disabled. For the crowds

PLZEŇ, CZECHOSLOVAKIA

Like a cheering crowd, U. S. flags commemorate the GIs who liberated this city in May 1945. Long forbidden by communist regimes to publicly recognize America's role in World War II, residents are now openly grateful. "To the Men of the 16th Armored Division," says a stone marker nearby. "Never Forget."

BERLIN, GERMANY

Caught in the cross fire of a child's game, a bystander in East Berlin surrenders at the skeletal remains of the wall that divided the city for 28 years. Before residents helped tear it down in November 1989, 81 people had died trying to scale it and escape to the West. Now capital of a reunited Germany, Berlin stands as a living monument to the end, finally, of World War II.

Yet the wall continues to claim casualties. Awed by their prosperous neighbors, East Berliners must overcome an inferiority complex and learn to do without the system that had planned out their life's work by the time they reached the tenth grade. It may take generations for them to finally scale *"die Mauer im Kopf*—the wall in the mind."

in the square the moment is gone, but delight lingers. "So you see he finally came to see us too," an elderly gentleman in a black fedora says to nobody in particular. Everybody around him smiles, nodding in agreement: "*Ano!*" they say in chorus. "Yes!" I notice that the policemen and young soldiers are smiling and joking with the crowd. That hasn't happened for a long while.

But even in this joyous time, there is a hint of trouble. The next day I listen to the Pope in the Moravian town of Velehrad, where he delivers blessings in Czech, Slovak, Polish, Hungarian, German, Ukrainian, Byelorussian, and a few other languages. It is a lesson in the difficulties of living in a part of Europe with disparate populations, each with its own language and strong nationalist urges, and a long history of wars and shifting borders.

The people of Czechoslovakia, for instance, proudly insist on their own identities as Bohemians, Moravians, and Slovaks, even though all live under one flag. Chatting with farmers and townsfolk in Velehrad, I learn that they would like more autonomy, and I hear about a disturbing price one pays for freedom of movement as ethnic tensions rise. A teacher, conversing in Polish, tells me that Poles are resented here.

"They come like locusts across the border, buy up all the inexpensive Czech food, and go home." Poles, for their part, don't like the Czechs—who, in the Polish view, act too superior. Relations get more complicated. The Slovaks resent Prague for granting equal rights to the large Hungarian minority and to Gypsies. Hungary has problems with the Slovak and German minorities on its soil. Romania has problems with Gypsies and with its long-settled Hungarian and German minorities. The Bulgarians still harass their ethnic Turkish minority. In the north, Poles and Germans quarrel across the Oder-Neisse frontier, drawn at the end of World War II when Germany lost important territories to Poland.

These animosities have been bubbling just beneath the surface through years of communist rule, but as long as the communists were in charge, there was a lid of "socialist solidarity" on the kettle. Now that people can speak their minds, the racial prejudices and regional hatreds boil over. Signs of anti-Semitism and other ethnic prejudice have reappeared, and the neofascists called skinheads are persecuting Vietnamese, Gypsies, Turks, and anyone who does not look "European."

WARSAW, POLAND, MAY 1

It is easier to topple a dictatorship than to start a democracy. In a democracy even people with despicable ideas can have their say, and sometimes the talk leads to action.

Today I visit a convention of the Polish right wing, a small political group that gathers, of all places, in the Palace of Culture and Science. The palace, the Soviet Union's gift to Warsaw in the 1950s, is the city's tallest, ugliest, and most despised building, because the communists used to meet there.

I am frisked at the door by muscular young men searching for weapons. Inside, I am invited to buy an anti-Semitic tract called "Protocol of the Elders of Zion," which depicts, among other things, a communist, presumably a Jew, shooting at the heart of a Roman Catholic priest. One wonders why the anti-Semites even bother. Only about 6,000 Jews remain among Poland's 38 million people, down from the nearly three million Jews who lived here before the war.

COMMUNION CHALICE COVERED, A PRIEST AWAITS THE POPE IN PRAGUE.

In the hall we are subjected to a tedious speech by a politician who drones on and on about the death of communism, the beauties of the free market, and the Jewish peril. When his talk finally ends, the muscular men who had frisked me earlier join up with a score of skinheads to attack another group of young people who have been outside, protesting the

right-wing gathering. The skinheads, carrying heavy clubs, seem to have the upper hand. Some even wear swastika armbands. I watch the fists flying and see the ambulances arrive. They load rightists and leftists into the vehicles, gun their engines, and disappear into the warm spring evening. The pavement is splotched with blood.

WARSAW, POLAND, MAY 4

With the collapse of the police state, law and order have broken down. Cops are seldom seen, except halfheartedly directing traffic, and clearly they would just as soon not interfere in the lives of fellow citizens. As a result, a wave of burglaries, stickups, muggings, and murders is sweeping Eastern Europe.

"Business is fantastic," says the young man running the gas gun store. He is about 40, well dressed, has impeccable manners—and he sells all kinds of gas weapons. Imported from West Germany, these pistols fire gas pellets: tear gas, temporarily paralyzing gas, asphyxiating gas, and skin-burning gas, all perfectly legal now, and perhaps of some comfort to those who fear the crime wave. The most popular gun, at least among younger customers, is a heavy black model known as the "Miami," after the *Miami Vice* television program, a favorite in Poland.

The irony is that this gun merchant is a former agent of Urząd Bezpieczeństwa, Poland's disbanded secret-police force—UB for short. Hundreds of former communist UB have gone into business for themselves, using their networks and party assets to open gun boutiques, consulting firms, and travel agencies, often in partnership with Western businessmen.

"So," says the gun salesman, "what do you think is going to happen to the three and a half million members of the Communist Party? You think they'll just vanish into thin air?" He smiles. He knows that I know he's a former UB agent and no explanations are necessary.

But his question makes me wonder: What happens to the hundreds of thousands of secret-police agents and informers in Eastern Europe? Will they find a place in the new democratic order? The most extensive network, in East Germany, was the dreaded Staatssicherheitdienst, the State Security Ministry. Known as the Stasi, this agency kept files on four million East Germans and two million West Germans.

The files still exist, presumably in the hands of new authorities. Until those records are opened, no one will know the details of the state's collective crimes. But blackmail, murder, and torture existed on so vast a scale that it would be almost impossible to exact punishment. In most of Eastern Europe the new governments won't even attempt to pursue former agents, now that the nightmare has ended.

"It would be unfair to deprive them of their retirement," says Jacek Kuroń, Poland's minister of labor and social policy. A former dissident and a veteran of several UB prisons, Kuroń believes in the rule of law—even for the secret-police agents who once abused him. "Only if they are convicted of specific crimes in a court of law should they be denied their benefits," he says.

In Czechoslovakia I meet another former prisoner of the communist regime who is now the country's interior minister. He refuses to publish lists of former informers, fearful that vengeful citizens would "hunt them down." Some countries, lacking a pool of experienced talent, are forced to hire former agents for security and intelligence jobs. "We must do the best we can," says a Polish friend who is a senior security officer. "Sometimes we look the other way when it comes to hiring." Sometimes, in fact, the new regimes are embarrassed to learn that they have inadvertently hired former agents. In East Germany, for instance, three new cabinet ministers and 68 new parliament members were accused of having worked for the Stasi.

LWÓWEK ŚLĄSKI, POLAND, MAY 8

This is the 45th anniversary of the Third Reich's fall, an event that changed the map of Europe. I drive along the Neisse River, which divides Poland and Germany, and I am reminded of the extensive German territories ceded to Poland after the war.

On the Polish side you see towns and villages that look tidy and prosperous, unmistakably German to this day, but there are almost no Germans here. Millions of them were expelled to the west after 1945 to make room for millions of Poles who settled in this wheat-farming country after the Soviets expelled them from territories Stalin had seized.

Late in the morning we reach the Polish town of Lwówek Śląski, where elderly men in sport shirts sit around enjoying the first beer of the day and the warm sun. They play chess on the sidewalk with giant knights and pawns

ONGRESOWA

WARSAW, POLAND

Caricatures of Soviet leaders meet outside the Palace of Culture and Science to witness the "Death of Communism," a satirical performance by a troupe from Kraków. The palace was erected in the 1950s as a gift from the Soviet Union. On the wall of an underpass, Lenin is memorialized in a punk-style haircut.

GDAŃSK, POLAND

Emblems of Solidarity—forged here in 1980—emblazon a wall. Banned until 1989, the union swept the nation's first democratic election since World War II and continues to be the principal political force.

and queens. The chess champion of the town is Antoni Dubicki, a 59-year-old Pole who looks much older, perhaps because he spent the war in a Siberian labor camp. The Soviets sent him here, with other settlers, to start a new life after the war. He pauses from his chess.

"This is ancient Polish land," he says, "and I'm not worried that the Germans will try to take it from us." (Editorial writers in Warsaw *do* worry about such things.) Dubicki is more concerned about Soviets, perhaps because of his Siberian experience.

"I fear them a lot," he says. He grips my hand, and his faded blue eyes fill with tears.

"Say hello to your President Bush from an old Siberian prisoner," he whispers. "Tell him we count on him."

Driving from village to village, we finally chance upon Erwin Wusman, one of the few Germans still living in this part of Poland. He refused to leave Sulików, now a shabby farm community of huts and lean-tos not far from the river. At 95 he is frail and slow but still holding his ground.

"No, I never agreed to be evacuated. . . . This is where I belong," Wusman told me in squeaky German, as we sat among the chickens on his back porch. As far as he is concerned, this is still Germany, with borders as they were before 1945. He can be cranky at times, but I am told that Wusman's neighbors have developed a grudging affection for him.

"Three times the Poles threw him out, and three times he came back," says a Ukrainian neighbor. "So let old Erwin die here."

BERLIN, EAST GERMANY, MAY 10

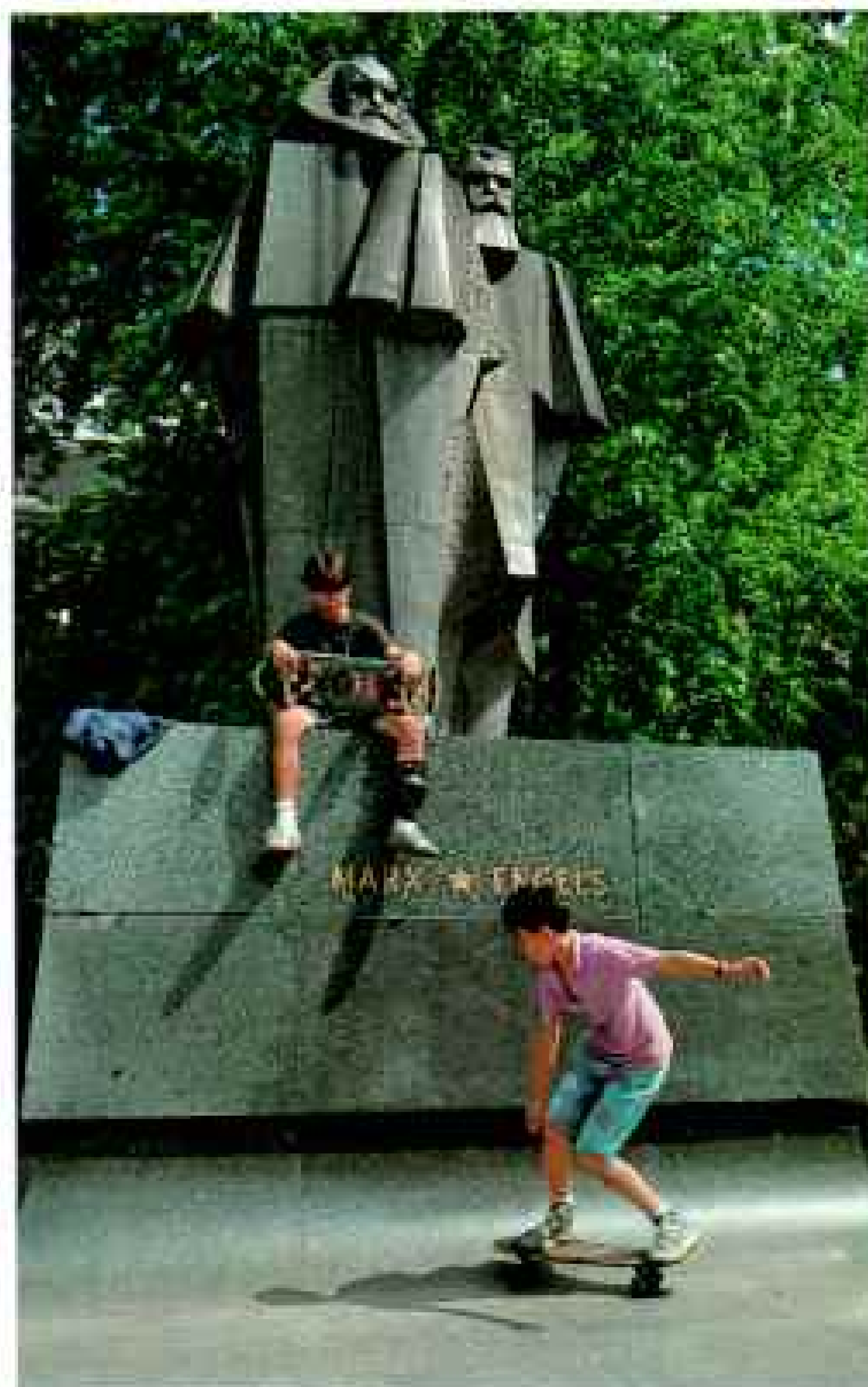
Just north of the Brandenburg Gate, which towers over the former Berlin Wall, I find children playing in the rubble, boys chasing other boys with plastic pistols. I know it's just a game, but it gives me the willies. An endless queue of West Germans flows through the majestic gate. They come across to visit relatives, to stare at the once forbidden city, and to buy everything in sight.

An East German friend tells me that West German investors are spending hundreds of millions of marks to purchase the imposing, modern apartment buildings the communist regime built for its top officials—just before the government changed.

Other buildings in the neighborhood are filling up with refugees nobody else wants—ethnic Germans who fled the Soviet Union, Polish peddlers, Romanians, and Gypsies. Those fresh from the railroad stations congregate around the fountains of Alexanderplatz. They've heard that this is the best place to find help or friendship.

Then there are Asian and African laborers imported by the communist regimes as virtual slaves—Vietnamese, Angolans, and Mozambicans. I hear that some 60,000 Vietnamese were sent here for menial labor, another 30,000 to Czechoslovakia. I don't give it much credence until I meet a Vietnamese named Nguyen Huy Thanh in a suburb of Prague.

Thanh, a highly educated engineer, moved to Zličín some years ago, after the Hanoi government promised him he could work abroad to improve his professional skills, earn some money, and see the world. In fact, Hanoi was scheming to pay its war debts in Eastern Europe and to earn hard currency by exporting the best of its technical talent. Thanh signed a five-year contract, leaving his wife and three children in Hanoi. But when he got to Czechoslovakia, he found himself washing floors in an iron factory. Because Hanoi kept most of Thanh's salary, his cut amounted to less than a hundred dollars a month.



SKATEBOARDERS PLAY ON A MONUMENT TO THE FATHERS OF COMMUNISM

"There is no way out," he tells me as we sit in the tiny room he shares with another Vietnamese worker. "I cannot afford transportation home, and the government here no longer needs me. The Vietnamese Embassy in Prague will not permit me to go ahead of time." I meet others in a similar fix.

To make matters worse, Thanh says, the Vietnamese who remain in Eastern Europe are often chased and beaten by skinheads, who waylay Asians headed for work in nearby factories. And on at least one occasion the thugs barged into Vietnamese barracks and assaulted them at home.

Thanh is a gentle man of quiet charm who is obviously pained to discuss his troubles. "Perhaps," he tells me, "democracy will come to help us."

BRATISLAVA, CZECHOSLOVAKIA, MAY 27

Just north of here the Morava River runs blue through green hills on a warm afternoon, forming the border between Austria and Czechoslovakia. Until recently, this bucolic stream was a piece of the Iron Curtain. From the Czechoslovak side a person could cross the Morava only after negotiating minefields, eluding border guards, wriggling through barbed wire strung between tall concrete pylons, and swimming 300 or 400 yards in the dark.

At one of the most famous river crossings, near the village of Devínska Nová Ves, there is a stone bridge, framed by weeping willows with branches that sweep the waters. This bridge, once the passageway to freedom for thousands of Jews crossing into Austria from Eastern Europe, was closed for years after the Iron Curtain descended, but it is open again.

Young lovers hold hands, and families push babies in prams on the pathways where guards watched over the bridge with machine guns. Tomasz and I wave to the lovers and parents, and the smiling people wave back.

The concrete pylons still stand along the river at hundred-yard intervals, like ugly signposts. I wonder idly what the local people make of these remnants of the old frontier, when the answer comes. I spy a fat stork nest on one of the pylons, with the mother sitting snugly on it. The father, flying back and forth across the old border, brings food and straw and branches. They are free to come and go as they please, as is the white-haired man I watch getting into a rowboat down below. He calmly paddles across the Morava River, from Czechoslovakia to Austria, to pass the afternoon with friends and relatives on the other side. It looks so natural that I have to remind myself that this short trip might have been fatal six months ago.

BUDAPEST, HUNGARY, JUNE 4

By 5:30 a.m., 3,000 or 4,000 workers of the first shift are pouring through the gates of the iron and steel works on the Danube River island of Csepel. Expanded by ardent communists in the 1950s, it became Hungary's largest industrial site. But now the workers worry about the future. Most of the complex, they tell me, is obsolete, and the government is looking for private buyers. But there are no takers, foreign or domestic. Serious unemployment is suddenly menacing.

Today's worker wants to become part of the middle class, to own a car and a weekend cottage in the country. "That's what I want," says Gábor Szabó, a young welder, "to become a European."

Elsewhere on the Danube I see that the headquarters of the Communist Party Central Committee is padlocked and that boys on skateboards are zipping around in front of it, using the pedestal of a Marx and Engels monument as a runway. All the years of communism seem forgotten in this country.

BUDAPEST, HUNGARY, JUNE 6

You don't see many Csepel workers on Váci Utca, the pedestrian shopping district in Pest, the section *(Continued on page 24)*

BUDAPEST, HUNGARY

To earn extra money, Soviet soldiers sell uniforms, even AK-47 assault rifles. Trendy officers' caps bring Beáta Marczy as much as $50 U. S. in resale, a respectable sum in a country facing rising inflation and foreign debt.

LEGNICA, POLAND

A spray-painted scrawl offers a less-than-fond farewell to more than 80,000 Soviet troops still garrisoned here. All are to be withdrawn in the early 1990s.

MILOVICE, CZECHOSLOVAKIA

A Soviet colonel bids farewell to soldiers and their families before they board the daily military train for Moscow. Although largely confined to crowded apartments and ignored by the local populace, many soldiers seem sorry to leave. They have heard that returning troops are housed in abandoned factories or tents. The Warsaw Pact, which could field as many as six million men during the decades of communist hegemony, has all but disintegrated.

GDAŃSK, POLAND

Solidarity leader Lech Wałęsa (right, at left) puts on a public smile beside then Prime Minister Tadeusz Mazowiecki, his former ally but a bitter rival in November's election. Finally winning a runoff election against a dark horse émigré, Wałęsa became Poland's first popularly chosen president.

LIBEREC, CZECHOSLOVAKIA

An admiring crowd hangs on every word of President Václav Havel. Unopposed, Havel won reelection last July to a two-year term, gaining 234 votes from the 300-member parliament. A playwright and former dissident, he takes pride in the nay votes—proof, he says, of the democratic nature of his country's new politics. Havel's warm manner and upbeat refrain, "Let us rejoin Europe," have earned him vast reserves of goodwill, a supply he will desperately need as economic reforms and Slovak demands for greater autonomy test his nation.

SOFIA, BULGARIA

In an unorthodox gesture, a priest shows his support for students striking for democratic change. The demonstrations forced President Petür Mladenov, a reform-minded communist, from office in early July. Mladenov had angered students by suggesting the use of tanks against earlier protests. Long held in check by the government, the Orthodox Church now includes members who openly sing the praises of the country's fragile democracy.

of the capital lying along the Danube's left bank. This part of Budapest is full of fine restaurants and elegant women and well-tailored men who pass the evening dining on goose and listening to the discreet musical charm of strolling violinists. Across the river at the grand old Gellért Hotel (named for the 11th-century bishop whom pagans are said to have rolled into the river inside a barrel spiked with nails), couples in skimpy swimsuits sun themselves among the statues in manicured gardens. Most of these fashionable people are foreign tourists—and erstwhile members of the Communist Party who have recently discovered the joys of capitalism.

Meanwhile the Soviets are withdrawing from this nation, usually by train. "If they depart at once," a cab driver tells me, "we have offered to take them to the border for free." And while few Hungarians would complain of the Soviet pullout, the leave-taking will carry a big price tag. Hungary has a foreign debt of 20 billion dollars, the highest per capita in Eastern Europe. And in 1991 the Soviets will make them (and all others in the region) pay for oil in hard currency.

ÁRTÁND, HUNGARY, JUNE 7

"We are a transit country," sighs Capt. Miklós Halmos, a deeply tanned man with white hair, who has guarded the Hungarian border for 27 years. Halmos, now commander of this crossing, points to a long line of cars with Romanian license plates.

"Our orders are to let them come and go freely," he says—and they do. More than 500,000 travelers passed through the month before.

Ethnic Hungarian and German refugees flee here from Romania, as do Romanians and Bulgarians seeking a better life in Hungary or points west. As a fresh-born democracy Hungary is reluctant to impose obstacles to free travel, so the refugees keep coming, and so do the problems.

A half hour's drive from the Ártánd border crossing is the grim and sooty town of Berettyóújfalu, where smuggled goods reach open-air markets operated by Gypsies, Romanians, and Hungarians who try outshouting one another to attract customers. Hanging around an outdoor bar where tough, sinister men drink beer from mugs, I gradually learn how this black market works.

"The Poles specialize in smuggling coffee," one of the beer drinkers says, explaining how the coffee is hidden in car fenders and resold to smugglers who pop up from Romania for the day. Romanians sneak over here to sell cheap shoes. Gypsies sell rock audiotapes. The competition is nasty, and tensions run high. A corpulent Hungarian woman points to a neighbor's stall. "Ah," she says, "the Gypsy thieves."

HORTOBÁGY, HUNGARY, JUNE 8

Many Hungarians are farmers who let others worry about refugees and economic plans while they themselves concentrate on the age-old concerns of the Great Hungarian Plain—shoeing horses, planting wheat, and fattening animals.

I meet about 7,000 geese at sunset outside town. They march along in regimental formation, led by other geese, a noisy, honking sea of white feathers advancing from field to barn.

A REGIMENT OF HUNGARIAN GEESE, 7,000 STRONG, MARCHES TO THE BARN.

The amazing thing is that this complex logistical operation is directed by only two men and one woman.

One of the men, Gáspár Gyula, stands at the barn gate and simply calls the geese home.

"Gyertek! Gyertek!" he shouts in a rich baritone, using the Hungarian phrase for "come here." The geese obey, conditioned by habit and by the tapes Gyula broadcasts through loudspeakers.

Hungarian agriculture was largely collectivized under the communist regime, and Gyula has now worked out a compromise with

the government. He leases his barn and fields from a cooperative, buys geese from the cooperative for cash or credit, fattens them at his own expense, and sells the meat and plucked feathers to the cooperative for a profit. In effect, this is a market economy, although Gyula has to pay only one farmhand. His wife works for free.

Across a ditch in one of his fields I watch this capitalist tending his geese with obvious pride. He shouts back: "Raising geese is awfully hard work—but think of the money I'll make!"

Even old Reds talk that way nowadays. In the wine country south of Budapest, I meet Gábor Kemény in the little town of Izsák. Kemény, a former Communist Party member, is Izsák's most successful entrepreneur. He owns a pleasant restaurant named Fekete Bárány (Black Sheep), the general store, and the local gas station. He makes wine and champagne on land leased from the local cooperative. He would like to expand his financial empire, and he believes that all the land confiscated by the communists should be returned to its original owners.

After a few hours in Kemény's town I can see that he is well liked. Neighbors smile and wave at him. He fits into the new scheme, I think, because he has been absolutely honest all along. He tried to be a good communist ("so long as I believed in it," he says and laughs), yet he maintained a close friendship with a labor leader jailed after the 1956 anticommunist rebellion.

"I am what I am," he says over coffee at the Black Sheep, "and people know it."

BUCHAREST, ROMANIA, JUNE 14

The peaceful death of communism—which Czechoslovakia's President Václav Havel described as the "velvet revolution"—seems like a faded memory on the night we land in Romania. The sky is black with clouds and slashing rain, the streets are dark and empty of traffic, the government palace is surrounded by army tanks.

The new government is ruthlessly smashing its liberal opposition. President Ion Iliescu, once a top communist leader, has assembled an army of several thousand coal miners to rout the students and intellectuals who oppose him. "Enemies of democracy," he calls them.

Driving from the airport, we see miners charging after fleeing, screaming people.

Wielding clubs and crowbars, they grab a young woman in a red dress from the sidewalk, slap her in the face, hit her with their weapons. She cries and falls. A miner kicks her. We see other miners beat two young men with long hair. They beat a teenager. They beat an old woman.

There are no police in sight, and now we see a knot of miners in the road, blocking our taxi. We stop. They gather around, rough men in tattered clothes. Their faces, black with soot, look menacing in the yellow glow of their helmet lamps, and I notice that they carry pipes and clubs. Our driver is trembling with fear. He opens the trunk to show that he is not transporting weapons. I hear the trunk slam. The miners wave us on.

At the hotel we find more miners patrolling the lobby. Their eyes reveal nothing, but all of them exude power and importance, probably for the first time in their lives. Throughout the night they exercise their newfound influence with raw fury, as if to settle long years of resentment and frustration.

Looking down on Nicolae Bălcescu Boulevard from my hotel balcony, I see a Dantesque scene of darkness occasionally broken by the flash of automobile lights and by what seems like thousands of tiny lightning bugs crawling and running on the ground. The scene is garish, intensely alive. I flick on the television to discover that a government channel is showing a wartime movie with Nazi SS troopers beating people.

By midnight, drained from viewing the savagery, I go to the hotel's rooftop restaurant in search of food. There I find a few happy couples dancing in an air-conditioned room. The band is playing a tango.

(Continued on page 30)

WARSAW, POLAND

Aiming for customers fed up with rising crime, a gun boutique manager demonstrates pistols for a potential buyer. Legally imported from West Germany, the pistols fire gas pellets: tear gas, asphyxiating gas, skin-burning gas, and temporarily paralyzing gas. The manager holds the heavy model favored by young people, the "Miami," named for the *Miami Vice* television show popular in Poland. It brings about $500 U. S., yet sales are brisk despite the expense. Burglaries, muggings, and murders have all increased with the collapse of the police state. Many of the new gun merchants, including this one, are former agents of the disbanded secret police.

PRAGUE, CZECHOSLOVAKIA

"This too is part of making democracy work," says Lord Mayor Jaroslav Kořán of cleaning up the city's garbage. Charged with providing safe water and housing for 1.2 million inhabitants, Kořán must also allocate funds to change communist street names.

BUDAPEST, HUNGARY

With no place to call home, indigents bed down in a railway station. Local homeless residents, beset by a housing shortage and growing unemployment, now compete for bunk space with refugees from Romania and the Soviet Union.

BUCHAREST, ROMANIA

A field day for petty tyrants arrived when several thousand coal miners—grateful to President Ion Iliescu for promised wage hikes—came to quiet those opposed to the regime. Residents of the capital, who had seen students demonstrating daily even before Iliescu won office last spring in a disputed election, suddenly found themselves subject to car searches (right). Packs of miners roamed the streets, led by men in civilian clothes, possibly former Securitate agents. They beat people at random. When victims said they would

call the police, the miners' response was quick: "We are the police today."

When they had finished, at least one person lay dead. Hundreds were injured, including student leader Marian Munteanu (left, at right), who had a hand injured and a foot broken. His younger brother, Bogdan, lies beside him, wounded by a crowbar. Soon after their mother's visit, here in a Bucharest hospital, they were arrested and taken to a government hospital. They suffered two months in prison before demonstrators won their release.

BUCHAREST, ROMANIA, JUNE 15

I wake to see the miners still in control, surrounding the hotel and patrolling University Square across the street. The toll from last night: at least one dead, hundreds injured. President Iliescu makes a speech, thanking the miners for "saving democracy" and warning them—a bit late, I think—against excess.

Meanwhile, I notice something odd on the streets. While some miners lounge around, relaxing and enjoying the spring sun, others rush about grabbing fellow citizens, cracking more skulls. Almost every group of miners is led by a civilian I assume to be a former agent of Securitate, the dreaded secret police who were the muscle behind Nicolae Ceauşescu's brutal dictatorship. Are they still running the place?

BUCHAREST, ROMANIA, JUNE 16

A thousand students have been arrested, and more citizens beaten since yesterday. On a hunch, Tomasz and I drive to the Bucharest Emergency Hospital to find the 28-year-old leader of the Students' League, Marian Munteanu, with his foot in a cast and his hand smashed.

ROMANIAN FARMER ARISTIDE COSMIUC OFFERS A GIFT OF POETRY

"I guess we had better change our strategy," he says, smiling feebly.

His brother, Bogdan, also active in Romania's prodemocracy movement, is propped in an adjoining bed. Somebody had taken a crowbar to him, cracking his ribs and piercing a lung.

The next day police come to the same room, armed with arrest warrants, to remove the brothers. They recuperate in a hospital of the Interior Ministry; then they are transferred to prison for two months until tens of thousands of demonstrators finally secure their release through protests.

BUCHAREST, ROMANIA, JUNE 18

It is impossible to understand the brutality of this springtime in Romania, but it helps to know what came before. First the Romanians were forced to fight, successively, on both sides during World War II. Then came communism and the megalomaniacal regime of Nicolae Ceauşescu, which ended only with his execution on Christmas Day 1989.

Romanians had no rights of any kind, barely enough food to survive, a few hours of electricity a day, no heat in the harsh winters, no contact with the outside world. To increase the country's population, contraceptives were banned and abortions were virtually forbidden, which spawned a generation of abandoned children—all of which must have left deep scars in the national psyche.

"What Ceauşescu had undertaken," a friend with long diplomatic experience in Romania told me, "was to turn 23 million Romanians into zombies with the sole purpose of producing for the state—and for the pharaonic life-style of the ruling family."

To get an idea of Ceauşescu's values, you need only visit his newly constructed—but never occupied—House of the Republic. One of the largest buildings in the world, it is boxy and outlandish, dwarfing any human who stands before it. With more than a thousand rooms and a hundred public reception halls, it is fitted out with fine furniture, gold-leaf walls, and thick slabs of marble. This communist palace supposedly cost a billion dollars to build, perhaps more.

Twenty miles to the west in the village of Grădinari, I see the other side of Ceauşescu's legacy. Here, in a decaying mansion called the Home for Non-recuperable Children, the government sent severely disabled patients to be forgotten, rather than waste official funds on remedial programs.

I see a hundred children wandering the halls or sitting outside, sleeping, screaming, defecating, sometimes fighting. Mosquitoes and flies buzz at their open sores. I see autistic, spastic, and retarded children, children with

cretinism. I am told that some could be helped with training or teaching, but little money is forthcoming from Iliescu's government. Although one physician commutes here daily from Bucharest, her duties are largely administrative; otherwise, no trained nurses, psychologists, or instructors care for the children. A kindly woman named Joana Dodoiv and a staff of 13 others provide for these patients as best they can, but there is little at Grădinari except empty time, day in, day out.

When one of the little patients, a boy no more than ten, takes my hand and silently looks into my eyes, I can take no more. I have to walk away.

SOLCA, ROMANIA, JUNE 23

Even Ceaușescu could not snuff out certain instincts. Driving along a country road in Moldavia, searching for a medieval monastery, Tomasz and I happen upon a wedding party walking in the opposite direction.

The groom, looking impeccable in a black suit, smiles, as does the bride. She wears red. Both carry flowers, and everybody is singing. It is the happiest thing I have seen in this tortured country. We stop and ask for permission to photograph the couple, and the groom waves for us to join them.

"You will be our guests!" he says.

Of course, we accept. I find a bottle of Scotch stashed away in our battered red Dacia station wagon and present it to the couple. They pile into the car, and we drive several miles to the home of the bride's parents.

We join the other guests who gorge on meats, pâtés, sausages, eggs, and Moldavian specialties I am unable to identify. They tell me I am the first American to attend a Moldavian wedding. We begin a round of toasts with powerful Romanian vodka—To Dorin and Georgets Gralis! To Romania! To the United States! Someone produces a violin and an accordion, and the dancing begins, men and women plunging into the *hora* and, to my amazement, something very much like the earthy *lambada*.

It is all very festive and warming, and I wonder if it would have been this way a year before, when food and foreigners were so much scarcer. Tomasz and I quietly slip away, delighted to have been part of it.

Making our way back to the city, we round a switchback on a mountain road and encounter an old man walking. He has a white beard and he carries a scythe, the very image of Father Time. He flags us down.

"I am Aristide Cosmiuc," he says with a flourish, "a poet and a philosopher." He begs to recite a few verses. His voice is soft but strong, rising and falling through the poetry, and I catch only the drift of his Romanian, enough to know he's saying something about love and faith and wisdom. When he is finished, he tips his hat and resumes his solitary progress up the mountain, stepping lightly.

SOFIA, BULGARIA, JULY 4

After the turmoil of Romania, it is a pleasant surprise to arrive in a country where the government isn't trying to kill its citizens. Bulgaria, which was the oldest communist police state in the region, seems highly civilized by comparison. Students seeking democratic reforms argue with the new socialist government here, but the debate is good-natured and peaceful, which is extraordinary when you remember that postwar Bulgaria has no democratic traditions whatsoever.

At Sofia University I find student strikers dozing in the sun on the steps. Others strum guitars, read newspapers, and chat pleasantly. A professor with a white beard climbs out of a third-floor window, moves gingerly along the ledge to the next window, then repeats this feat in reverse, disappearing into the building. Nobody knows why. But the students are mildly amused. ("He teaches Greek history," one of them tells me.) Nobody is seeking confrontation, and no police show up.

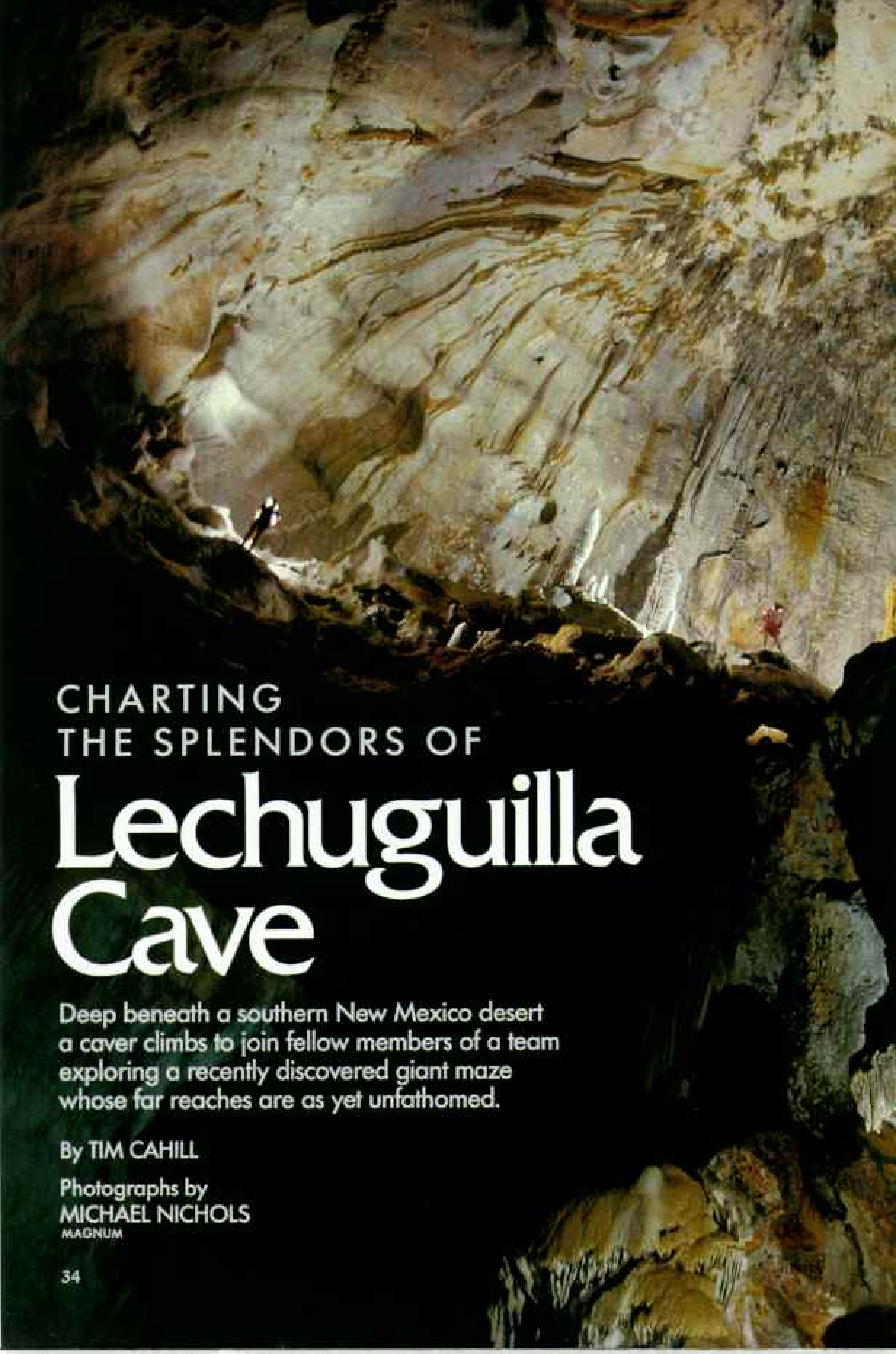
Looking around town, I pass the massive building of the Central Committee of the Communist Party, and on Ruski Street I find a huge statue of Lenin, a figure more tolerated than admired these days. "We let the statue of Tsar Alexander II stand during the communist years, so why not let Lenin stay?" a Bulgarian official asks, shrugging.

The tolerance is surprising, given the suppression and enforced isolation Bulgaria has suffered, but I am relieved, here at the end of my journey, to find that spark of goodwill. All over Eastern Europe the days ahead will be difficult, with mounting debt, rising unemployment, and civil unrest demanding much of these already fatigued nations. But they have been through worse, and I know how their immense reserves of courage, common sense, and humor sustained them. They will survive—of that I am certain.

NEAR SNAGOV, ROMANIA

Reclaiming the land, a couple dig a new foundation close to where their house once stood. Their village, bulldozed by Nicolae Ceauşescu to increase farm parcels and

production, has given way to a sterile town of high rises. Although the new regime has allowed them to return, the building of a free and prosperous society here remains as unpredictable as next year's crops. Seeds of democratic hope have been planted throughout Eastern Europe. It will be a difficult harvest. □



CHARTING THE SPLENDORS OF Lechuguilla Cave

Deep beneath a southern New Mexico desert a caver climbs to join fellow members of a team exploring a recently discovered giant maze whose far reaches are as yet unfathomed.

By TIM CAHILL

Photographs by
MICHAEL NICHOLS
MAGNUM

I SIT ON MY air mattress and wait to stop sweating. Fifty miles of caverns plunge and snake and twist away from me in every direction, passages of impenetrable darkness, like damp black velvet pressing against my face. The disk of light from my helmet lamp sweeps across the walls of the tunnel as I turn my head. The surface is white, glittering with gypsum crystals, and crystals loosened by my body heat snow gently onto my hands. The air smells clean and wet, like fresh laundry, and the silence is absolute. It must be like this in outer space, I think, but I am a thousand feet underground.

I am, in fact, in the heart of the newest wonder of the world. Only five miles from Carlsbad Cavern, New Mexico, Lechuguilla Cave has been astounding cavers and scientists alike for the past five years. How much more remains to be discovered is unknown, but at 1,565 feet it ranks as America's deepest cave, full of rare and fantastic formations. Some have never been seen in this quantity anywhere else, and a few, like the subaqueous helictites (page 57), were never even imagined. It is as if someone had just discovered the Grand Canyon in this day and age.

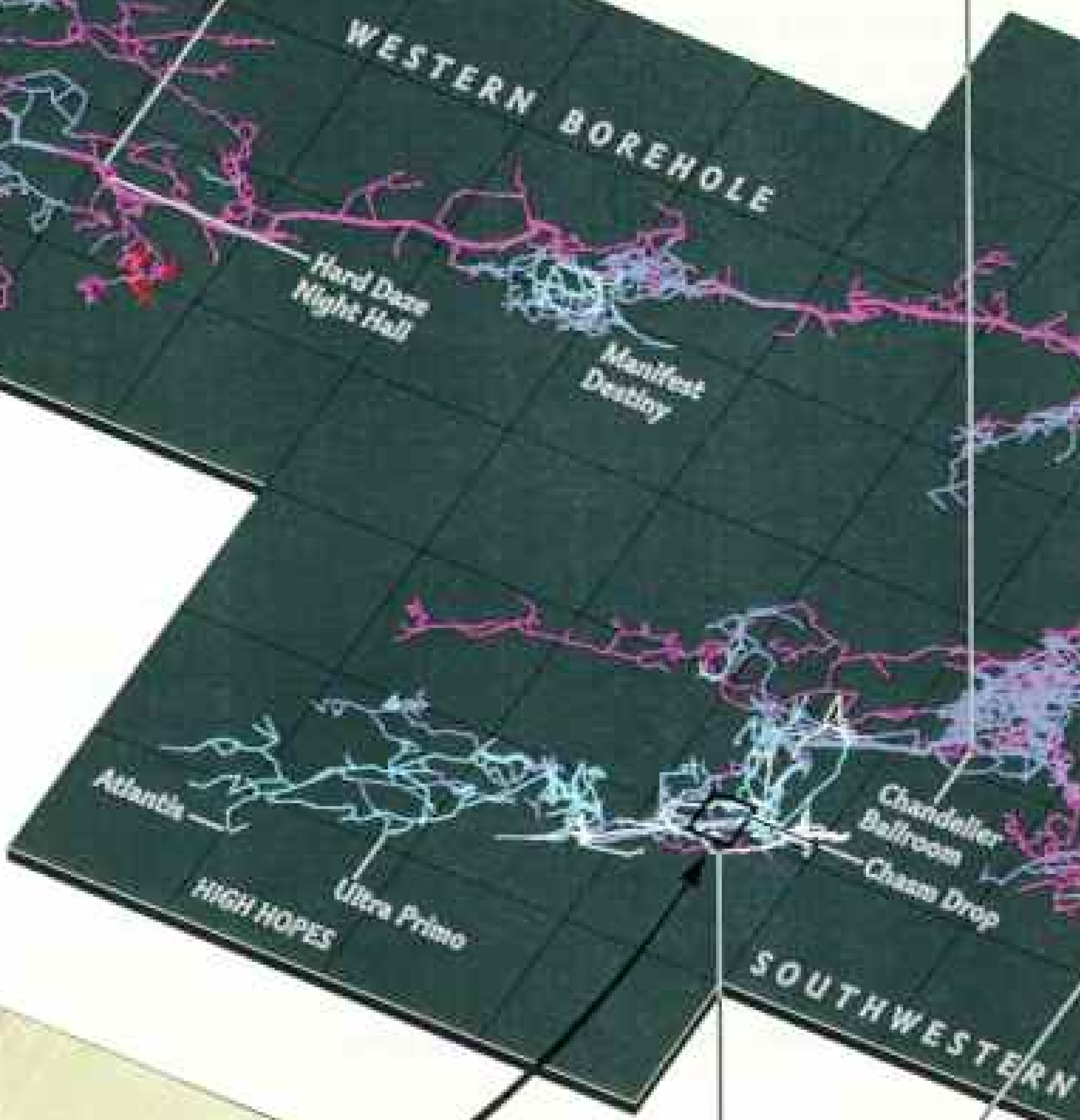
Like the Grand Canyon, Lechuguilla is overwhelming. Experienced cavers (the only kind that can deal with Lechuguilla's demands) are immediately dazzled: "The finest underground wilderness in the world." "Arguably the most beautiful cave in the world." "The cave I've been looking for my entire caving career."

It's not just the immense size of the rooms that is so amazing but also their lavish decoration—glittering white gypsum chandeliers 20 feet long, walls encrusted with aragonite "bushes," rippling strands of indescribably delicate "angel hair" crystals, some 30 feet long but so fragile that a puff of air can break them. The cave's shimmering lakes, like liquid sapphires, have lain untainted for millennia.

The excitement in the caving world has been so intense that the rate of exploration has amounted to a subterranean invasion as teams of cavers have worked in relays to "push" the cave ever farther.

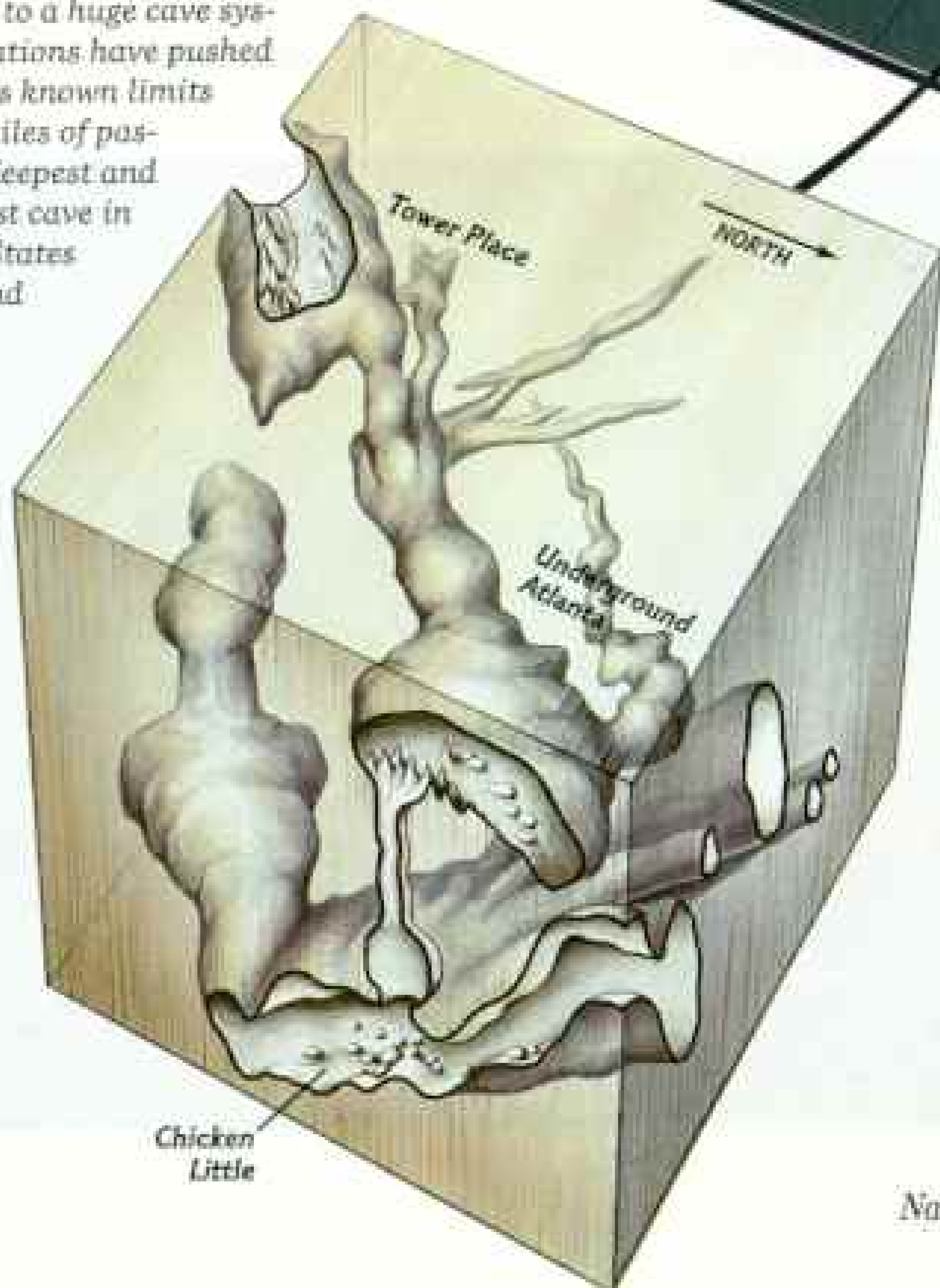
But Lechuguilla doesn't reveal its secrets willingly. You have to work even to enter the cave, descending a rope straight down into a 70-foot pit and down another 18 feet to the culvert that shores up the entrance. You take off its cover, and winds of as much as 65 miles an hour howl out of the earth, swirling dust and grit into your

Huddled like gnomes, stalagmites of calcite, a deposit of calcium carbonate, cluster next to a pool in the Pearlsian Gulf (left), a room named for its calcite cave pearls. Nearby, a bed-size crack shows Lake Castrovalva, whose pristine water is free of sediment. For this report the author and photographer joined other cavers for several four-to-five-day expeditions.



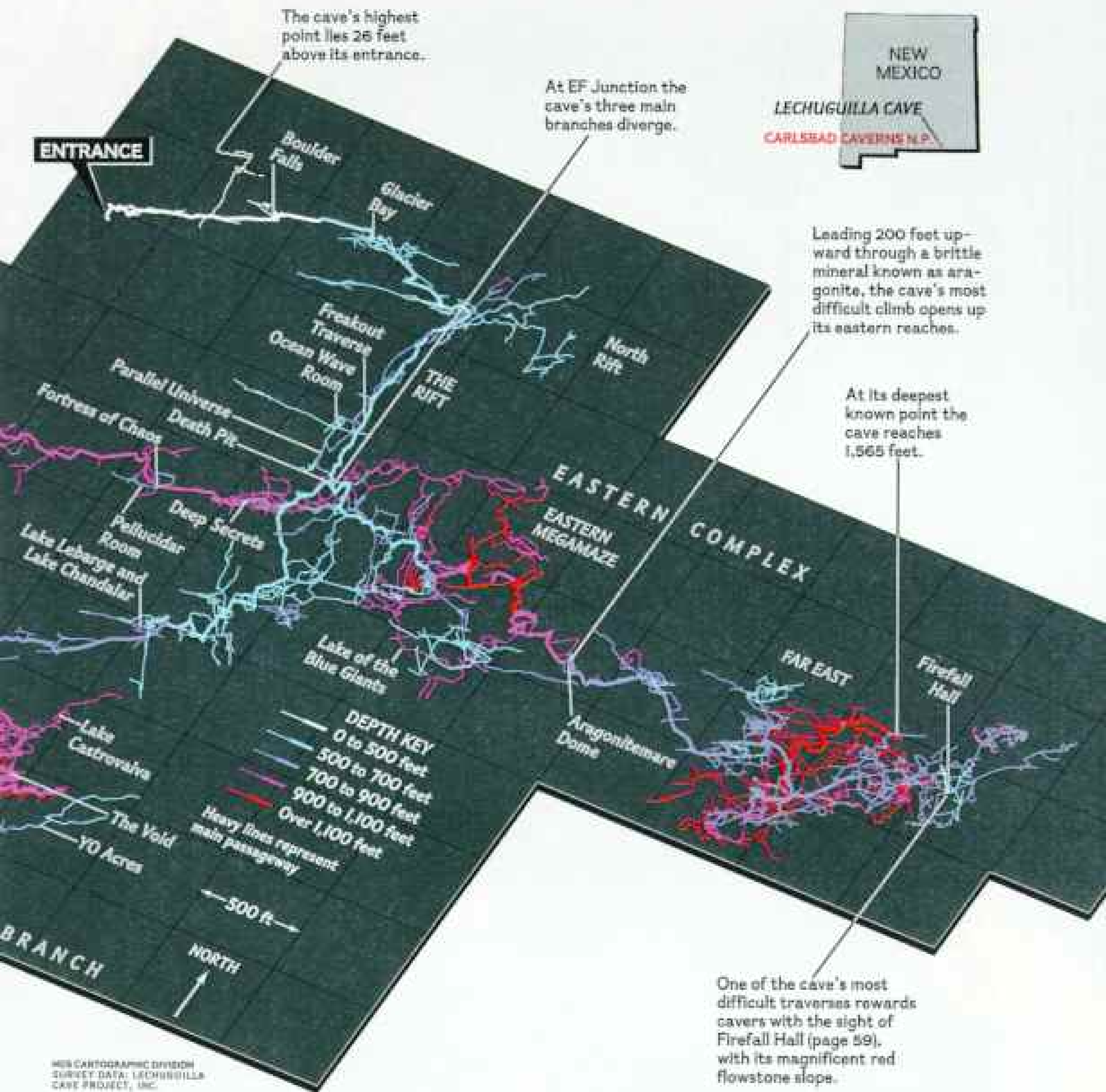
Exploring Lechuguilla's Labyrinth

Although long suspected, the existence of another sizable cave in Carlsbad Caverns National Park was not confirmed until 1986. That year cavers found Lechuguilla's only known entrance by digging in a 90-foot-deep pit once called Misery Hole. Wind blowing out of the rubble was the clue to a huge cave system. Explorations have pushed Lechuguilla's known limits beyond 50 miles of passages—the deepest and fourth longest cave in the United States—with no end in sight.



Lechuguilla is a type of cave rare for the way it was formed. When the surrounding Guadalupe Mountains were uplifted beginning some 20 million years ago, cracks in the earth's crust released hydrogen sulfide, which rose from nearby oil reservoirs. As it reached the water table, it reacted with oxygen to create sulfuric acid, which ate through the limestone to form Lechuguilla's labyrinth of tunnels and rooms (left).

SCALE VARIES IN THIS PERSPECTIVE



eyes. Climbing into the culvert, down a 30-foot ladder into the wind and the dark, is the only way in. And the only way out.

Once I'm inside, any effort makes me burst into a sweat: The temperature stays around 68 degrees, and the humidity near 100 percent. Dehydration is a danger, and my two quart-size canteens are filled with electrolyte replacement fluids to tide me over till the next water hole—perhaps four hours away.

The cave is not demanding technically, but the climbing and the heat never let up; they punish the body and the mind. (Lechuguilla cavers like to joke that the labyrinth stretches 50 miles with only three flat spots.) The place-names evoke the challenge: Freakout Traverse, Death Pit, Land of the Lost, Fortress of Chaos, The Void. A typical move is like getting up onto a table, crawling across it, then climbing down. Easy, unless you have to do it 50 times in a row, in the dark, with a 50-foot drop-off beneath you.

Crumbling "cornflake" or "popcorn" rocks made slick by greasy mud are treacherous, and sharp gypsum crystals work their way under my soaking T-shirt and into my shorts. I cut my elbow sliding onto a razor-sharp aragonite formation. It takes two terry-cloth headbands to keep the sweat from my red-rimmed eyes. My 40-pound backpack is hateful.

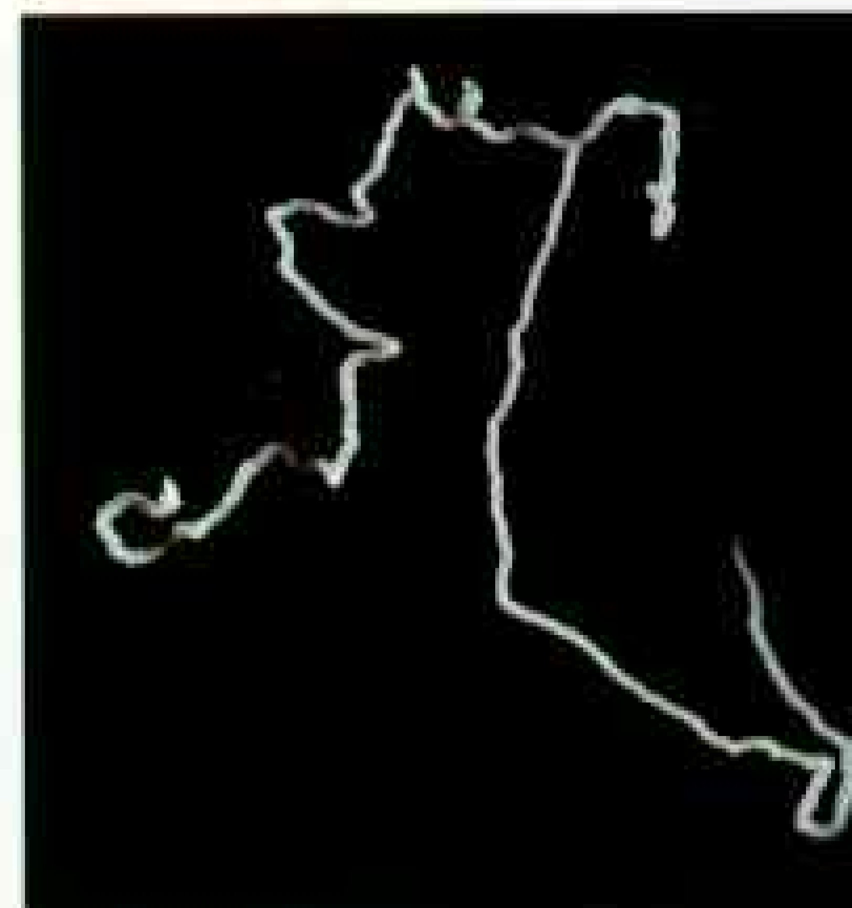
This is my first of three trips into *(Continued on page 46)*

PRECEDING PAGES: A netherworld of prodigious formations unfolds for Bob Coney and his wife, Kathy Minter, as they ascend just after the initial exploration of Chasm Drop. The two Decatur, Georgia, cavers discovered the chasm, which plunges 180 feet.

BELOW: Like creatures from a sci-fi movie, gnarled calcite columns stretch more than 50 feet to the ceiling of Tower Place. The columns and floor are composed of flowstone, deposited as sheets of water gently washed over the cavern walls and floor.

(Continued from page 39)
Lechuguilla Cave; I will spend four days with seven other cavers who are exploring and mapping, and it is slow, exhausting work. Every moment of discovery is earned by an hour of tension as we creep cautiously over unknown terrain. It seems that every time I put my foot down, something gives out from under me. Before long I lose my confidence about climbing anywhere. It becomes harder to push myself mentally. I am not the only one struggling. At times I hear some of the others asking the cave to let go of them.

We catch up with another team of cavers crawling through what is called a boneyard maze, a series of dry, dusty passages winding around and over and through one another like tunnels in an anthill. At one point there is a walking passage that skirts a



Sprays of gypsum crystals festoon the Chandelier Ballroom (left). A tendril of helictite—a form of calcite (below left)—extends erratically from a wall. The cave abounds in fantastic stone decorations (right): a gypsum beard growing out of the rock, crystal by crystal; a balloon of hydromagnesite (a magnesium carbonate compound) once inflated by gas, possibly carbon dioxide; and a formation whose aragonite spikes inspired the name bottlebrush.

funnel-like pit, which drops off into darkness. I slip, fall, and begin sliding rapidly downhill, feetfirst.

The funnel is a foot deep in powdery rock flour, and I am sliding down on my belly—not entirely uncomfortable, although the events of the immediate future concern me. Caver Pat Kambesis is below me, and she reaches out a hand. Pat weighs a hundred pounds. I weigh two hundred and have gathered a bit of momentum. It occurs to me, in passing, that if I take Pat's hand, I'll pull her down with me, and she will share my uncertain future. I decline her offer, rather gallantly, I think.

A sharp rock rips through my T-shirt and gashes my chest. I can now see that there is a low archway just below. I get a leg up and manage to stop myself, *bam,* like that. I am not badly hurt, only embarrassed.

FINALLY WE STOP to rest, turning off our lights to save the batteries, wired from a pack on our belts to our helmets. Each of us carries extra headlamps and batteries because in Lechuguilla light is even more crucial than water. After all, you can get more water from the cave's pools.

We sit together, talking about what we've seen and about other things as well—things we would probably never say on the surface—clasped by the mysterious bonds that tighten around strangers in the dark, especially if they're sharing danger. We are too exhausted to go farther, so we each find a place to spread out a sleeping bag. We boil water on our camp stoves for our freeze-dried food, which we spoon right out of the foil

Nature's unhurried artistry hollows a calcite stalagmite (above) by dripping water from the cave roof. In the Pearlsian Gulf, cave pearls form when loose bits of foreign matter pick up successive coats of calcite from gentle splashes of water.

packet, then sleep. I don't wake up for 20 hours. After taking a shorter rest, the others—all veterans of Lechuguilla—continue exploring.

They are part of a team from the Lechuguilla Cave Project. Under the supervision of the National Park Service (the cave is part of Carlsbad Caverns Park property), the LCP bears the responsibility of exploration, pushing new leads to see where they go and mapping meticulously. Anyone with a valid scientific reason and proven caving skills can get an entry permit, but many cavers wait to join one of the several LCP expeditions each year. It is vital to protect the cavers, but it is also essential to protect the cave.

Everyone I meet is rabid about conservation. Dan Clardy, for instance, is absolutely zealous. If Clardy sees so much as the print of a muddy glove on a stalagmite, he immediately puts down his pack, takes off his shirt, and wipes the formation clean.

I've seen cavers routinely put themselves at risk of a fall simply because they didn't want to mark a formation by grabbing or stepping on it. But it is inevitable—and all the cavers castigate themselves for it—that sometimes you cannot help damaging a formation.

Exhaustion can erode your scruples too. That's why people have to be in shape to go in. "If you're physically wasted in the cave," LCP team leader Richard A. Bridges emphasizes, "you're not worried about protecting the cave. You're worried about getting your butt out. That's a point a lot of people do not recognize."

Yet we are always careful to lay down tarps to catch our crumbs as we eat, to wear special non-marking boots, to strip off our clothes if we have to swim a lake so as not to foul the water (we only swim if there's no other way to cross). And the LCP places pitchers beside water holes so cavers can refill canteens without dipping them into the water and contaminating it with dirt from the outside.

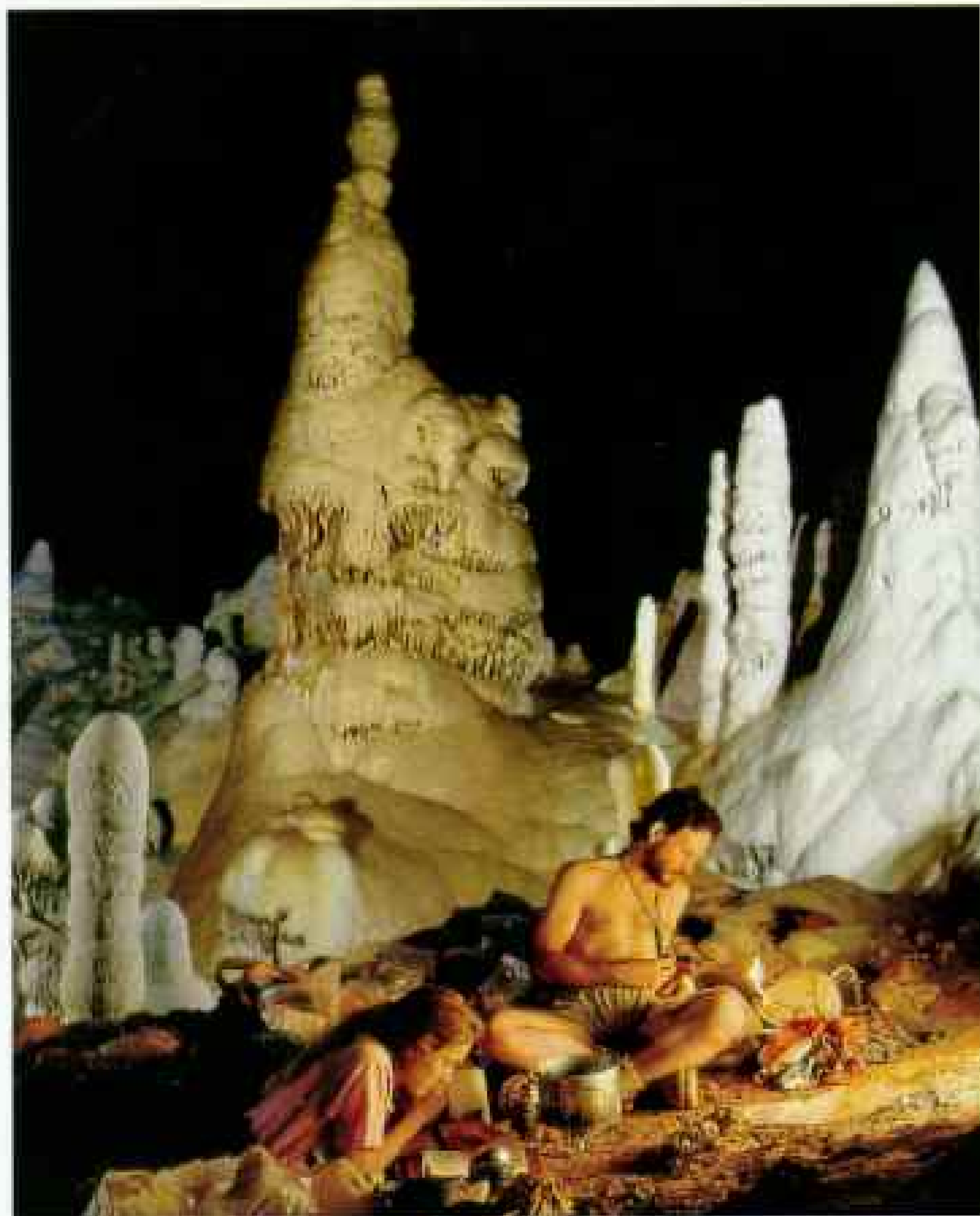
Because the cave opening was covered for years by rubble (and

In an unearthly rock garden called Atlantis (above), stone shelves shaped like birdbaths mark the surface of a pool that has since receded. They were formed at an earlier water level around columns, as minerals in the water crystallized and grew outward. Dave Modisette examines helictites (above right).

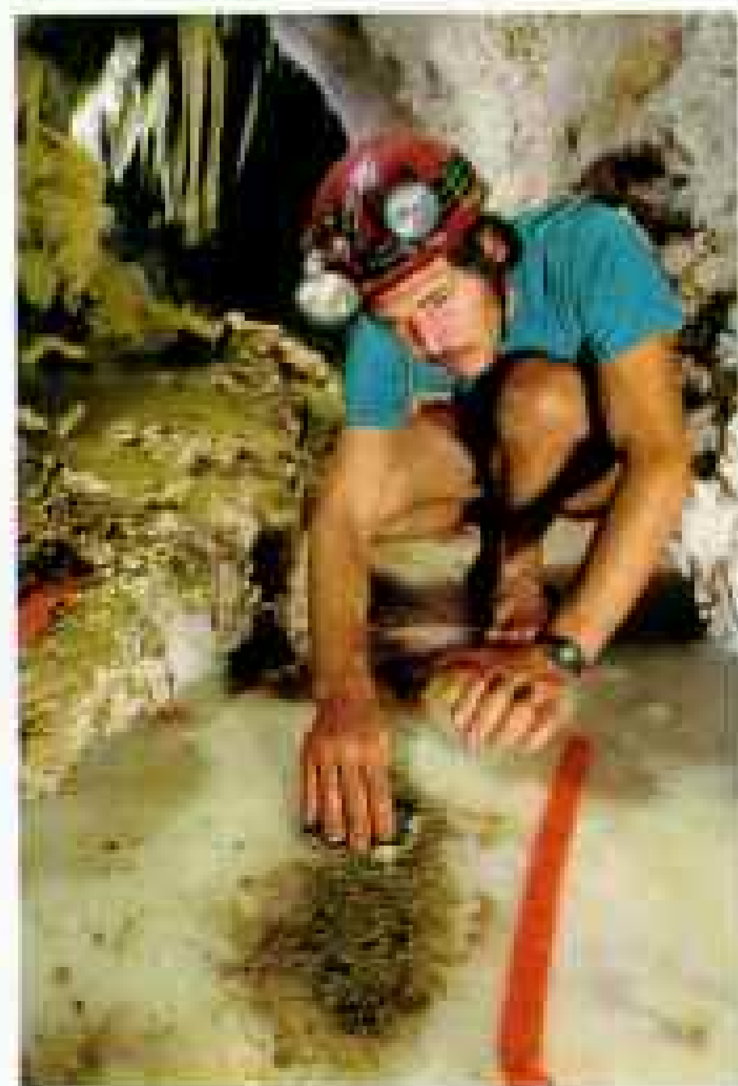
At the entrance culvert Bruce Zerr clocks winds at 48 miles an hour. Even stronger winds have been recorded during periods of low barometric pressure. Figuring the volume of escaping air, the air pressure, and the average size of the chambers, Zerr believes the cave may be much larger than the area explored.

Beneath an inverted forest of stalactites, a team member wearing a caver's helmet equipped with a carbide lamp climbs from the depths toward YO Acres. For this

world of absolute darkness, most team members wore head-mounted electric lamps and carried backup lights and plenty of spare batteries.



Day's end finds Bob Coney and Kathy Minter camped in Underground Atlanta, a room they discovered on a previous trip. Dan Clardy rinses off a footprint left by an earlier expedition. Orange tape marks the cave trail. To protect a pristine area, a caver (right) removed his boots before ascending the flowstone in the Ultra Primo chamber.



even now can be entered only through that narrow culvert), there is very little visible life inside. Biodegradation is radically slowed, making Lechuguilla a fascinating environment to study but a difficult one for cavers. We strive to keep it pristine and leave nothing behind—that means nothing. Plastic bags serve as toilets, which we then wrap in foil and pack out.

THE CAVE was discovered in several stages. Back in 1914 the 90-foot entrance pit was mined for guano. The bottom of this pit, called Misery Hole in the 1950s and later named Lechuguilla Cave, was clogged with rocks, but sometimes wind could be heard whistling out of one corner.

Large caves tend to "breathe"; they inhale and exhale great quantities of air. When the barometric pressure on the surface changes, air rushes in or out seeking equilibrium. Although there was no obvious way in, a number of people concluded that there had to be a major cave somewhere below the rubble.

Over the years cavers dug in Misery Hole. Eventually, on May 25, 1986, three men broke through—Dave Allured, Rick Bridges, and Neil Backstrom, from a group calling themselves the Lechuguilla Dig Project. The cave was inhaling that day, and Bridges remembers feeling the ground begin to give way, like sand in an hourglass.

After breaking through and easily traversing a passage, they came to a sheer drop. "I looked in and said, 'This isn't a climb down, this is a bottomless pit!' " Bridges recalls. "I mean that was the biggest, darkest hole you'd ever seen in your life."

Cavers don't ask for much; the mere prospect of discovery gets them excited. But in Lechuguilla they have opened a world that is equally exciting to scientists. Hydrologist Art Palmer and his geologist wife, Peg, are fascinated by speleogenesis, the formation of caves. In limestone areas most caves are created by carbonic acid in water. As the water percolates downward, the acid gradually dissolves the limestone in predictable patterns along structural weaknesses.

But Lechuguilla, the Palmers tell me, was born of the more powerfully corrosive sulfuric

acid produced when hydrogen sulfide rising from nearby oil reservoirs reached the water table. This process eats out, from the bottom up, a pattern of rooms and passages that is difficult to predict—and much more exciting to explore.

Other scientists are intrigued by the strange environment, which they expected would be sterile. "In fact," says geologist Kimberley Cunningham, "we find that Lechuguilla is a microbiological forest." Cunningham believes that the air flowing deep in the cave transports tiny organisms that consume the rock. There are bacteria in Lechuguilla that are chemosynthetic, able to feed off sulfur, manganese, and iron in the limestone. In turn there are fungi that live on the bacteria. These organisms and the corrosive cave air may create the slippery brown mud I feel. For Cunningham the idea of a cave being modified by microbiological means is perplexing: "We're talking about bacteria and fungi directly influencing the growth of crystal decorations."

But the challenge of exploration is the real driving force

behind all the effort. Hard-core cavers literally live for that challenge. Fifty-two-year-old Donald Davis, a beekeeper from Colorado, calls caving an obsession and has made more than a dozen forays into Lechuguilla. "Caving," he says, "is the only activity in which a person of modest means can actually explore the unknown."

Cavers are impelled by "borehole lust," "virgin passage fever," the passion for discovery. Talking later with Ronal Kerbo, a National Park Service cave specialist, I remarked that the exploration of the cave reminded me of the Lewis and Clark expedition.

"You know," Kerbo replied, "I used to use that analogy myself. But then I realized that everywhere Lewis and Clark went, there were people. Exploring Lechuguilla is entirely different. No one's ever been in those virgin passages. It's Neil Armstrong stuff."

To see a new part of a cave for the first time is called "scooping booty," and I have done it. I am climbing with Pat Kambesis, who is the LCP's chief cartographer, and we are trying to see how far a new

Squeezing through a gap, Chris Stine explores an arm of Lake Castrovalva (above). To avoid fouling the water with dirty clothing, he wore nothing but his helmet. The team never used cave water for bathing, instead settling for occasional sponge baths with premoistened paper towels. Diver-photographer David Bunnell illuminates and explores the Lake of the Blue Giants, which he found to be 90 feet deep.

Delicate helictites growing in a pool in the Pellucidar Room of Lechuguilla are astonishing—a formation never seen before.

lead might take us. We come to a junction room with at least five more good leads that I can see. The best one, I think, is a man-size keyhole-shaped opening in the rock, completely rimmed in gypsum.

We have discovered the leads; our job is done. It is bad form to scoop booty and not map. Still, we will map this room later, and I cannot help myself. I have to see what is on the other side of the keyhole.

So I scoop the rim, alone. On the other side of the keyhole there is a concave block of gypsum, sculpted by the corrosive wind into an upward sweeping curve. It looks like a cresting ocean wave. I sit and study it for several minutes. Something that feels very much like victory expands inside my chest, and I think I can hear my own heartbeat echoing off the cave walls. Neil Armstrong stuff.

No one can say how much more of this extraordinary underground wilderness there is to explore, or what wonders remain to be found. "For me," says Ron Kerbo, "I think Lechuguilla's significance is that it continues to foster the spirit and the heart and soul of exploration. And out of exploration comes knowledge."

"The cave doesn't end," Rick Bridges observes. "The cavers end."

I know what he means. Climbing back up toward the surface, we are exhausted, and we haven't been able to push all the new leads. I had even hoped we would find a major new wing of the cave. But that was before last night, when all the handholds had given way on me; I was bleeding quite a bit from the left arm, the walls looked crumbly and tight, I was sweaty, and the thought of getting all that dust down my neck and in my shirt didn't appeal to me. When we had pushed all the leads except for one very narrow fissure, I just didn't feel like pushing any farther.

When it comes time to name our finds and transfer our survey data into the computer, Pat nods to me. "The Ocean Wave Room," she says. I feel gooseflesh rise along my arms and across my back.

"A whole new world has been opened up," hydrologist Art Palmer told me. "It's something that is ongoing and luring people on and on and on."

The Ocean Wave Room. □

Swirls and ripples mark folia (below), rare calcite deposits that grow on walls at water-table level and reveal its fluctuations over the millennia. A caver descends in Firefall Hall (right), a remote part of a cave that, with further exploration, is certain to reveal other spectacular sights.

French-Canadian esprit de corps impassions a crowd waving Quebec flags on a day honoring their patron saint, Jean-Baptiste.

SPIRITED HEART OF MONT

FRENCH CANADA

REAL

By DOUGLAS B. LEE
NATIONAL GEOGRAPHIC SENIOR STAFF

Photographs by
SISSE BRIMBERG

Hull-ripping barrier to French explorer Jacques Cartier in 1535, the St. Lawrence River's Lachine Rapids douses tourists running its white water in aluminum

jet boats. Prevented from sailing farther west, Cartier scouted the large island nearby and climbed its prominent hill, naming it Mount Royal.

IT IS A BLUE-AND-WHITE DAY in Montreal, the colors of a summer sky and the flag of the province of Quebec. On the sidewalks of Rue Sherbrooke flutter thousands of the flags, the white fleurs-de-lis on an azure background, the symbol of New France. Three hundred thousand persons have come to parade in honor of the patron of French Quebec, St. Jean-Baptiste—John the Baptist.

"You Americans have your Fourth of July," a bystander tells me. "English Canadians celebrate on July first. June 24 is our day—this day is French!"

The crowd is frisky with the first warm weather after a rainy spring. It is the biggest St. Jean-Baptiste parade since 1968. That year French-speaking separatists threw bottles and tomatoes at Pierre Trudeau, then the nation's prime minister and a French Quebecer who stood for Canadian unity. Today there is no hint of violence, but emotion is

palpable. It hovers like heat shimmer as speeches ring out across the park that hosted the 1976 Olympics. A 90-foot-long Quebec flag drapes from the tall, canted tower above the stadium as the crowd cheers.

"There is a place for us, and that is here," one speaker says. "There is a language for us, and that is French. There is a time for us, and that is now!" The flags wave.

Times have changed. In 1980 a majority of Quebec voters rejected independence for the overwhelmingly French-speaking province. Just two days before this parade, however, the flames of separatism were rekindled when Quebec's effort to amend the Canadian constitution, granting the province status as a "distinct society" within the national confederation, failed. The legislatures of Newfoundland and Manitoba had rejected the so-called Meech Lake accord, named for the site of a national conference on the subject.

The mood of the crowd today is one of cheerful awareness that if French Quebecers are to achieve full recognition of their special culture, they may indeed have to seek a new identity as a sovereign nation. And it is likely that the question will be decided amid the skyscraper canyons of this city, Canada's second largest and third oldest, as it approaches its 350th birthday in 1992.

Montreal is not French alone. In the mid-19th century the majority of Montrealers were English speakers; they still make up 20 percent of its three million metropolitan population. Most residents are bilingual, and polyglot other tongues attest to Montreal's role as a haven for immigrants.

The city's landmarks are Mount Royal, only a hill in elevation but a towering peak in the hearts of Montrealers, and the St. Lawrence River glistening at the bottom of sloping cross streets. The contrast of mountain and river, of French and English cultures now mixed with many others—these shape and define the complexity, charm, and problems of this grand old island gateway to the heartland of the continent.

Montreal's story begins in 1534 when the French navigator Jacques Cartier, landing on the Gaspé Peninsula, claimed a vast swath of North America for the French king. The next

Snow translates into instant sport for students at McGill University, by tradition an elite institution of English-speaking, or anglophone, Montrealers.

The French-speaking, or francophone, majority of the city and province demanded that a new Canadian constitution recognize Quebec as a francophone "distinct society." However, not all the other Canadian provinces ratified the Meech Lake accord, which would have cleared the way for such a provision. Result: a French word with identical meaning in English—impasse.

MONTREAL

Since its settlement by Sieur de Maisonneuve in 1642, Montreal has transformed itself from a missionary outpost and fur trading center to Quebec's premier metropolis. A financial and transportation hub, Montreal is the largest French-speaking city in the Western Hemisphere. Laughter from cafés of Old Montreal, map below, echoes down narrow cobbled streets thronged with visitors.

Land use

- Residential
- Commercial
- Industrial
- Public
- Rural or recreational
- Undeveloped

- Major highway
- Other highway
- Metro
- Point of interest
- Cemetery
- PONT Bridge

NGS CARTOGRAPHIC DIVISION

POINTS OF ARCHITECTURAL INTEREST

1. Grand Trunk Building
2. Customs House
3. Grey Nuns General Hospital
4. Royal Bank
5. Caverhill Building
6. Montreal History Center
7. Youville Stables
8. Old Harbor Commissioners Building
9. Old Customs House
10. Old Stock Exchange Building
11. Old Seminary
12. Notre-Dame Basilica
13. Bank of Montreal
14. New York Life Building
15. Aldred Building
16. Le Royer Courtyard
17. Ernest Cormier Building
18. Old Courthouse
19. Montreal City Hall
20. Château Ramezay
21. Rasco's Hotel
22. Bonsecours Market
23. Municipal Court
24. Notre-Dame-de-Bonsecours Chapel
25. Old Dalhousie Station, École Nationale de Cirque
26. Old Viger Station and Hotel

Gothic-to-glass Montreal rises above its Old Port on the St. Lawrence. Docked lakers (above), which haul grain from Prairie Provinces, and oceangoing vessels make the city Canada's busiest containerport.

year Cartier pushed up the St. Lawrence River. He landed on the largest island in an archipelago at the confluence of the St. Lawrence and the Ottawa Rivers. Met by a thousand Iroquoian Indians from the village of Hochelaga on the island, he climbed a small mountain and named it Mont Réal—Mount Royal. Then, within a day, he sailed off.

A little over a century later the first French settlers established themselves here, led by the nobleman Paul de Chomedey, Sieur de Maisonneuve. He named the site Ville-Marie, in honor of the Virgin Mary. The settlers had the idea of evangelizing the Indians, but for years there was conflict. In time the settlement became the center of the fur trade, its *coureurs de bois* ranging from the Rockies to the Gulf of Mexico.

Farmers came next, and *seigneurs*—big landowners. But the dream of a French Canada faded in 1759 when on the Plains of Abraham at Quebec City, founded three decades before Montreal, British forces defeated the French.

Montreal, with its key river site, continued to prosper under British rule. By the early 19th century it had become Canada's premier city: Here passed the settlers—British now—bound westward. Here flourished the entrepôt that served that west. And here in the 19th century rose the great port, industry, grain depots, leading banks, railroads, and insurance companies of Canada.

By the 1960s Montreal was that nation's largest and wealthiest city, guided by an English-speaking elite. But the '60s also saw Montreal's world turned upside down.

"PEOPLE USED TO SAY French Quebecers were dominated by priests, doctors, and lawyers," says Pierre Marc Johnson—doctor, lawyer, professor, and former premier of Quebec. We were dining at an outdoor café on Rue Saint-Denis.

Now in his mid-40s, graying at the temples, Pierre Marc is an heir of the "quiet revolution" of the 1960s, when René Lévesque and other members of the provincial Liberal Party masterminded a drive for education and social change among French Quebecers.

"Thirty years ago," Pierre Marc said, "the French society in Quebec was among the least educated and most religious in the Western world. French speakers were kept landbound and faithful, raising large families to

carry on a French presence in a continental sea of English speakers: '*la survivance*—the survival.' Industry was '*l'affaire des Anglais*—the business of the English.' Now that has changed."

Along with social improvements for French speakers in the sixties came economic help. Quebec nationalized most electric companies, including the large system of hydroelectric generators to the north. Hydro-Québec became a generous uncle for French-speaking entrepreneurs and contractors.

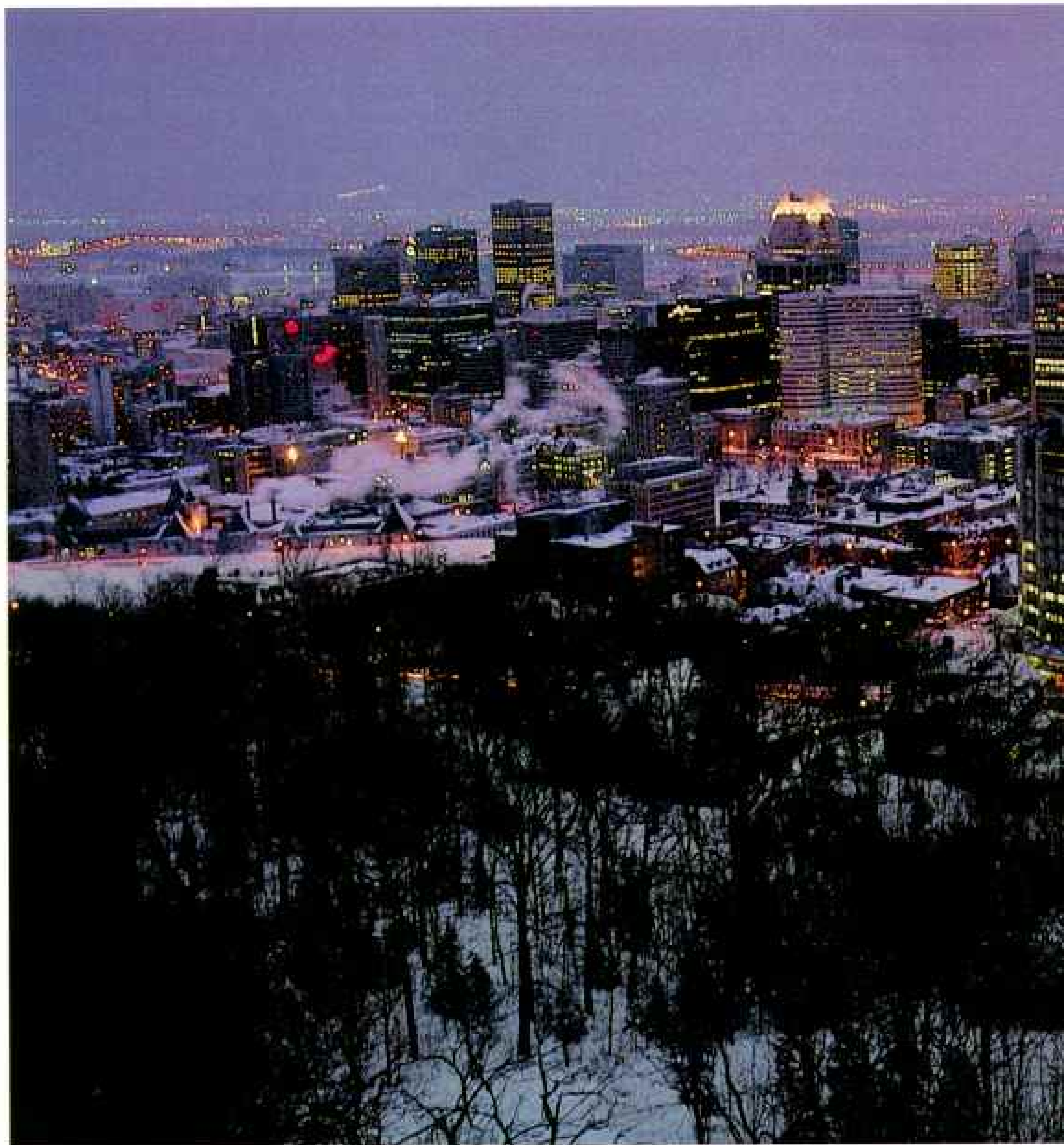
French nationalism expanded also. In 1970 bombings, kidnappings, and a murder by the radical Front de Libération du Québec (FLQ) led to the declaration of martial law. Federal troops appeared; hundreds of citizens were arrested and held without trial. "Almost no one was rooting for the FLQ," Pierre Marc remembers. "Quebecers have historically been against violence. But a lot of us joined the Parti Québécois when we were told, 'You're either a federalist and a patriot or a Québécois nationalist and a terrorist.' "

The crisis polarized Quebec society. In 1976 a separatist ground swell washed the Parti Québécois into power. The new leaders quickly passed Bill 101, mandating the French language in education, commerce, and public life. All public signs, it decreed, must be in French. Bill 101 also directed immigrants into the French culture—a crucial issue when the current low birthrate means that the percentage of native-born French-speaking Quebecers is declining.

ANGERED, UNCERTAIN about the future, thousands of English speakers voted with their feet—leaving the city. Many corporate headquarters moved to Toronto, which a decade ago replaced Montreal as Canada's largest metropolis. The vacuum in Montreal was filled by a new breed of French-speaking businessmen.

The first wave of French entrepreneurs had emerged in the 1940s, mostly self-made men in timber, paper, and pulp. A second generation got formal educations, expanded family businesses, and reached senior posts in bigger companies. "And," said Pierre Marc, "they adopted Montreal as the place to live

As "partial answer to Canada's northern problem," entrepreneur Jean de Brabant (above) built a condominium complex with a giant tropics-simulating greenhouse. Another solution: the five-story Place Montréal Trust's climate-controlled atrium.



Montreal's winter silhouette traces a renaissance that began in 1962 with the inauguration of Place Ville-Marie (at center with beacon), the city's first commercial complex to bring shops and restaurants together underground. Other buildings followed, linked by a network of subway tunnels and pedestrian walkways to form Montreal's renowned Underground City, where people gather in comfort.

and do business. We are only six million in Quebec. We can't afford to have half a dozen small cities, so we have one big one."

Still I wondered: If French Quebecers control the language issue and so much else, why risk the perils of independence? Their civil code is based on old French law, not English common law. Their strong collective sense has led the provincial government to regulate educational and social services: hospitals, schools, universities, cultural affairs, community and day-care centers, aid for children, the sick, the aged, the jobless.

"Many have long thought that our culture would be better served by our own independent political institutions," Pierre Marc said. "The difference now is that more and more people believe that Quebec—economically—is a feasible country."

All evening long we had been interrupted by strangers who stopped and greeted the former premier in familiar terms. A retired labor-union worker had shaken his hand. A young man with long hair bound in a bandana had recited Pierre Marc's personal history in a booming voice. An urchin in clean jeans, young to be out so late, had stopped and stared. "I've seen you on TV. Your name is . . . Johnson?" Pierre Marc explained the easy intimacy: "We're Latins."

As for Montreal's English speakers, once the kings of the city and now a minority, they sometimes grumble. "Talking to the Parti Québécois is like talking to someone who has the fervor of a religion," said one anglophone legislator. "They see no shades, only black and white."

Another politician, noting the ban on English signs in public, believes that the

With slap-shot intensity, seven-year-old Isabelle Demers steels herself before taking the ice. Inspired by the National Hockey League's Montreal Canadiens, youngsters suit up and pack indoor rinks. Skating is just one attraction at Montreal's annual snow festival, lower, where sunlight warms a pensive dragon competing in a snow-sculpting contest.

civility of English speakers makes a point. "When you obey a law that's asinine, stupid, and hysterical—that's tolerance."

I attended a specially arranged dinner party one night with students from three great universities in the city: McGill, founded by a Scottish fur-trade tycoon, James McGill; Université de Montréal, the largest French-speaking university outside France; and the Université du Québec à Montréal.

Leaders at their schools, the dinner guests knew and mostly liked one another. But there was silence, then laughter, when I asked if they often socialized together.

"This is probably the most social contact between these schools in history," one said. The walls of language are not barriers; all the students were bilingual.

Of the same generation, they nevertheless often misunderstand one another. "Sometimes there seems to be a feeling that you can't be Québécois and Canadian at the same time," said one young man.

Alex Johnston, a McGill student majoring in history, came to Montreal 12 years ago from Ontario when her father, David Johnston, became president of that university.

"I often wonder how I'd feel if Quebec actually separated," she told me. "I love Montreal, but I'm a Canadian."

Enrollment in French-speaking schools at age nine introduced her to French-Quebec literature and helped her understand the emotions of French Quebecers. "It made me want to be a part of Quebec. It also made me want to fight to stay a part of it. I hope that in 20 years I'll have a part in making decisions in Quebec. But I don't really expect to. Sometimes I just want to shake people. Someone has to compromise, and we have to get on with living together in this province and raising kids who are bilingual."

BUT ENOUGH OF POLITICS, I thought. I wanted to find out why so many Montrealers speak of their city as a first love, a mistress, a lifelong mate. Perhaps it is the older parts of the city: narrow, high-faced streets of damp gray stone that lean and wander with a European air. Or perhaps the insouciant fashions on Rue Saint-Denis, where French Montrealers go to see and be seen: *Femmes* dress with Gallic flair and a "go-to-hell" individualism.

Perhaps it is the festivals that crowd the year: an international fireworks competition, a Grand Prix car race, a jazz festival, a comedy festival, and—in a city that loves movies—an international filmfest.

I talked with Montreal filmmaker Denys

Eager to take your order, manager Jan Haim works the noontime crowd at Schwartz's Montreal Hebrew Delicatessen. "All the people in the world are coming to eat my smoked meats," he boasts of the spicy slabs piled in his window.

Arcand, prizewinner at Cannes in 1989. "For a French Quebec artist, there's nothing else than Montreal. Some dream of going to Paris, and do so, but that's another story. We're North American. The main thing we have in common with the French, other than French, is love of good coffee and bread."

We are drinking very good coffee with croissants at his favorite bistro in Outremont, a fashionable part of French Montreal. As an artist, Arcand tells tales of universal appeal, capturing in Montreal's here-and-now dreams from its subconscious. In *Jésus de Montréal,* the Cannes winner, a brilliant and obsessed young producer interprets the Passion play at a shrine on Mount Royal with parables the church is not ready to countenance. His conflict with authority leads to an altercation at the Crucifixion scene; he is left brain-dead because of time lost in visits to hopelessly chaotic hospital emergency rooms.

Arcand is very much an artist idolized in his own city, but he says he is careful to premiere his films outside Quebec. "People haven't known what to make of my films until they come back from somewhere else. Then they say, 'It got awards there, it must be very good.' That's the sign of an artistically uncertain city. Like many provincial cities, Montreal is unsure of itself."

But maybe it was Brigitte Bruneau, 34 years old, an 11th-generation Quebecer, who best put into perspective the affection for Montreal. We were in Notre-Dame Basilica, its stained-glass windows gently aglow. Montreal is a city of churches: Mark Twain, visiting the city in 1881, noted that "you couldn't throw a brick without breaking a church window."

"People don't go to church any more," Brigitte said, "but we're still attached to places like Notre-Dame. It's where you go for weddings. I know that my ancestors walked up its aisles. We're as much a city of steeples as Paris is a city of lights.

"Montreal is like a big village. When I'm away from it, I miss it, the human contact. I was in New Orleans once, in a jazz hall, and heard a French Quebec accent. I said hello, and found out the person was a cousin of a neighbor of mine.

"When I came back to Montreal, I was happy even waiting at a bus stop. Everyone was speaking French. I'd start talking to people next to me. I said, 'This is home.' "

Church attendance has indeed declined

Unsheepishly flaunting Quebec's blue and white colors, a mural in the largely French-speaking east side of town celebrates French Canadians, who proudly refer to themselves as "pure wool"—100 percent Québécois.

sharply, but faith was still strong in pilgrims I watched climb on their knees up the staircase that leads to St. Joseph's Oratory. Its outsize dome, comparable to St. Paul's in London, broods over the western half of the island from a perch on one of Mount Royal's summits, Westmount.

It was built in the 1920s through the inspiration of Brother André, who served in a simple role at a parochial school but dreamed of a great church on Westmount. Miraculously, some say, he raised the money from benefactors. The shrine is revered for healing. In its lower chambers, not far from the ornate case that holds Brother André's preserved heart, stand crutches and artificial limbs cast away by supplicants who departed healed.

Near the river, in a business district already head-spinningly vertical, a new peak will soon be the headquarters of Lavalin Inc., rising 45 stories. It will suit chief executive Bernard Lamarre to be able to see afar as he exports his engineering expertise worldwide.

The firm got its first boost with contracts for Hydro-Québec's massive development in the north of Quebec. Today some of the electricity produced is sold to U. S. power companies. Now Lavalin Inc. is helping dam the Yangtze and Yellow Rivers in China and the Karnali in Nepal.

Lamarre represents today's new French-speaking titans of business, but he also represents something else new. He is chairman of Montreal's Museum of Fine Arts and a highly persuasive fund-raiser. A 70-million-dollar expansion under way at the museum comes largely through private gifts.

"At least 70 to 75 percent came out of the French community," Lamarre says. "That may seem normal to you, but not long ago we were giving only a fraction of that. Until 1970 the museum was sponsored by the English community; it seemed a sort of private club. Charitable gifts were not a French Quebec tradition. Now that's changing."

IF I WERE GROWING UP in Montreal, I would want to run away with the Cirque du Soleil, the Circus of the Sun. Montrealers knew what they liked when some canny circus and street performers reinvented the wheel, or more correctly the ring, with Cirque du Soleil. Eschewing animal acts and two of a grand circus's rings, Cirque du Soleil relies on intimacy with the audience, on character and

In a tangled tableau, three young contortionists from Montreal's Cirque du Soleil are bent into shape by their instructor. First rigging its tent in 1984, this all-human circus mixes the big top with the blacktop, as seasoned circus performers join street artists in a theatrical explosion of acrobatics, juggling, cycling, and old-fashioned clowning around.

fantasy, and above all on the artistry and acrobatics of the human body. The success of this concoction has become a pride of the city. This year it dispatched the circus on an eight-city North American tour.

At Montreal's province-funded École Nationale de Cirque, the students were doing their homework—on the trapeze, stilts, trampolines. The school, with an enrollment of more than 200, provides its dozen fearless teenagers and preteens with an academic education while they learn the arts of the big top.

"At first I wanted to do trapeze," said merry-faced, 16-year-old Jennifer. "Then I tried tightrope and I liked it better, so now I'm a tightrope walker."

Said her friend Karina, whose hair was dyed purple: "I leave my house in the morning at 7:30 and get home at night at 9:00. But I like the circus, so it's worth it."

"Sacrifice," Jennifer said, laughing.

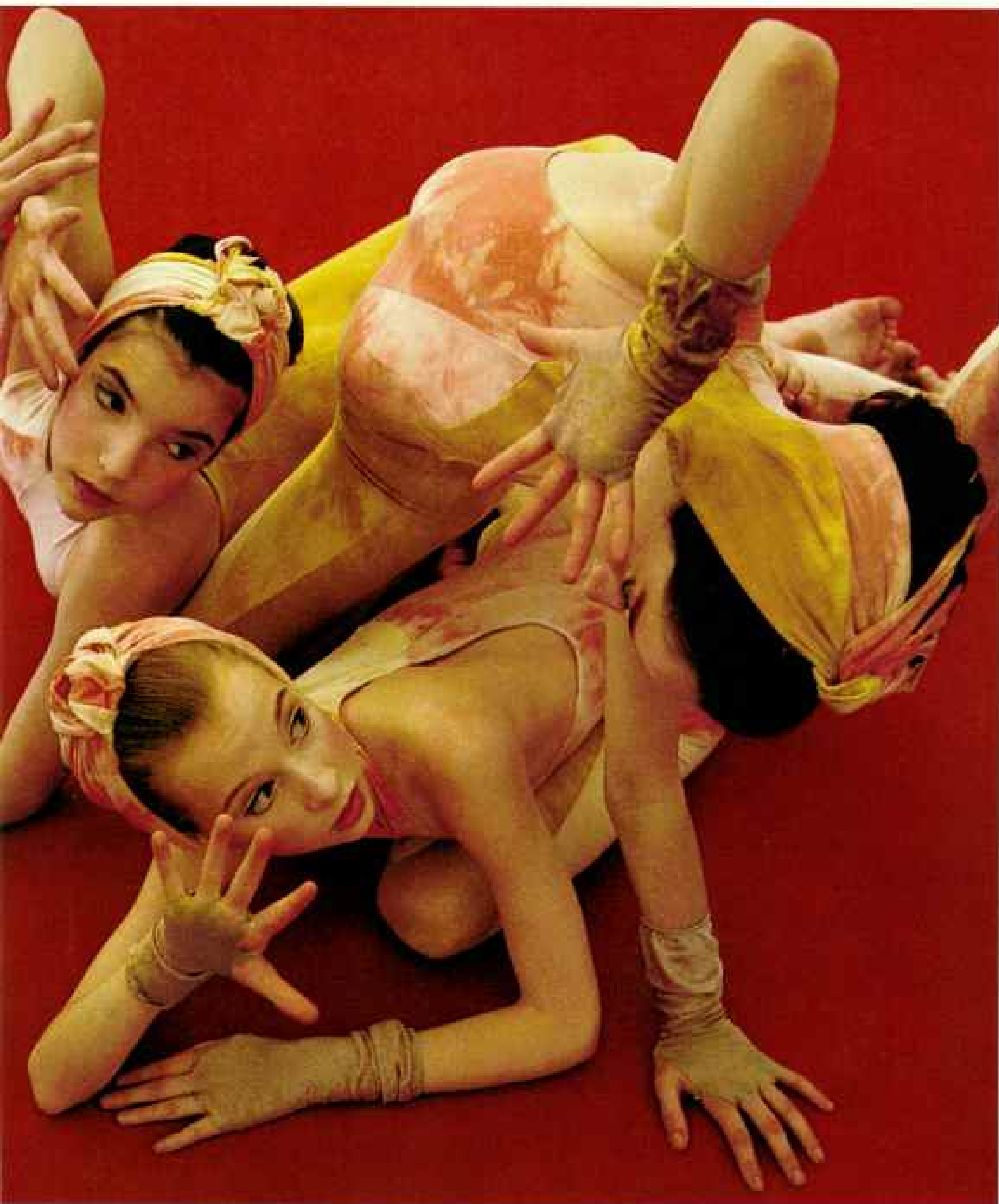
This kind of sacrifice—happy and starry-eyed—I could understand.

I COULD ALSO UNDERSTAND compassion—when at Jewish General Hospital I sat in a circle strong in common sense, humor, and desperation kept at bay. Fifteen cancer patients gathered in a mutual-support group called Hope and Cope. They spoke in Montreal's many accents—but the subjects were the same, suffering and fear, anger, depression, and denial. There was healing laughter and the satisfaction of helping one another find thankfulness for another day of life.

"Here we release things we're holding within ourselves, as if within prison walls, things that eat at you like another kind of cancer," said Cynthia Cassidy, a young mother of two. A cancer patient herself, she had come to Montreal from Toronto to be with her mother, who also had the disease.

The program at Jewish General is a spiritual weapon in the array of armaments fielded by Montreal's medical forces. Alliances of hospitals and top university medical schools make the city a leading research center in the fight against cancer, diseases of the aging, and other enemies of the flesh.

Yet, as in many cities, hospital facilities are stretched thin. Emergency wards are often jammed, some patients waiting there 24 to 48



hours for a bed. A disproportionate number of hospital beds are filled with the chronically ill; public-nursing care has not kept pace with a population that, because of emigration and low birthrate, is growing older.

Jewish General, like all of Montreal's major hospitals, is government regulated and funded, a piece in the French Quebecers pattern of collectivism. The hospital's name bespeaks its past: founded in 1933 by a Jewish community that today numbers 100,000.

Montreal is a city that lives in its downtown by night as well as by day. I spent an evening with Nick Auf der Maur, a city councillor and columnist for the English-language *Gazette*. A Runyonesque observer

Explosive intermission dazzles 57,000 motocross fans at Olympic Stadium, built for the 1976 summer games. Despite cost overruns, which delayed completion of

its retractable roof until 1987, the all-weather facility helped focus world attention on a modernized Montreal—and made a permanent home for Expos baseball.

of the urban scene, he is a walking flea market of stories, opinions, and facts about Montreal. He may talk all night, chain-smoking strong French cigarettes at his favorite Rue Bishop haunt.

Nick likes to tell jokes about Toronto, Montreal's rival. He considers it a slick, yuppie city. "Did you know that *Toronto* is an old Indian name? It means 'where the mind narrows.' Montreal has always been kind of the disreputable, boozy uncle. Catholic cities are always much more fun."

One past election proves the point. A few days before the vote, he was arrested in an after-hours speakeasy. He claimed he was just there for a bite to eat. Many said his election chances were nixed. But he won—by 48 votes out of 4,577 cast in his district. "The last ballot box took me over. That was the area where the Grey Nuns convent votes. They all voted for me. Montreal is the only city where I could be a councilman."

Nick loves his city. On the late-night tour we eat at Schwartz's, a Jewish-owned landmark famous for the Montreal specialty of smoked meat. This marinated-brisket delicacy is richer than pastrami, its close relative, and floors are slick with grease late on a jam-packed evening.

Later we stop at the Bagel Factory, a popular all-night hangout, where Dantesque fires burn in huge ovens in the predawn hours. "I find New York bagels doughy, inedible," Nick says. "Here they're boiled in honeyed water before they're baked."

Then, while the sky lightens, we walk the streets of the bohemian Plateau-Mount-Royal. "See," Nick exults, "Montreal is safe. You're in the center of a big city and never have a sense of fear. Isn't this what a city is meant to be?"

Yes, I say, it's a city like cities should be. And the bagels are wonderful.

Of course, like all cities, Montreal has its seamy side. A woman I will call Louise told me about the prostitutes who work for her. "I look after my girls," she asserted. "A lot of pimps get their girls hooked on crack cocaine. Then the girls will do whatever the pimps want so they'll keep getting their crack. If they make their pimps angry, they may get locked up like slaves for a year. When the pimps finally let them go, sometimes they slash the girls' faces with a razor, just to teach them a lesson."

THE UNPLEASANTNESS of Louise's story left me as I began to look into the ethnic mosaic of Montreal: The trail led from one heaping table to another. On an evening of fine food when I never saw a menu, I shared a table with Italian Montrealers—the city's largest immigrant group, with 200,000 members. Many are employed in writing, publishing, politics, and business.

All agreed they were the ethnic group that most easily integrated into Montreal's French

culture, and all agreed that it was *bellissima*—a fine thing—to be an Italian in Montreal. Yet theirs was a trilingual life. "We speak French because we're in a French city," said Lamberto Tassinari, editor and publisher of a trilingual arts and politics magazine. "And we speak English because we're in North America. But at home we speak Italian."

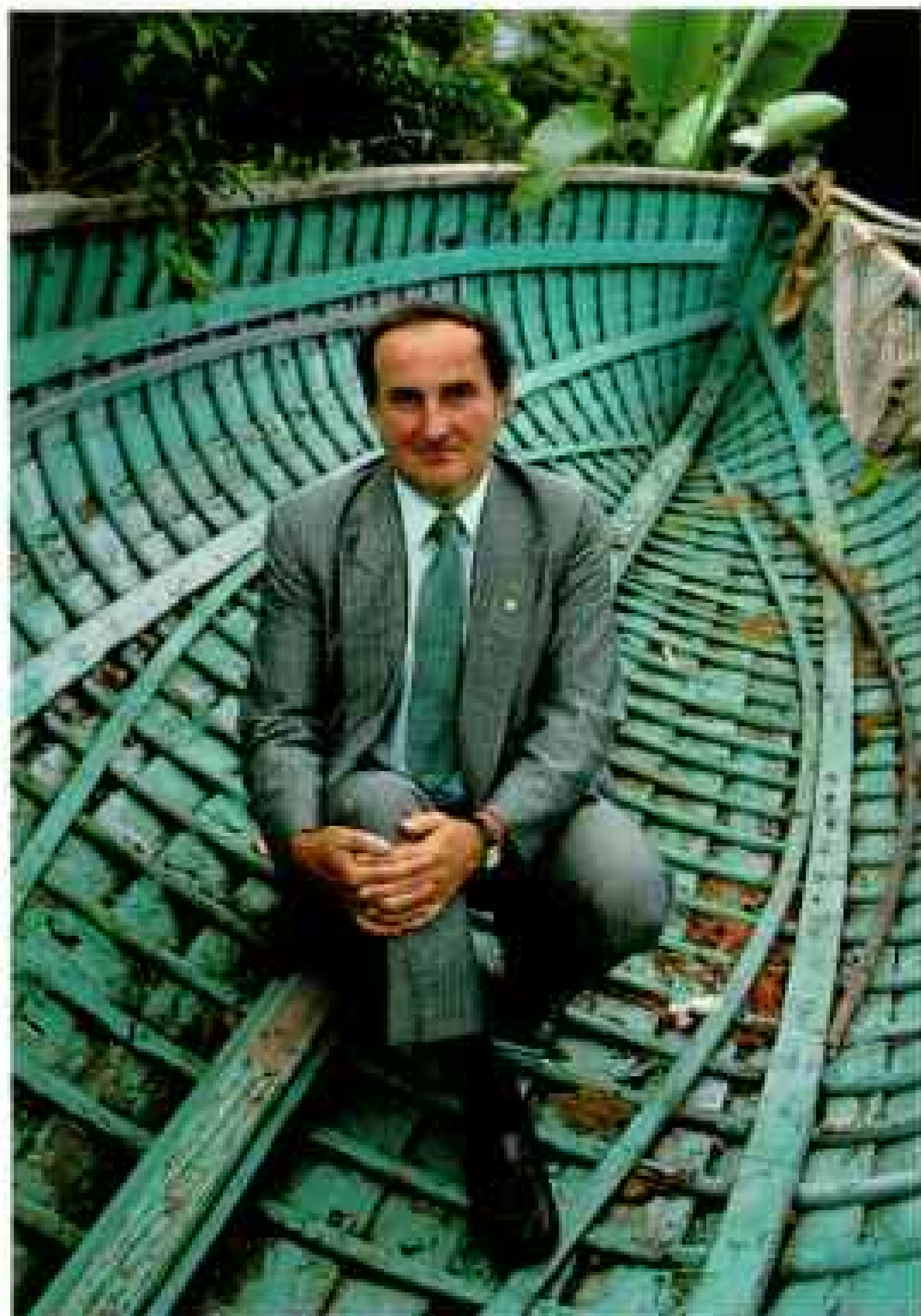
In a small restaurant wallpapered with palm trees and island scenes, immigrant Haitians ate stew over rice laced with okra. Community leader Jean-Claude Icart told

Giddy after a hard night's work, French-Canadian waitresses at Alexandre, a restaurant on Rue Peel, unwind with laughter. Time enough to pay attention to the early morning headline—news of the Meech Lake accord's collapse.

With their flair for fashion and joie de vivre, Montrealers add spice to their nightlife and pepper to their politics.

From a sea of greenery Pierre Bourque (below) commands Montreal's Botanical Garden. Its collection of 26,000 plant varieties makes it a world horticultural center. The fishing boat, on exhibit, worked the St. Lawrence in the 1920s.

Rector Gilles Cloutier descends a staircase at the Université de Montréal, the largest French-language school outside France and an intellectual center for up-and-coming Francophones.



how two waves of his countrymen fled to Montreal. First, in the sixties, came professionals and intellectuals like his parents; they were welcomed. Then came working-class refugees from that French-speaking island. Many became taxi drivers. They met prejudice. "Our solution," said Jean-Claude, "was to set up our own company. We have 550 Haitians who own their own cabs, and 1,200 drivers in the business."

In a modest living room Vane Southammavong's family watched politely while I spoke with him. My Portuguese taxi driver interpreted; they shared fluent French.

Just a year earlier Vane had been released from a "reeducation" camp in Laos, where he was interned because he had worked for the pro-American government before the Pathet Lao took power in 1975. When the family left Laos, they went to an orientation camp in Thailand, where a school run by the Quebec provincial government familiarized refugees with the life they would find in French North America.

Vane works in a factory, and his children are in French-language schools. Yes, they intend to stay in Montreal. No, they don't want to move any more. Vane looked for the words. "In Laos it is very heavy. Here it is very light."

NOT EVERYONE would agree. Strife with Native Americans marked the first settlement here; it also touched Montreal during my visit. Just across the St. Lawrence River, within sight of Mount Royal, militants from two Mohawk communities protested the proposed expansion of a golf course adjacent to a tribal burial ground.

Defying federal and provincial authority, the Indians set up barricades, blocked a commuter bridge, and took up arms. A policeman was killed in cross fire. The Mohawk demanded recognition of tribal authority and large land claims.

Negotiations, patience, and a show of military force ended the dispute and averted a final shoot-out. Barricades came down. When I visited the Kahnawake Reserve, my reception was amiable and I was fed roast chicken. "You're lucky to be eating chicken," a Mohawk told me, "a few days ago we were eating bread-on-bread sandwiches."

The siege was over, but not the dedication to Indian sovereignty. When I told one Mohawk I was working in Montreal, he corrected me: "Hochelaga"—the name of the Iroquoian village that stood on the island when Cartier first arrived.

How long has Kahnawake been here, I asked. "If you mean when did a white man look at a map and say, 'Here it is,' I don't know," was the reply. "We've always been here." It may seem ironic that many French Quebecers, relishing the idea of their own independence, do not sympathize with the Mohawk desire for sovereignty. But human nature is what it is: "Oh, the Mohawk, that's different," I was told more than once.

Ah, the future of Quebec and its mellow great city, Montreal. Various economic

"I must go up there to start a colony, even if all the trees on that island were to change into so many Iroquois," said gentleman-adventurer Sieur de Maisonneuve in 1641. Today's trees, such as these near Beaver Lake in 490-acre Mount Royal Park, pose no threat to winter skaters—and conceal little but the occasional stolen kiss. Yet until the issue of French-Canadian nationalism is resolved, Maisonneuve's colony will never be quite at peace.

institutes report on the possible financial gains or losses of independence. Canadian and provincial political bodies establish committees to seek solutions of one sort or the other. I thought about the future often as I walked the city's streets.

An illuminated cross atop Mount Royal commemorates a wooden one raised in 1643 after the community's deliverance from a flood. On the first night of frost I stood at a lookout near the mountaintop and tried to see into the shiny heart of the new mountain that is skyscraper Montreal. The St. Lawrence

was an inky slash in a glimmering plain. Young couples gathered at the railing, more intent on each other than on the city sprawled at their feet. Boys opened their coats and wrapped their girls inside, to shield them from the wind.

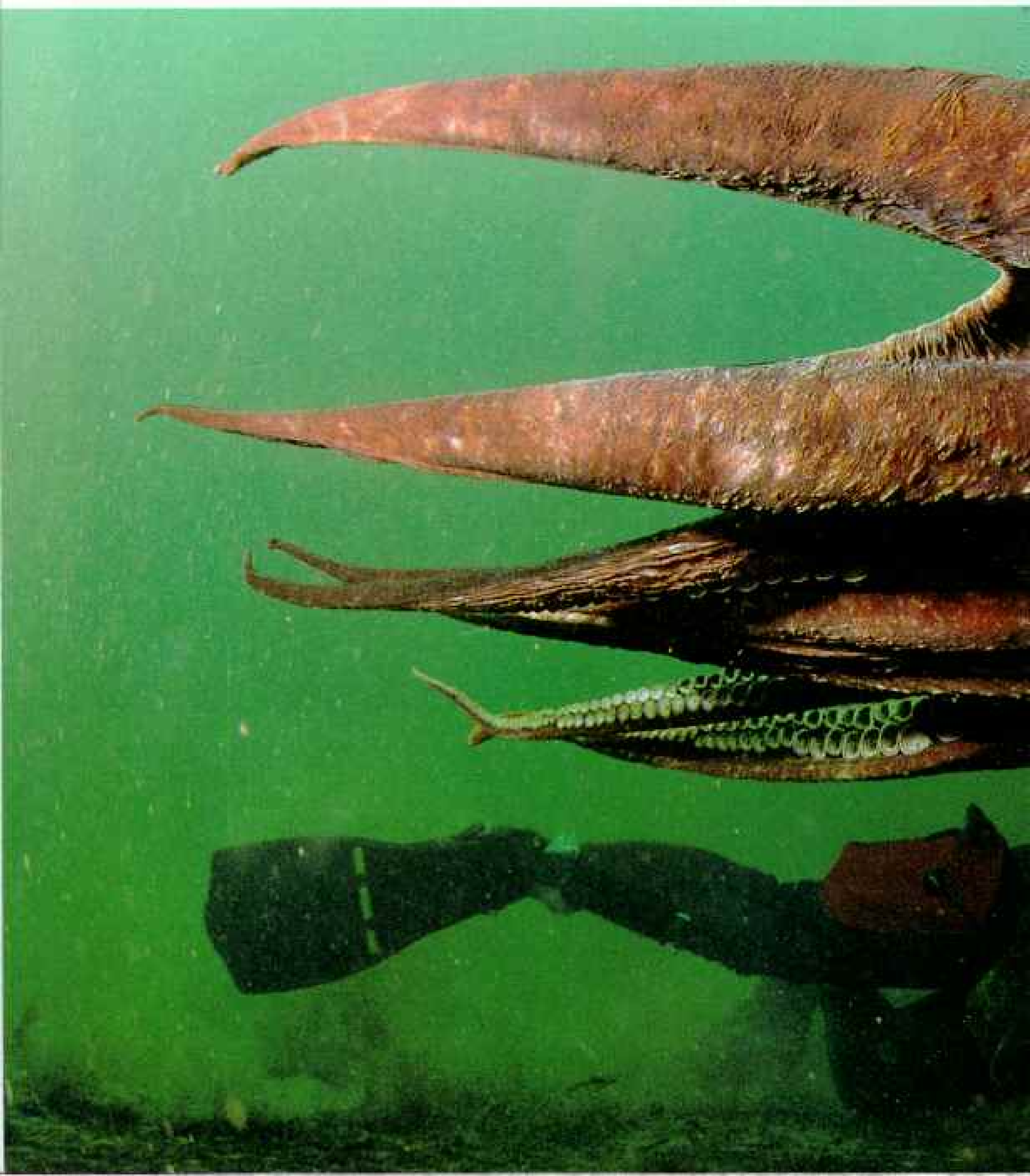
The amount of romance that has flourished on Mount Royal staggers the mind. For generations it has served as the trysting place for young Montrealers, and Montreal is a city that knows about love.

What does it know of the future? I posed the question to the young, glittering high-rise mountain. Is Montreal destined to lead Quebec to independence? Does the new mountain have the power, the foresight, and the luck to navigate a fledgling French-speaking nation safely away from Canada's familiar, if irksome embrace—embarking into the unknown as if on a reverse Columbian voyage?

A couple nearby broke from a clinch and turned toward the fantasia of the city. *"C'est beau*—it's beautiful," the young man said, as though seeing it for the first time. *"Oui,"* the girl replied, *"c'est beau. C'est très, très beau*—Yes, very, very beautiful." □

EYE TO EYE WITH THE

Giant Octopus



PAINTING BY ROBERT INGPEN

Text and photographs by FRED BAVENDAM

The giant octopus once inspired tall tales of a monster that ravaged ships and plucked terrified men from the decks like canapés. Octopuses are actually shy, intelligent animals with a strong parental instinct. Off the coast of British Columbia, diver Mike Richmond keeps pace with a Pacific giant octopus, the world's largest species.

IN A DISPLAY of strength, a giant octopus clings to a pile supporting a pier in the town of Campbell River, British Columbia. As my diving partner Mike Richmond looks on, the creature easily grips the porous wooden surface with its suckers.

I had an even more telling encounter when an octopus embraced me at a depth of 55 feet, an experience that made me see how the animal got its ill-deserved notoriety. It happened in Discovery Passage, a narrow strait that separates Vancouver and Quadra Islands in British Columbia. Exploring a series of rock ledges, I spotted the brilliant yellow of a nudibranch mollusk as it crawled amid a group of red sea anemones. Peering into my viewfinder, I moved closer. Just as I took a picture, something brushed my shoulder. Thinking it a piece of kelp, I ignored it and kept shooting. Feeling another tug, I turned and confronted a giant octopus. By now it held my head with one arm, my shoulder with another.

Both my mask and my regulator—my vital air supply—were threatened. Placing one hand on

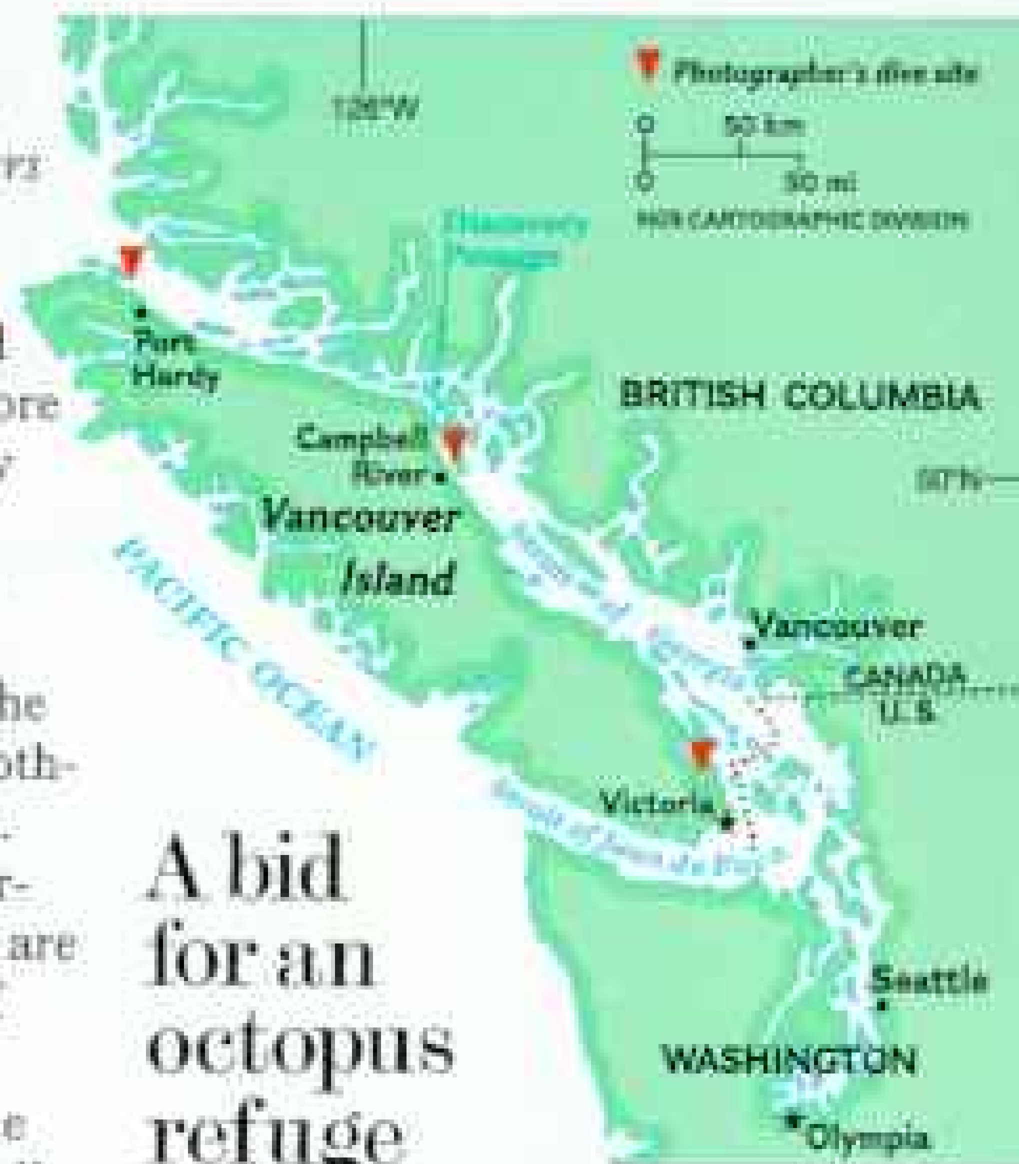
my mask, I pulled at the beast's arm. It finally came free but still dislodged the mask, which immediately filled with water. After I cleared my mask, I realized what the creature wanted. Two of its arms were wrapped around my camera's bright orange strobe light, which had aroused its curiosity. For five minutes I pulled away its arms one after another until I at last freed the camera.

In his 1866 novel, *Les Travailleurs de la Mer (The Toilers of the Sea)*, Victor Hugo recounted a grueling fight to the death between a man and an octopus. "What can be more horrible than to be clasped by those viscous thongs which adhere closely to the body by virtue of their many sharp points?" Hugo wrote. "But the wound of these points is as nothing to that of the sucker discs. The points are the beast entering into your flesh. The discs are you, entering into the flesh of the monster."

The hero prevailed, and the novel made the octopus the talk of Paris. Newspapers debated the dangers of this "devil fish." Restaurants featured octopus entrées. Milliners created an octopus hat for ladies to show off at seaside resorts. Hugo set the standard by which the octopus would be described for nearly a century, but his descriptions were mostly fantasy. Octopus suckers, for example, have no sharp points, although the creature has a sharp parrot-like beak and on occasion has bitten humans when provoked.

No one knows exactly how big the giant octopus gets. Mature males average about 23 kilograms (50 pounds), females about 15 kilograms (33 pounds). Arm spans average 2.5 meters (about eight feet). One octopus found off western Canada in 1957 was estimated to weigh 272 kilograms (nearly 600 pounds) and have an arm span of 9.6 meters (just over 31 feet), setting a widely acknowledged world record for the Pacific giant, which inhabits an area from California northward along the coast to Alaska and off eastern Asia as far south as Japan.

A New Hampshire resident, Fred Bavendam photographed peat bogs and manatees for his first two National Geographic articles.



A bid for an octopus refuge

Narrow straits between Vancouver Island and the mainland harbor an array of marine life. Overfishing for octopuses, favored as bait, led to a ban on their harvesting in Discovery Passage. Mike Richmond, operator of a scuba dive charter who once fished octopuses for a living (below), now campaigns to create a permanent marine sanctuary there.

LAYING CLAIM to a windfall, an octopus feeds on a spiny dogfish beneath a Campbell River wharf. The shark, considered a pest by fishermen, had been killed and thrown back. Disdaining the skin, the octopus bit the shark behind its fin to get at the viscera.

But the giant octopus is less a scavenger than a predator, sustained by a wide variety of sea life, especially crabs and other shellfish. Often prowling at night, a hungry octopus usually carries its prey back to its den.

The attempt on my strobe light notwithstanding, octopuses like nothing more than to be left alone. With the advent and growth of scuba diving, the myth of the octopus as frightful monster has been thoroughly

debunked by biologists studying the animal. Today many divers consider an encounter with an octopus to be the highlight of an outing.

Like all octopuses, the Pacific giant, *Octopus dofleini*, belongs to a group of mollusks called cephalopods. The word cephalopod translates as "head-footed," reflecting the fact that the appendages seem to grow directly out of the head. Octopuses have eight arms; most other cephalopods, which include the squid, cuttlefish, and nautilus, have ten or more.

The octopus exhibits a variety of characteristics: territoriality, aggression, fear, curiosity. Most biologists consider it to be the smartest of all invertebrate animals, with about the same intelligence as a house cat.

REARED UP and ready to hunt, a giant octopus scans its surroundings for a meal (above). Behind the eyes droops the baglike mantle that houses the internal organs and is the means of its locomotion. After sucking water into the mantle, it expels it through a siphon and jets across the seabed. As it glides along, the tips of its arms occasionally brush the ocean floor (right).

Eventually it drops to the seafloor (bottom right), trapping a luckless red rock crab. After releasing a poison into the water to stun the crab, the octopus uses its beak to crack the crab's shell and reach the meat.

Using its web—the skin between its arms—an octopus can carry a dozen or more crabs back to its den. A biologist once watched an especially determined octopus as it foraged for crabs at water's edge. It crawled out of the water, climbed over a large boulder, then reentered the water on the other side.

Individual octopuses have different food preferences, as seen in the refuse piles, or middens, outside their dens. Empty shells show this octopus's weakness for abalone (left). It's no matter that the abalone is a distant relative; octopuses are known to eat their own kind. When under stress, as in captivity, some octopuses will even eat their own arms, which grow back.

The appendages can also break off: Predators sometimes must settle for a mouthful of arm as the octopus scurries away with its other seven intact. Whales, dolphins, seals, sea lions, and various fish have a taste for octopus.

To evade foes, the octopus squirts a blackish ink as it retreats. Once thought to be merely a smoke screen, the ink may have a more sophisticated purpose. Some say the cloud takes on the shape of an octopus, leaving a phantom drifting in the water to confuse the predator while the real octopus makes a getaway.

When man is the predator, he

uses baited hooks or just snags octopuses from hiding places at extreme low tide. Farther from shore, divers flush them into the open by squirting chlorine or other irritants into their dens. Some fishermen trap the creatures by laying down artificial dens, such as wooden boxes, which octopuses will occupy even if there is no bait inside.

But fishing has had little effect on the species as a whole. Most harvesting is in shallow water, leaving those octopuses in deeper water untouched. And by the time an octopus is large enough to interest a fisherman, it is already close to the end of its life.

SHYNESS diminishes among males when the urge to mate peaks in winter. This boldness may explain the behavior of the octopus I had struggled with.

With plenty of arms for grappling, males appear to writhe in combat with females. Mating (bottom left) can take hours. In this case the male, on the left, has enveloped the female's mantle with his web. The third right arm of a male octopus has a modified end called a hectocotylus, which transfers sperm-carrying tubes called spermatophores. During mating the hectocotylus is inserted into the female's mantle cavity, and a spermatophore is attached near one of her oviducts.

In her den a female stares out from beneath her nest (right), which contains as many as 80,000 eggs. Using a mucous secretion, she attaches them to the ceiling in strands of 150 to 200 eggs, each about the size and weight of a grain of rice. In another den, nascent eyes show through egg membranes (bottom middle). Hatchlings burst forth and head for the surface, where they will begin feeding on plankton. If they survive to maturity, these specks of life will increase their weight by a hundred thousand times. But the odds are against them; in areas with stable octopus populations, an average of only two offspring from a clutch make it to adulthood.

Always on guard, the female aerates the eggs by shooting water through her siphon and removes bits of foreign matter with her arms. For six months or longer she perseveres, rarely if ever eating, and nearly always dies of starvation. James A. Cosgrove, a biologist at the Royal British Columbia Museum in Victoria, examines a female who had just died (far right). Already, crabs and small fish were feeding on her eggs.

THE LAST SIGHT that many marine creatures see is the underside of an octopus as it slowly parachutes down for the kill (right). One scientist reported seeing giant octopuses "ambush good-size salmon and move rocks much heavier than themselves." With this strength comes dexterity. Octopuses easily open screw-top jars and stoppered bottles to get at food placed inside.

Lacking a skeleton, the octopus also has a suppleness and agility that enable it to make astonishing Houdini-like escapes. As an experiment I rigged a mesh bag with an opening measuring only 50 by 100 millimeters (two by four inches). Into the bag I placed an octopus that weighed eight kilograms, with an arm span of 1.22 meters (four feet).

The octopus soon poked one of its arms through the opening (left, from top). Next came other arms and its web. Finally, by distorting its pliable eyeballs, it managed to free its mantle after extricating its chitinous beak, the only hard part of the body, and completed its getaway.

As part of its arsenal an octopus can change its appearance in a flash, showing a whitish hue, then quickly reverting to its normal dark red color as it nears the ocean floor. Most likely this is done to fool its prey: The octopus's silhouette is made less visible against the water surface, causing the victim to hesitate for a fatal split second before trying to flee.

This chameleon-like ability also serves when the octopus is in jeopardy. An octopus responds to danger by taking on the color and texture of its surroundings. Once while searching for octopuses to photograph, I checked a rocky slope just below a small cliff. I swam back and forth along its length twice but found nothing. Giving up, I decided instead to photograph an abalone grazing on a growth of algae. Settling on the bottom, I put my hand on a rock. It was soft! The rock turned out to be an octopus, camouflaged so well that I hadn't seen it, even though I had swum past it several times.

To a human, one unflustered giant octopus looks virtually the same as any other of the same

size and species. This explains why divers claim to have seen the same octopus occupy a den for ten or more years. But an octopus seldom lives more than four years.

For a creature so surprisingly strong and tenacious, the octopus tires quickly. The oxygen-carrying component of its blood, a copper-based compound called hemocyanin, is far less efficient than the iron-based hemoglobin of humans. Hence a struggling octopus quickly goes into oxygen debt and becomes listless as it runs out of energy.

I have worked for more than a dozen years diving and photographing sea stars, nudibranchs, and other marine life, and I spent months photographing the Pacific giant octopus. Never have I passed so much time with any one animal and remained so fascinated by its behavior.

I hope to study the octopus again in a natural setting with its fellow sea creatures. A sanctuary in Discovery Passage would help preserve just that. If approved by Canada's lawmakers, it would protect all fish and other marine animals from both sportfishing and commercial fishing by divers. The giant octopus would then have a haven where man is no longer an enemy but an ally. □

ALONG THE SANTA

FE TRAIL

Wagons hitched to yesterday's dreams roll through Kansas along the old road to Santa Fe. Now a national historic trail, the 900-mile route began in 1821 to carry trade goods between frontier Missouri and Mexico's northern outpost. Cutting through buffalo country, the trail traversed the domain of the Plains Indians, provoking more fighting than any other western trail. Yet heat, thirst, prairie fire, blizzard, and disease took a greater toll. Only when the railroad reached Santa Fe in 1880 did the trail finally wind its way into memory.

By ROWE FINDLEY

Photographs by
BRUCE DALE
NATIONAL GEOGRAPHIC PHOTOGRAPHER

TRAILSIDE NEIGHBORS BERNARD DWYER AND NAT GILLIHAN SHARE CHORES AND SWAP STORIES NEAR EDGERTON, KANSAS.

"You can tell from the dip in that hedge over there where the trail went through. They used to call this road Buttermilk Lane, probably because travelers stopped to buy milk here."

BERNARD DWYER, 1989

THEY SAILED the Great Plains like naval flotillas, four columns abreast, each column counting as many as 25 high-wheeled wagons, stowed with trade goods and canopied by billowing canvas, pulled by plodding 12-ox teams, churning long wakes of dust on winds that rippled the prairie grasses. They were headed for Santa Fe.

Before 1821 Santa Fe was the northernmost provincial capital in New Spain, and the few Americans who ventured there risked fines, confiscation of goods, a prison cell. But in 1821 Mexico declared its independence, and the barriers fell. Before the year was out, traders from the U. S. frontier—Missouri—were welcomed. The 900-mile trail became a two-way road, with more Hispanic than Anglo traders in some years. It boomed during the Mexican War that made New Mexico a U. S. territory in 1848, and shrinking segments survived until 1880, when the railroad finally reached Santa Fe.

"It was the longest lasting of the great trails west, and it saw the most Indian fighting by far," says Gregory Franzwa, a St. Louis historian who has retraced and mapped both this trail and the great emigrant route to the Pacific Northwest—the Oregon Trail.*

In search of the Santa Fe Trail story, I recently retraced the route, now a national historic trail. More often than you might suppose, I walked in the very ruts cut by countless straining hoofs, booted heels, and burdened wagons. But for me, Missouri-born, this journey was more than following a line on a map. The trail was a meeting ground of three cultures—Anglo, Indian, and Hispanic—and it brings to mind how their bittersweet encounters here shaped the history of the West.

When Missouri became a state in 1821, its farmers and bankers were still reeling from the Panic of 1819. Hard money was as scarce as hens' teeth. Nearly a thousand miles of wilderness away, in what is today

*See "Life and Death on the Oregon Trail," by Boyd Gibbons, in the August 1986 NATIONAL GEOGRAPHIC.

FARMER RICE'S DINNER BELL SUMMONED HUNGRY TRAVELERS HEADING OUT FROM INDEPENDENCE, MISSOURI. RICE-TREMONTI HOME, RAYTOWN

northern New Mexico, 30,000 commodity-poor settlers had long been subjects of the King of Spain, though they lived more than a thousand desert miles from the heartland of Spain's Mexican domain.

"Santa Fe was not on the frontier of Spanish settlement; it was an island beyond the frontier," said Thomas E. Chávez, whose Hispanic family line there goes back 12 generations. A historian, he directs the New Mexico state museum in the early 17th-century Palace of the Governors. "New Mexico was starved for manufactured goods, and Missourians were desperate for cash."

Among the most desperate was a Franklin, Missouri, farmer-speculator named William Becknell. In 1821 at least five creditors including his doctor were suing him, and he faced a debtor's cell.

Leaving town ahead of the sheriff, he headed west at the lead of a packtrain he'd put together, ostensibly to trade with trappers and Indians. But hearing that Mexico had revolted against Spain, Becknell set a course to Santa Fe, and through good timing he became the first foreign trader to tap this newly liberated and lucrative market.

Returning to Franklin after a five-month absence, he and his partners indulged in a theatrical gesture. An old-timer reported: "My father saw them unload when they returned, and when their rawhide packages of silver dollars were dumped on the sidewalk one of the men cut the thongs and the money spilled out and, clinking on the stone pavement, rolled into the gutter."

Becknell placated his creditors and again headed for Santa Fe, this time with wagons instead of pack animals, laden with factory-made hardware and fabrics, "goods of excellent quality and unfaded colors," according to his own prescription for fetching top prices. Even the wagons could be turned into dollars: He parted with a $150 rig for $700.

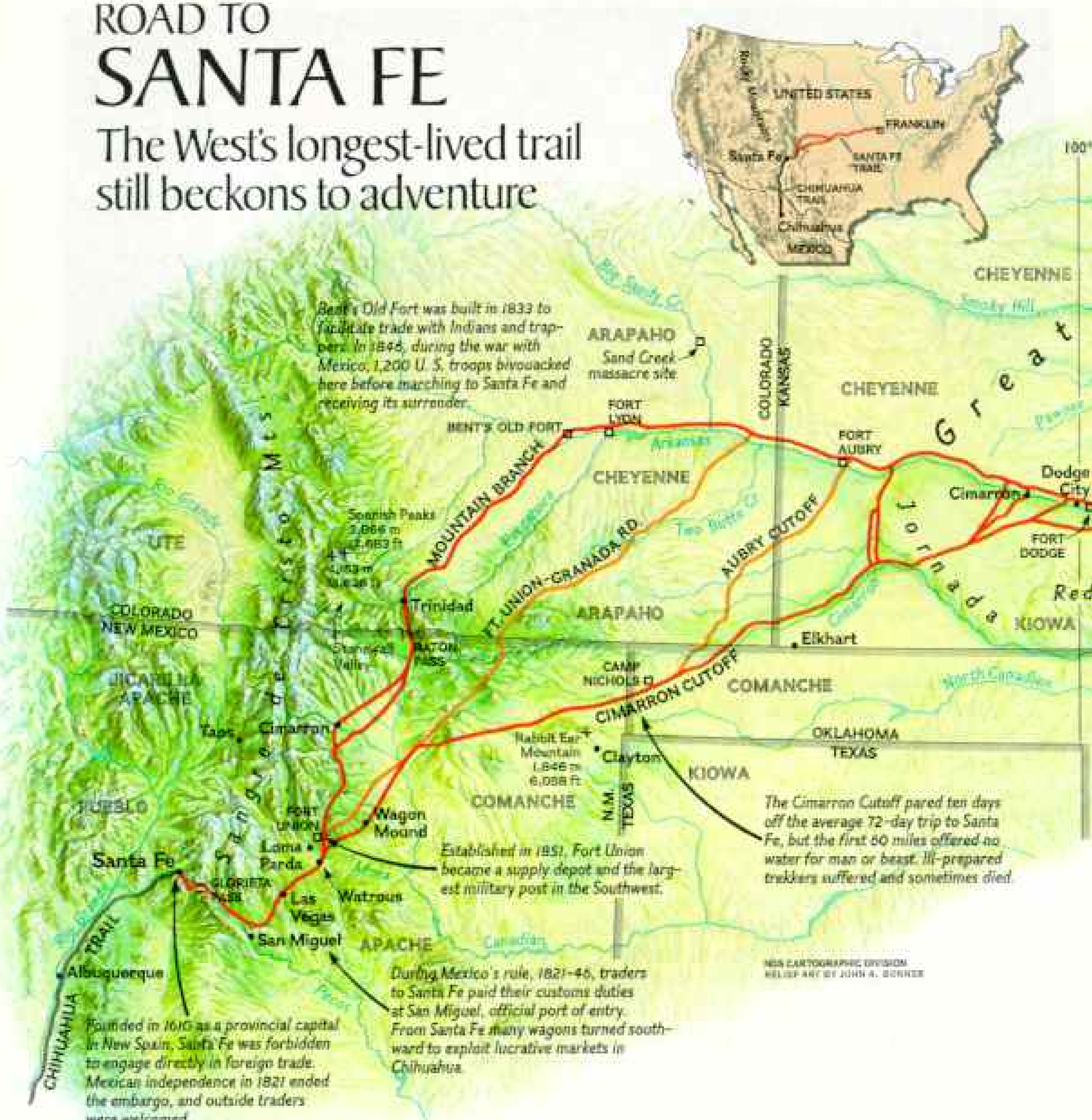
Other traders followed, and the Santa Fe Trail was born. By 1824 a Franklin justice of the peace, Augustus Storrs, estimated that the year's profits from the trail would "amount to $180,000 . . . principally, in

"About half a day's travel brings the Santa Fe bound traders past the flourishing plantation of Farmer Rice, where leisure travellers often linger to enjoy his sweet bacon, fresh eggs, new milk, and the other nutritious and unsophisticated luxuries that always appease appetite without encumbering digestion."

MATT FIELD, 1841

ROAD TO SANTA FE

The West's longest-lived trail still beckons to adventure



Spanish dollars and bullion. . . ." By the 1840s it was in the millions.

The trail was also an unrelenting mix of Indian threat and natural perils that ranged from drowning torrents to fatal thirst, from icy blizzards to prairie fires, which "ran on until blocked by stream, lake or barren ground, until quenched by rain or the wind swept the flames back to feed upon their own ashes." There were buffalo stampedes, mosquito hordes, rattlesnakes, deadly dysentery and cholera.

But most travelers not only survived the journey, they also made repeated trips. The trail was in fact a familiar road for noted leaders: explorer John Charles Frémont, George Armstrong Custer, Philip Sheridan, Jeb Stuart, Wild Bill Hickok. And it turned young Christopher "Kit" Carson into the West's most far-ranging guide and scout.

Author Rowe Findley retired as Assistant Editor of National Geographic in December 1990 after 31 years with the Society.

Beyond Council Grove, rolling tallgrass prairie gradually gave way to shortgrass plains. Here nomadic Indians pursued great herds of bison and often encountered wagon trains.

Built in 1827 to protect the trail, Fort Leavenworth from the 1850s through the 1870s dispatched military escorts and supply trains to serve garrisons along the route.

Virtually every Santa Fe Trail journal mentioned Pawnee Rock, and hundreds of travelers carved their names in its sandstone crest, since cut away to provide building stones.

The trail began in Franklin in 1821 with trader William Becknell's first trip to Santa Fe, but by 1830 steamboats pushing up the Missouri River had made Independence the trailhead.

Here the trail divided, the right fork veering northwestward toward Nebraska and on to Oregon and California, the left continuing to Santa Fe.

The way to Santa Fe is marked with some 300 plaques and monuments. History-minded travelers will find many museums and interpretive centers along the trail, including those at forts such as Larned, Bent's, and Union.

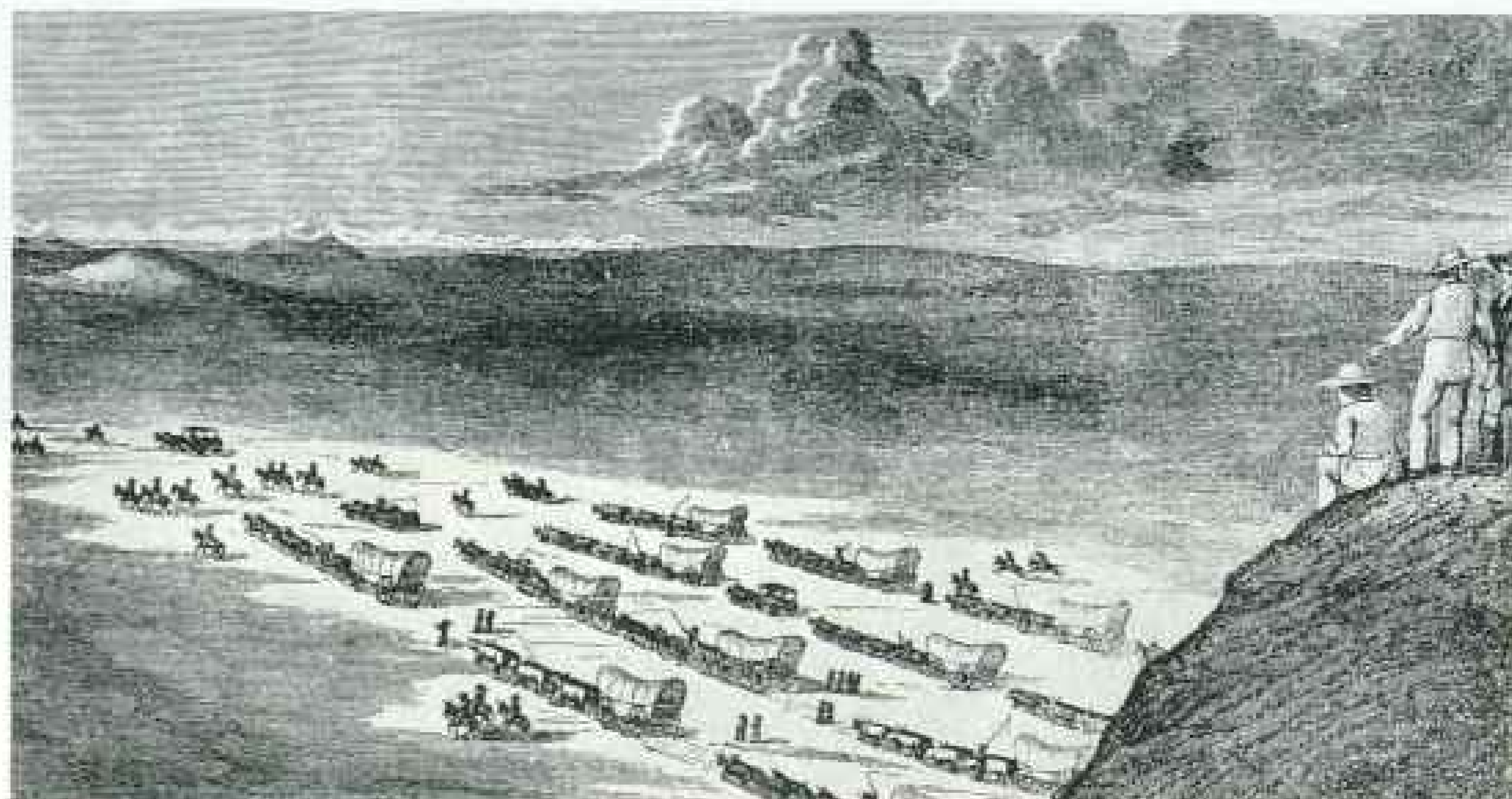
Lt. Col. George Armstrong Custer led his Seventh Cavalry from Fort Larned in 1868 as part of a major campaign against the Cheyenne.

Santa Fe Trail
Major branches

PRESENT-DAY BOUNDARIES AND DRAINAGE SHOWN

"The wagons marched slowly in four parallel columns, but in broken lines, often at intervals of many rods between. The unceasing 'crack, crack,' of the wagoners' whips, resembling the frequent reports of distant guns, almost made one believe that a skirmish was actually taking place between two hostile parties."

JOSIAH GREGG, 1844



STATE HISTORICAL SOCIETY OF MISSOURI, COLUMBIA

WILD PHLOX AND OLD ELMS FRAME AN ABANDONED HOUSE NEAR LYONS, KANSAS.

"As I write scenes of the old trail come flooding back to me: Places where the earth was like a Persian rug, the lavender, red and yellow wild flowers mingling with the silvery green prairie grass."

MARIAN RUSSELL, CIRCA 1935

BIRDS FORAGE ON A BISON IN A TALLGRASS PASTURE CLOSE TO FORT LEAVENWORTH.

"Short, thick, curling horns, almost hidden in masses of black wool; eyes that glare like balls of polished ebony, whose very want of expression excites fearful imaginings . . . ."

MATT FIELD, 1840

In 1826 Kit was a 16-year-old apprentice to a saddler in Franklin, then the eastern trailhead. As he plied his awl on harness destined for the trail, he heard stories of fortune and adventure that awaited in the West.

By August, Kit had decided to join a Santa Fe-bound caravan. Two older brothers recently back from the West had whetted his yearning, and his father's death and mother's remarriage had left him spiritually awash. Kit regretted fleeing his apprenticeship to kindly David Workman, but remaining had become unbearable: "I would have to pass my life in labor that was distasteful to me, and being anxious to travel . . . I concluded to join the first party that started for the Rocky Mountains."

A master was expected to publicize the flight of an apprentice, but David Workman waited a month before advertising in the *Missouri Intelligencer*, gave false clues about Kit's direction of travel, and offered only a penny reward for Kit's return. Within a year Workman had also pulled stakes and gone to New Mexico, where his brother William was distilling "Taos lightning" for a growing clientele. David and Kit had a pleasant reunion. You could meet a lot of Franklin folk along the trail.

MISSOURI RIVER FLOODS in 1827 and 1828 washed Franklin away, and by 1830 steamboat navigation had pushed the eastern end of the trail a hundred miles upriver to Independence, which also became a jumping-off place for Oregon and California. Even so, the old trail from Franklin bore enough traffic before its demise to leave indelible ruts. Forty miles westward I paused in Grand Pass Community Cemetery, where a deep swale cut a lane of history through the tilting gravestones. How many wagons and teams and cargoes of calico and hardware and hopeful dreams had it taken to incise the earth with such a lasting mark?

Independence boomed with the business of outfitting, including sturdy wagons made by free black man Hiram Young and corrals of

THUNDERSTORMS CRACK WHIPS OF LIGHTNING OVER NORTHEASTERN NEW MEXICO.

bawling oxen and braying mules—the relative merits of which were never settled. Oxen were steadier but slower, better able to live off the land. Mules were faster, better for packtrains, more willful. The frontiersmen recognized good breeding stock in the sturdy jacks that Mexican traders brought from Santa Fe and began to improve their quality. The result was a mule of legend. According to Independence historian William C. Bullard: "The Missouri mule by himself would have made the Santa Fe trade worthwhile."

But mulish stubbornness could add entertainment value to a wagon train's departure, as journalist Matt Field noted in 1840:

"In the square you observe a number of enormous wagons into which men are packing bales and boxes. Presently the mules are driven in from pasture, and a busy time commences . . . catching the fractious animals . . . and introducing them to harness for their long journey. Full half a day is thus employed before the expedition finally gets into motion and winds slowly out of town. This is an exciting moment. Every window sash is raised, and anxious faces appear watching with interest the departure. The drivers snap their long whips and swear at the unruly mules, bidding goodby in parentheses between the oaths, to old friends on each side of the street as they move along."

The wagon beds, their bottoms slightly upcurved at each end to curb cargo shifting, each creaked and groaned with as much as three tons of trade goods from across the United States and Europe: woolens, cottons, silks, linens, handkerchiefs, gloves, suspenders, ribbons, earrings, brooches, combs, needles, shears, files, forks, spoons, penknives, pocketknives, razors, beads, tacks, files, china cups, portmanteaus, watches, velveteens, whiskey. . . . Veteran trader Ceran St. Vrain sometimes shipped wagonloads of champagne.

Teamsters must eat, so wagons packed 50 pounds of flour per man plus beans, bacon, coffee, and sugar, a sustaining but scurvy-prone diet that whetted hunger for buffalo steaks and a kettle of wild greens.

"We were encamped upon a dead level . . . and in this exposed situation we bore the brunt of a battle between conflicting armies of opposing clouds. . . . never have I experienced so fully the sense of a personal malevolence (so to speak) in the gathering and onset of a tempest as I did in this instance."

GEORGE DOUGLAS BREWERTON, 1848

TRAIL RUTS YET RUN IN THE SANDY SOIL OF RALPH HATHAWAY'S PASTURE OUTSIDE CHASE, KANSAS.

The teamsters themselves mirrored the mix of frontier society. There were horse-wise farm boys, savvy Mexicans who could be artistic with whip and lariat, and inexperienced dudes determined to experience the West. Some 20 French Canadians worked an 1846 train that included a frail Cincinnati lad drawn West by the journals of Frémont, 17-year-old Lewis H. Garrard: "As I have ever been a lover of sweet, simple music, their beautiful and piquant songs, in the original language, fell most harmoniously on the ear as we lay wrapped in our blankets."

Some 20 miles southwest of Independence, westering trains left Missouri and "the States" and entered "Indian country." Stepping over the line into what would become Kansas was like entering a foreign land, beyond writ of law and church bell's peal.

Yet the first miles lay among the farming villages of the peaceful Osage and Kansa. Wagon trains moved casually in small units until they reached Council Grove, about 150 miles from Independence.

"My earliest memories include these ruts and stories of the Santa Fe Trail told to me by my father. Fortunately, my grandfather had never plowed them—I can't remember a time when they weren't part of my life."

RALPH HATHAWAY, 1989

TREES TIE PAST AND PRESENT for Council Grove. In 1825 a vast swath of huge hardwoods fringed the sparkling Neosho River, an oasis of shade in what then was a near-treeless land. The U. S. Santa Fe Road Commission, dispatched that year from Fort Osage near Independence to survey the trail and negotiate with the Indians, chose this sylvan stage to hold council with the Osage. For $800 in trade goods, the Osage agreed to let Santa Fe wagons pass and even lend them aid. Commissioner George C. Sibley voiced his satisfaction and suggested naming the place Council Grove, and the name was recorded on a "Suitable Tree . . . in Strong and durable characters."

Josiah Gregg, a physician-turned-trader, reported that the grove in 1831 comprised "the richest varieties of trees; such as oak, walnut, ash, elm, hickory, etc." Matt Field was more lyrical: "We rode . . . through the thick wood, enjoying the grateful sensations occasioned by the transition from the burning heat of the prairie to the cooling shade of the

grove. We reached the water—the crystal stream rushing over its white bed of pebbles."

I lingered in Council Grove to note that it is still a city of trees, but now they shade brick-paved streets that lead to landmarks from trail days—the Hays House restaurant where travelers dine today as they have since 1857, the Last Chance Store, the stump of an oak revered as the site of the 1825 treaty signing.

Nineteenth-century travelers also tended to linger for business and the pleasure of the setting. One order of business was explained by young Lewis Garrard: "As this is the last place . . . where *hard* timber can be procured, the men were busy felling hickories and oaks for spare axletrees, and swinging the rough-hewn pieces under their wagons."

A more important business was to organize into bigger units before entering the domains of the Plains Indians—Kiowa, Comanche, Arapaho, Sioux, Apache, and Cheyenne. Gregg noted that it was customary "to travel thus far in detached parties, and to assemble there . . . for mutual security."

Before the Mexican War (1846-1848) led to a building boom of Army forts along the trail, traders generally traveled in one annual caravan. The number of wagons ranged from as few as 26 in 1824 to as many as 230 in 1843. With their fortunes and possibly their lives at stake, the usually competitive wagon merchants elected a captain and lieutenants to run a paramilitary train, with care to adequate small arms and sometimes a small cannon. Four columns abreast was the rule beyond Council Grove, to facilitate a defensive maneuver against attack:

"The two outside columns swung out in arching movements, the first two wagons meeting . . . the following ones coming alongside. . . . The inside columns paused until the tail wagons of the outer ones were in place, then swung out at right angles, one right, one left, to join up with the two tail wagons and complete a rectangle. . . . Wagon tongues were lashed to the wheels of the vehicles before them, making a nearly impregnable fort."

Although Indians stole livestock and harassed trains almost from the beginning, killings on the trail were few until its use increased during the Mexican War, as the Army dispatched endless supply columns. Afterward, emigrants began heading to the newly acquired New Mexico Territory, and mail and stagecoach service were needed. The traffic cut year-round wakes through the living seas of bison, threatening the very way of life of the Indians who hunted them for food, clothing, shelter.

THE FIRST SIGHTINGS of the huge animals set wagon trains into a frenzy that, in Josiah Gregg's words, "beggars all description. Every horseman was off in a scamper: and some of the wagoners, leaving their teams to take care of themselves, seized their guns and joined the race afoot." With rifle, shotgun, pistol, even bows and arrows, they slaughtered and butchered the bison, built fires, and had a feast. Some men even acquired a gourmet relish for a slice of raw liver eaten while still warm from the carcass.

The buffalo hunt as a macho ritual began to draw sporting parties from the East, and the market value of hides and horn brought professional hunters. Indian depredations increased; clashes were numerous, and Congress was pressured to legislate the Indians onto reservations, a job for the Army. By 1867 Kiowa Chief Satanta stated sadly: "There are no longer any buffaloes around here, nor anything we can kill to live on."

CARBON ARC LAMP ILLUMINATES A GLASS PLATE IN THE AULTMAN STUDIO, TRINIDAD, COLORADO.

"Father named this Aultman Studio one hundred years ago last July. I helped him when he shot pictures for a GEOGRAPHIC *article on the Santa Fe Trail published in 1929. I was 25 years old at the time."*

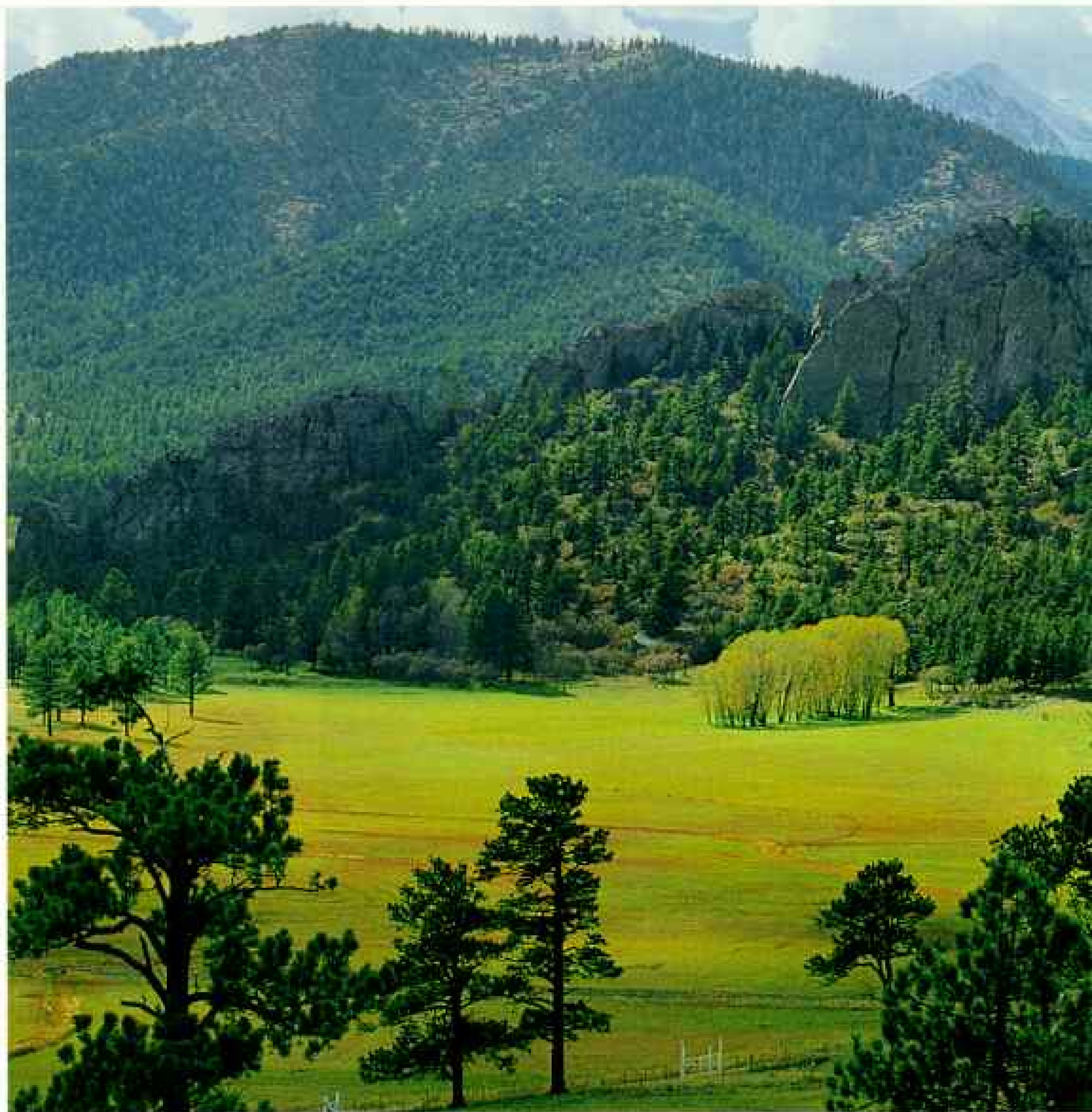
GLENN R. AULTMAN, 1990

The Indians' growing frustration triggered more raids, more deaths. In present-day Rice County, Kansas, farm fields still yield shards from an 1867 attack on a small wagon train. Some say the raiders were "dog soldiers," renegades from a Cheyenne warrior society seeking revenge and loot.

I got an on-the-scene account of the raid from Ralph Hathaway as we walked in his pasture near Chase, part of a perilous 36 miles of trail between its crossing of the Little Arkansas and its reaching the big Arkansas. The way Ralph figured it, we were near the spot where trader Franz Huning lost his mother-in-law and her teenage son.

Ralph and I were walking in one of the most impressive sets of ruts on the entire trail, seven parallel swales. Spry septuagenarian Ralph grew up on this farm: "My earliest memories include these ruts and stories of the Santa Fe Trail." A gentle man with eyes that have assessed much weather, he quickens at the memory of the deadly raid.

It was the Plum Buttes Massacre, named for three 100-foot-high dunes that once punctuated the horizon a couple of miles to the west but have since been dispersed by winds. Huning's wagon train was bound for Albuquerque, where his young wife Ernestine awaited him and reunion with her mother and youngest brother Fritz. Because of recent



MARIAN RUSSELL SPENT HER LATER YEARS IN COLORADO'S STONEWALL VALLEY.

Indian troubles Huning had sought military escort, but he was refused.

There may have been as many as 200 Indians. They struck suddenly, cutting out the last four wagons while the others led by Huning wheeled into a defensive circle. The raiders "emptied the wagons of their contents and loaded the captured mules with them." Of his mother-in-law's fate, Franz said, "I saw a big crowd in one place with much noise and laughter and then a pistol shot. I knew that . . . pistol shot killed the old lady. The boy having been killed at the first onset. . . ."

Huning and other survivors made for Fort Zarah, a dozen miles west. Scout Charles Christy and a partner raced back to the scene with an Army ambulance, finding the body of a teamster "scalped and hacked in a horrible manner" and Huning's mother-in-law and her son mutilated beyond recognition.

Ralph Hathaway pointed to a low corner of an adjacent field: "I figure the raiders captured the wagons right down there. My grandfather

plowed up a pistol there, and a watch, some old wagon iron, and broken china." His expertise on the subject draws historians for interviews, and school buses bring classes to see the great swales in his pasture. "I'm never too busy to talk about the trail and show people this little bit of it that I've been lucky enough to save," he told me. Now the venerable swales are affectionately known as Ralph's Ruts. You can see the directional sign along U. S. 56.

This is flat country, flattening even more as the trail joins and follows the serpentine Arkansas upstream past Great Bend, named for the river's northernmost loop in Kansas. Here rises Pawnee Rock, a sandstone bluff that measures short in height but tall in the history of the trail. Virtually every trail diary lists it, and hundreds of names were incised in its 60-foot crown, since cut off by quarriers.

By the time young Lewis Garrard got to Pawnee Rock in 1846, people said the turf below it held the graves of both trail travelers and Indians.

A SOLDIER'S WIFE WHO LOVED THE TRAIL, MARIAN RUSSELL TOOK THE BEST OF IT AND THE WORST. COURTESY LEE RUSSELL

"Mid-afternoon on the second day of our travel, we saw the great Stone Wall rising from the blue mists at its feet. Behind it . . . rose the white-capped Sangre de Cristo Mountains. . . . Suddenly we came to a gap in the towering wall and drove through a natural gateway. God, it seemed, had decided to let us into the Garden."

MARIAN RUSSELL, CIRCA 1935

"It is said, if you want to thoroughly test a man's character, go with him into the army, but I will put life on a ranch or the frontier against it."

William H. Hartwell, circa 1865

CHAPS, BOOTS, AND SPURS EQUIP COWBOYS AT FORT UNION RANCH IN NEW MEXICO (ABOVE). SCORE ONE FOR THE BRONC IN A CIMARRON RODEO (RIGHT).

Garrard found a body partly buried atop the bluff, causing sad musings: "To die anywhere seems hard, but to heave the last breath among strangers, on the burning, desolate prairie . . . is hard indeed. . . . Yet such is a frequent fate on the Santa Fe Trail."

Susan Shelby Magoffin cut her name in the rock to celebrate July 4, 1846, but she confessed: "It was not done well, for fear of Indians made me tremble all over and I hurried it over in any way."

She was traveling west with her husband Samuel, who at 45 was 27 years her senior and had long prospered in the Santa Fe trade. He was able to pamper his teenage bride with enclosed carriage, driver, maid, two other servants, toiletries, library, and ample time to keep a journal.

FRINGED, EMBROIDERED BUCKSKIN COAT AND HAWKEN RIFLE BELONGED TO FRONTIERSMAN CHRISTOPHER "KIT" CARSON. WEAPONS BY JAKE AND SAM HAWKEN SET A BENCHMARK FOR RANGE AND ACCURACY. COAT COURTESY COLORADO HISTORICAL SOCIETY'S BACA AND BLOOM HOUSES AND PIONEER MUSEUM, TRINIDAD; RIFLE, MONTEZUMA MASONIC LODGE NO. 1, SANTA FE

Susan's climb of Pawnee Rock, while Samuel kept watch with "gun and pistols," had let their wagon train get far ahead, and as they overtook it at Ash Creek, their carriage upended on the steep bank. It was a wreck, but, as Susan noted, "wonderful to say, we are almost entirely unhurt!" But she was pregnant, and less than four weeks later, the day after her 19th birthday, she lost her baby. Susan never saw the two events as cause and effect, but as "something rather sad, though I will not murmur at the chasten hand of Providence."

Susan Magoffin was long believed to be the first American white woman to travel the trail. But Santa Fe historian Marian Meyer discovered in 1987 that Susan had been preceded by a trader's wife 13 years earlier. "Mary Donoho, 25 years old, arrived in Santa Fe in 1833, with her husband William and a nine-month-old daughter," Marian said. "They were with a party of 150 Missourians and a great wagon train of freight. William set up a trading operation and ran a hotel, perhaps the old La Fonda, known as the 'inn at the end of the trail,' where La Fonda stands today."

For four years they ran the inn, and two more children were born, but when rebelling Pueblo Indians killed the provincial governor in

Santa Fe, William feared for his family's safety and returned them to Missouri. Accompanying them were two other American white women who had been freed from Comanches by ransom or parley.

It was an uncertain world for women in other ways. In his extensive research of Army posts along the trail, Leo Oliva of Fort Hays State University, Kansas, turned up an instance of a U. S. woman soldier in the 1840s, though she had disguised her sex. "Her soldier-boyfriend persuaded her to enlist as a man so they could be together," Leo told me, "and everything was fine until she became pregnant. Then the Army court-martialed her boyfriend and found him guilty of 'depriving the United States Army of a good and competent soldier.' "

COL. KIT CARSON IN 1864—LEGENDARY SCOUT, GUIDE, AND INDIAN FIGHTER. AS A TEENAGER HE RAN AWAY TO FOLLOW THE SANTA FE TRAIL. COLORADO HISTORICAL SOCIETY, DENVER

IN 1867 THE ARMY WAS MARCHING 1,400 of its good and competent soldiers to Fort Larned, Kansas, 15 miles southwest of Pawnee Rock. Maj. Gen. Winfield S. Hancock believed he faced a major uprising, having been told of an ultimatum from Kiowa Chief Satanta to close the trail, stop killing buffalo, stop building railroads, and get all whites out of the area. Actually Satanta sent no ultimatum; Hancock reacted without verifying his intelligence.

The Indian troubles along the trail had begun like that—through misunderstanding—back in 1828. When two returning Santa Fe traders were killed along the North Canadian River, vengeful friends shot and killed the first Indians they met, without ascertaining guilt. A small Indian war began, and by the next year the Army had been assigned its first escort duty on the trail. By the late 1840s the Army presence had become significant; by the mid-1860s the stage was set for the final showdown wars between the Plains tribes and the U. S. military.

Before resorting to arms, Hancock sought a powwow, but only lesser chiefs came. He told them to spread the word that the "steam-car and the waggon-train must run, and it is of importance to the whites and Indians that the mails, goods and passengers . . . shall be safe. You know very well if you go to war with the white man you would lose. The Great Father has many more warriors."

The message didn't fetch the other chiefs to counsel, so Hancock advanced in force on a major Indian village, causing the occupants to flee so fast that their cooking pots still bubbled. Lt. Col. George A. Custer of the Seventh Cavalry chuckled at an Army doctor who sampled some stew with gusto until told it was dog.

Still no chiefs appeared, and Hancock heard that Indians had burned a stage station. He ordered the village destroyed as a lesson. This the troopers did with thoroughness, breaking all breakables, burning whatever would burn, keeping inventory: "251 lodges, 942 buffalo robes, 436 horn saddles, 435 travesties [travois], 287 bead mats, 191 axes, 190 kettles, 77 frying-pans, 350 tincups, 30 whetstones. . . ."

This lesson convinced the Indians that Hancock wanted war, so to avoid another tragic summer, Satanta at last came in to face Hancock, saying: "I don't want the prairies and country to be bloody, but just hold for a while. I don't want war at all. I want peace."

These events still echo across the years at Fort Larned, now a national historic site run by the Park Service. Ranger George Elmore told me how local citizens moved Congress in 1964 to buy back the fort's old sandstone buildings from a ranch for restoration. "It takes people interested in their history to make projects like this work," he said. As I left, a bugle sounded the traditional evening salute to the colors, and the big garrison flag in the quadrangle slowly descended.

"Kit gave me an order for a rifle and I didn't see him again for several years. One day he walked into the shop—I didn't know him—and asked if I had any rifles. I told him there was one on hand, and that was made for Kit Carson. That's my name, he said, and took the rifle for $25. He would have readily paid twice as much, for all my guns were made to kill at 200 yards."

SAM HAWKEN, 1882

LOMA PARDA DANCE HALL ONCE BLAZED WITH REVELRY FOR FORT UNION SOLDIERS.

"Every night parties were formed from our camp . . . where we danced, smoked, and indulged in flirtations, with the native damsels, over glasses of the white mexican wine, ever present upon these occasions, until the approach of dawn in the eastern sky, with its rosy light, warned us to take saddle, and ride to the fort to be ready to answer to our names, when the roll was called at sunrise in the morning."

FRANK OLSMITH, CIRCA 1920

A CRITICAL CHOICE of routes faced trail travelers near Fort Dodge, the area where the legendary Dodge City of cattle-drive days would flourish. They could continue up the Arkansas into Colorado, then cut southwest into New Mexico over Raton Pass, the Mountain Branch, which from Independence took an average of 72 days. Or they could pare ten days off that by cutting southwest from the Arkansas just west of Dodge—the so-called Cimarron Cutoff to the river of that name. It led across what today is the Oklahoma Panhandle into New Mexico. Most in-a-hurry Americans used it, except when Indian troubles intensified.

But there was another catch to the shorter route. Between the Arkansas and the Cimarron was the *jornada*, or journey. The word carried a connotation of dread. For man and beast it was a bone-dry 60 miles, a "water scrape" that could also unleash extremes of weather. When thirst eroded judgment, heat waves served up bewitching mirages of brimming lakes.

The jornada almost doomed the Cooper-Walker party in 1823. A survivor later reported that the thirst-crazed men killed their dogs and cut off their mules' ears to drink blood, and finally were saved by drinking a slain buffalo's stomach juices. A traveler wrote: "I have since heard one of the parties . . . declare that nothing ever passed his lips which gave him such exquisite delight as his first draught of that filthy beverage."

Famed trapper Jedediah Smith, wise to perils of the Rockies, was overmatched by the jornada in 1831. His brother Austin wrote to his father: "Your Son Jedediah was killed on the Semerone the 27th of May on his way to Santa Fe by the Curmanch Indians, his party was in distress for water, and he had gone alone in search of the above river which he found, when he was attacked by fifteen or twenty of them. . . ."

Forty miles up the Cimarron, Middle Spring still feeds several pools amid willows and cottonwoods. There I met up with trail historian

TRAIL RUTS PASS BY FORT UNION'S OLD EARTHEN STAR FORT AND A LATER COMPOUND OF ADOBE.

Steve Hayward of Elkhart, Kansas. He showed me swales, some rock outcroppings perhaps worn smooth by trail traffic, and how to get a jeep stuck in a wallow and how to get it out again without emotion or loud shouting. Next day in his grasshopper of a Cessna 150, he showed me how the trail, so intermittent to the eye at ground level, from the air becomes a continuous mark on the earth. "You can see it like that from here to Santa Fe," he said. We circled sky-mirroring Upper Spring and found dim traces of old Camp Nichols in Oklahoma's Panhandle.

BALTIMORE OYSTERS ONCE PACKED THIS TIN, TRANSFIGURED INTO AN ORNATE FRAME FOR A RELIGIOUS IMAGE. METAL SHORTAGES CAUSED NEW MEXICO ARTISTS TO RECYCLE CANS BROUGHT WEST ALONG THE SANTA FE TRAIL. FRAME COURTESY COLORADO HISTORICAL SOCIETY'S BACA AND BLOOM HOUSES AND PIONEER MUSEUM

For Army bride Marian Russell, Camp Nichols held fond memories of two favorite men—Lt. Richard Russell, her husband, and Col. Kit Carson. Newly married in 1865, Marian pleaded with Kit as Richard's CO to let her accompany them to the isolated post. Carson said it was too dangerous but made a promise to stop her tears: "Little Maid Marian, believe me I will take you out to Camp Nickols as soon as it is safe."

A month later she was there, in time for a fearful nighttime thunderstorm: "I had never known the wind to blow so hard. . . . the lightning would tear jagged holes in the black sky and our tent would be illuminated with an unearthly blue light. Suddenly our tent pole buckled. I hid my head under Richard's arm and did not hear Colonel Carson calling. Richard was trying to find his clothing when the Colonel's cry changed suddenly into a roar of rage. His tent had fallen down upon him. Richard had to call out the Corporal of the guards to get the Colonel extricated."

KIT CARSON'S CAREER began on the Santa Fe Trail, at old Franklin, Missouri, and it ended on the trail, at Fort Lyon, Colorado. To visit the place where he died in 1868, I diverted from the Cimarron Cutoff northward to the trail's Mountain Branch beside the Arkansas.

The trail was the school of life for unschooled Kit. He went on to fame as a scout and pathfinder for John Charles Frémont and rose to brevet brigadier general in the Army's campaigns in the West. For leading an 1863-64 scorched-earth campaign that crushed the Navajo, he has been called an Indian hater.

But Santa Fe historian Marc Simmons, preparing a Carson biography, sees Kit as a man who always answered his country's call. He cites Kit's own views, specifically Carson's denunciation of Col. John Chivington's murder of as many as 200 Cheyenne at Sand Creek, Colorado:

"The pore Injuns had our flag flyin' over 'em, that same old stars and strips that we all love and honor. . . . then here come along that durned Chivington and his cusses. They'd bin out huntin' hostile Injuns, and couldn't find none no whar. . . . So they just pitched into these friendlies, and massa-creed them—yes, sir, literally massa-creed them in cold blood, in spite of our flag thar—women and little children even . . . And ye call these civilized men Christians; and the Injuns savages, du ye?"

Kit's last trip east was with some Ute chiefs, helping complete a government treaty. He also consulted doctors concerning an aneurysm against his windpipe that was killing him. Given little hope, he hurried west to be with his wife, Josefa, then pregnant. She died after bearing their seventh child, and Kit went to Fort Lyon for treatment. There he made a will "for the benefit of my children." Through a final gasp and gush of blood, he bid *adios* to his doctor and a friend. The small stone building where he breathed his last is now a memorial chapel.

Some 20 miles west of Fort Lyon a huge adobe bastion rises like a mirage above the Arkansas River. Influenced by fortified Mexican

TINWORK IN A SANTA FE MARKET STALL EMBODIES ARTISTRY SPANNING FOUR GENERATIONS OF THE SANDOVAL FAMILY.

haciendas, with 14-foot-high walls and large enclosed courtyards, Bent's Old Fort was the most imposing edifice on the trail.

Built in 1833 by the firm of Charles and William Bent and Ceran St. Vrain, it facilitated trade with Santa Fe, the Indians, and white trappers. By 1846 its amenities included a billiard table and an ice house, so parched mountain men could look forward to refreshing "hailstorms"—a version of mint julep. Fresh off the trail, Lewis Garrard noted: "We sat down to a table, for the first time in fifty days, and ate with knives, forks, and plates." Influential with Indians and Mexicans alike, Charles became the first American governor of the New Mexico territory, only to be scalped and killed in front of his horrified family, the most memorable act in a futile revolt by Taos Mexicans and Pueblo Indians. William abandoned the fort two years later, in 1849.

The adobe pile melted back into the ground, but the Park Service got federal funding to rebuild it for the nation's 200th birthday in 1976. A national historic site, it stages nine living-history events a year, according to interpretive ranger Alexandra Aldred: "Our four-day encampment in September brings hundreds here from all over the country."

From just west of Bent's, the Mountain Branch angled southwest along the Purgatoire River. Then came tortuous 8,000-foot Raton Pass into New Mexico, an axle-breaking trail until pioneer entrepreneur Uncle Dick Wootton smoothed it into a toll road in 1865. Intent on getting his tolls, he was a hardnose who wouldn't even waive fees for two men who had just helped him save his house from burning.

"My grandfather used old tin cans that were bought from the wagon trains that came from the East. Sometimes he made frames for mirrors or religious pictures. Later, when I was growing up, I helped tend his iron, and sometimes he would even let me do a little punching."

BEN APODACA MARTINEZ, 1990

BEYOND RATON PASS trail travelers skirted the eastern face of the Sangre de Cristos. A hundred miles from Santa Fe they came to Fort Union. Built in 1851 near the junction of the trail's Mountain Branch and Cimarron Cutoff, Fort Union became the quartermaster depot for all the garrisons in the region, eventually making it the largest military facility in the Southwest.

"Great supply trains shuttled over the trail from the East," historian Leo Oliva said. Smaller military trains carried beans and bullets to isolated garrisons. The trail took on a heavy military flavor.

Fort Union's ruins today are an adobe Stonehenge of pillars and windowless walls. But it has become a national monument, and Superintendent Harry Myers led me through the maze. We talked of how these interpretive centers and local museums provide today's travelers with as-you-go history lessons. "Those original Santa Fe traders would be amazed if they knew all the attention they're getting," Harry said.

A special excitement gripped traders and bullwhackers as they finally descended a gentle rolling plain to their long-awaited goal—La Villa de Santa Fe de San Francisco, the City of Holy Faith of St. Francis. Never mind that it was only 5,000 souls living in humble adobe around a dusty plaza. It was the dream realized.

"It was truly a scene for the artist's pencil to revel in," wrote Josiah Gregg. "Even the animals seemed to participate in the humor of their riders, who grew more and more merry and obstreperous as they descended towards the city. I doubt, in short, whether the first sight of the walls of Jerusalem were beheld by the crusaders with much more tumultuous and soul-enrapturing joy."

It was a rapture that took few to church but focused on finding top prices for trade goods, plus a bath, clean duds, and a sighting on the nearest fandango. Such activity was frequent and energetic. "After the dancing had once commenced it did not flag the whole evening," wrote newly arrived W.W.H. Davis in 1853, "for no sooner were one set through than another stood ready to take their places."

My joy in reaching Santa Fe was mingled with regret that the trip was over. I had become a "trail junkie," in the words of historian Marc Simmons, a longtime president of the Santa Fe Trail Association. The trail's mystique draws people back again and again. Marc thinks its lure may even have something to do with the ghost trains.

According to reports reaching Marc, these ghost trains move along the trail in deepest night, usually in lonely stretches of northeast New Mexico or the Oklahoma Panhandle.

"It's always in the middle of the night," Marc says, "and the descriptions are always identical: 'I woke up and I heard this sound I'd never heard before, a kind of jingling sound, then I heard a rumble of wheels, and all of a sudden I realize what it must be—and it's gone.' "

Just a vivid dream, perhaps?

"If it is, it's a shared dream," says Marc. He posed that explanation to a group hiking the trail five years ago. "They were in different tents, but they all heard it. At first they thought it was a dream. But then came the cross-checking, and all had heard the same thing at the same time."

Army wife Marian Russell was a trail junkie who made five trips to New Mexico, beginning in 1852 as a child. In her later years she lived in Colorado's Stonewall Valley, idyllic mountain-framed country. "Yet I have grown tired of tall trees and cool greenness," she wrote. "My heart has returned to the land the old trail ran through, so long ago. Old paths that wind through the malpais [badlands] beckon to me. I want to feel the desert sun shine hot on my hands, my face and my breast. . . . My thoughts move slowly now like motes behind a faded window blind. I stand listening for the sound of wheels that never come. . . ."

Marian, a new generation is taking up the trail, reviving its memories, renewing the luster of its spell: New wheels are turning, and the Santa Fe Trail lives again. □

"Fandangos, as they are sometimes called, are carried on almost every night. The love of the people for dancing is almost insatiable, and they certainly indulge in it to their hearts' content."

WILLIAM A. BELL, 1869

SANTA FE AT LAST: WHOOPS AND WAVES HASTEN A WAGON TRAIN TOWARD TRAIL'S END, WHERE SPIRITED TRADING AND A WHIRL OF SOCIALIZING AWAIT. DENVER PUBLIC LIBRARY WESTERN COLLECTION

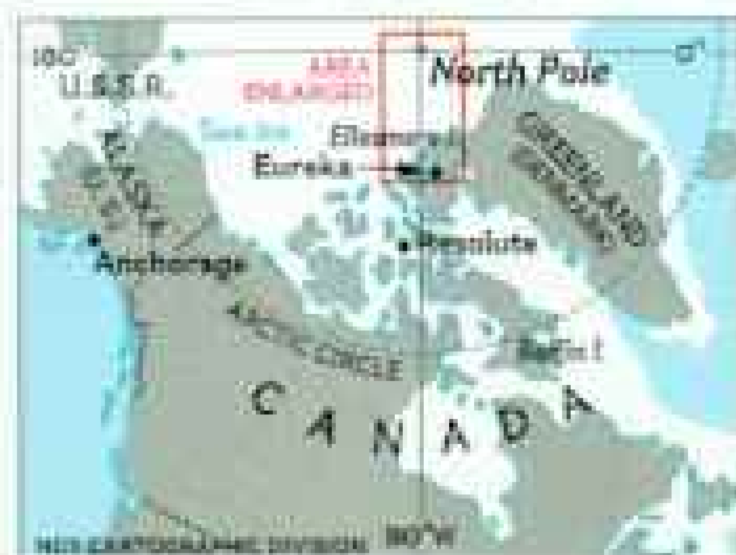
THE HARD WAY TO

No motors, no dogs, no resupply. Just three Norwegians

THE NORTH POLE

on skis—alone against the ice.

By BØRGE OUSLAND



ERLING KAGGE (PRECEDING PAGES); AL MCDONALD

POLAR OUTFITTER Bezal Jesudason looked us over carefully when we reached Resolute, high in the Canadian Arctic. "You're the best prepared expedition I've seen," he said. "I'll give you a 10 percent chance."

We had come from Oslo, Norway, in late winter of 1990 to meet one of the last great challenges of the Arctic. Jean-Louis Etienne, who in 1986 had made a successful trek on skis with five resupply flights, asked: "Will anyone ever reach the Pole under his own power, entirely unassisted? Perhaps, though the day is still in the future" (NATIONAL GEOGRAPHIC, September 1986).

Since then four expeditions had tried to reach the Pole without "support"—defined as anything that physically helps move you forward—and failed. A team led by Englishman Sir Ranulph Fiennes reached farthest north in 1986 but fell short by 307 nautical miles. Now Fiennes was back for another try, starting from the Russian side, along with a Soviet team. An unsupported expedition of Canadians was already on the ice.

We Norwegians started as a team of three: Geir Randby, 28, was a white-water canoeist; Erling Kagge, 27, was an Antarctic sailor; I was 27, a deep-water diver. None of us had ever tried a trek to the Pole, but we had grown up on skis and been nurtured on tales of our own polar explorers—Fridtjof Nansen and Roald Amundsen. We trained for two years.

On March 8 our airplane from Resolute landed on the

sea ice near Ellesmere Island.

"Pick you up same place, same time, in two days," joked our pilot. "These are the worst conditions I've seen in 15 years." Then his radio crackled, and we heard that the Canadian team had quit after one week because of open water.

From the start, huge pressure ridges and drift snow blocked

BØRGE OUSLAND

our way. Erling had to stretch over a crack in a 30-foot-thick ice floe (above). For navigation we used the global positioning system, finding our location via satellite.

On day nine Geir's sledge slipped into a crevasse, painfully wrenching his back; we had to call for an aircraft to take him out. With our lightweight VHF radio we reached a Scandinavian Airlines jet on its way to Anchorage, Alaska. By prior arrangement SAS crews contacted us five times a week.

The wait for the rescue plane was miserable (left). Geir, comforted by Erling, right, and me, was close to tears in frustration. Our chances now were slim, but we loaded Geir's share of food and fuel on the plane with him.

Does using food and fuel from Geir's sledge during our four-day wait constitute support? Our conclusion—and experts agree—is that we followed the unwritten rules of an unsupported expedition.

The only "support" we got was a whiff of perfume from the woman copilot.

WE WERE CROSSING ocean covered by a crust of moving ice that cracked and buckled constantly, leaving leads of open water, some so wide we could not see the other side. These we had to ski along until we found a narrow neck to cross. We broke through eight times during the trip, but saltwater ice is elastic, like rubber, and we had time to scramble to safety.

Past expeditions would wait for days for water to freeze over, but we didn't let smaller leads stop us. We had designed our sledges extra wide and high to act as boats, and now we lashed them together with our skis to form a stable catamaran and paddled with a shovel or another ski. On this crossing (right) I broke thin ice with empty sledges before returning to haul supplies.

ERLING KAGGE (RIGHT); BØRGE OUSLAND

Low weight was the key; of the unsupported attempts at the Pole we were among the lightest. Our Kevlar-and-fiberglass sledges weighed only 265 pounds each, fully loaded. We took bottled-gas fuel for 70 days, and it all went to melt ice for water, none to heat the tent. The thermometer read minus 50°C inside as Erling luxuriated in his morning porridge (left). It was like having a sauna on your face, and we looked forward to it all night.

Erling's left foot blistered from the hiking (bottom), but he's a tough guy. We just bandaged it, and he used a safety pin each night to drain it.

We ate the same food every day—porridge mixed with fat for breakfast, porridge with fat and sugar and high-fat chocolate for lunch, and freeze-dried meat with rice or potatoes, mixed with fat, for dinner. But hunger followed like a ghost, and as we struggled toward the Pole, visions of pork roasts, spaghetti, and creamed mushrooms haunted us. My diary brims with crazy recipes.

Leaving my son, Max, back in Norway was hard. When his second birthday came on April 12, we celebrated with a bag of fruit soup I had hidden in my gear. The only other extra weight I carried was two family photographs. Erling sneaked in a tube of toothpaste.

WE WERE NOT expecting company this far north, latitude 88 degrees, 19 minutes. The only signs of animals we had seen were some fox tracks heading southeast and a lone seal that popped its head out of a lead we were crossing. All of a sudden a polar bear appeared over a pressure ridge. Like us, it seemed tired and disoriented, and it may have been starving.

I had just put on my parka and was getting ready to chop ice for dinner when I saw the bear closing in, only 30 yards away. "Ho!" I yelled, alarming Erling, who was pitching the tent. I went for the .44-magnum handgun that I had worn on my hip when we were farther south. But I had packed it in the sledge, thinking the danger from bear attack was past. Sightings of polar bears this far north are extremely rare. Suddenly I thought: "National Geographic! I've got to photograph it!"

The camera wasn't loaded, and I fumbled with the film as Erling, now gripping his own revolver, looked at me in disbelief. "No, no," he shouted, "we have to shoot first!"

The bear stopped, pacing back and forth and sniffing the air, giving me enough time to get the film in and take photographs (right, top). And then it began to approach us (right). I fired one warning shot, but when the animal closed to nine yards and kept charging, we had no choice.

The bear shook as two bullets pierced its chest. Heaving silently, it turned in its tracks, stumbled, and collapsed

(left). A smaller caliber gun would have been useless. You need a weapon with stopping power. Even if you shoot a polar bear in the heart it still can charge.

We put a final shot in its head, so it wouldn't suffer. We felt quite bad; it was a beautiful animal. But we had no choice: It was him or us.

Later we realized how lucky we had been. The bear had probably followed us all day. If it had attacked us in the tent or while we were on our way, dragging the sledges, we might have been the victims.

Before our encounter with the polar bear that day we had trekked an exhausting 13½ hours. At times I was so dizzy I couldn't walk straight; I kept asking Erling for the right compass bearing.

Using animals for food during the trek might have been seen as support in some expedition circles, so we didn't eat any of the meat but cut some to carry with us. We would celebrate with bear steak at the North Pole.

UNDER THE MIDNIGHT sun, temperatures rose, the ice smoothed out, and we leaned into a fast rhythm. We were running on the edge of exhaustion; it couldn't last. But the Pole was near. SAS informed us on April 19 that the British team was three to four days ahead. We

hadn't talked much about the race; we had assumed we were ahead. But now we had to forget the cold and the pain and sprint, with 15-hour treks and often 24 hours between sleeps. And for what? For Norway? Because Amundsen beat Scott to the South Pole in 1911? Yes. Yes! We had to beat the British!

LEGS CRAMPING from the strain, we skied right past the Pole, 550 yards into the Russian side. It was May 4. We shook hands, hugged each other, and collapsed. The ice was moving toward Canada. As we slept, we drifted back over the Pole.

Our food was nearly gone, and we had been out of radio contact for two weeks. We made camp, not knowing how long we would be forced to wait. That day we ate bear. I cut it into strips (right), added salt water to spice it, and fried it in blubber. It was awful, but for us it was the taste of victory.

The following day a large turboprop bore in low from the south—the U. S. Navy on a scientific mission. They had seen us. I hurried to get the radio. Erling stomped "FOOD"

ERLING KAGGE (ABOVE AND TOP)

in large letters on the snow.

"Who are you?" the pilot radioed. "Is there an emergency?"

"No," I said. "We are just two Norwegians who skied here from Canada."

In a few minutes containers tumbled from the sky. It was their lunch—sandwiches, juice, kippered herring—and magazines of all persuasions (left).

On May 9 the pickup plane arrived with our partner, Geir Randby. He brought a Norwegian flag and poured champagne (below). Geir's back was fine, and he was so choked with emotion he couldn't even speak. He just held me.

"What about the British?" I asked.

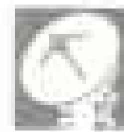
"Didn't you know? They gave up a long time ago."

So we did it!

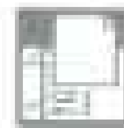
Other polar treks will follow; none will be easy. There is no highway to the North Pole. The wind, the cold, the struggle—they will be the same. □

BJORN REESE

C&C Computers and Communications



Saving a tree just takes a little paperwork.



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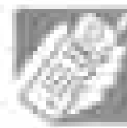
This experience led us to begin examining the prospects of paper recycling over 17 years ago. And after much trial and error, paperwork if you will, we've developed ways to help produce recycled paper of such a high quality that it can be used with office automation equipment. In doing so, we've used 240 million recycled sheets, saving a significant number of trees in the process.

Paper recycling has never saved NEC any money. In fact, it costs considerably more to produce the kind of recycled paper that can be used within our offices. But by recycling paper as well as completely eliminating the use of CFCs and harmful chemicals within our operations, we're able to invest in something much more meaningful than company profits. That being the future of our environment.



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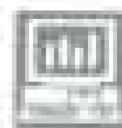

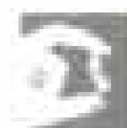

NEC

Education Foundation

Lesson of the Week: Global Interdependence

Celebrities and elected officials took to the classroom in November during National Geography Awareness Week.

Alex Trebek (right, at left), host of the TV quiz show *Jeopardy!* and moderator of the National Geography Bee finals, joined me in a Burbank, California, elementary school to teach a lesson on global interdependence, showing how even simple products require raw materials from many nations. In Virginia, Senator Charles Robb taught a high school class on the global impact of that state's goods.

The Society sent lesson-plan kits, underwritten by Citibank, to some 150,000 teachers across the country.

MARIA STENZEL

New Maps to Tell Story of Canada

With this issue the Society embarks on a new map series: "The Making of Canada."

From Newfoundland to British Columbia and from southern Ontario to the Arctic Ocean, Canada encompasses more territory than any other nation except the Soviet Union. Yet much of Canada is too austere for anything but sporadic settlement, and much of it is too frigid for profitable farming.

Guided by eminent Canadian geographers R. Cole Harris and John Warkentin, "The Making of Canada" tells the story of this nation in six double-sided maps, each depicting a distinctive region (below), bound to the others by common threads of geography and history.

The first map, Quebec (outlined in red), comes at a crucial time in history as La Belle Province de Québec contemplates secession from the confederation.

To make it possible for teachers and students to share these new perspectives on Canada, the Society plans to distribute 120,000 maps over the multiyear life of the project to educators at our summer institutes.

NGS CARTOGRAPHIC DIVISION

Geography Games for Computer Age

With the push of a button you find yourself on R.M.S. *Titanic*, exploring cabins, looking at menus in dining rooms, and meeting passengers as you steam toward an iceberg.

This suspenseful adventure takes place when you try one of the Society's 21 interactive features on Prodigy, an on-line computer service initiated by IBM and Sears.

About 600,000 Americans subscribe to Prodigy, which can be accessed at home by personal computers. The on-line features add a new chapter to the Society's history of harnessing modern technology to diffuse geographic knowledge.

THE NATIONAL GEOGRAPHIC SOCIETY EDUCATION FOUNDATION WAS ESTABLISHED IN 1988 TO HELP RAISE AND DISTRIBUTE FUNDS FOR EDUCATIONAL AND SCIENTIFIC PROGRAMS.

Mrs. LaRocco Encourages Her Students To Hang Out With The Seniors.

In this case, though, the "seniors" aren't upperclassmen; they're a group of active, energetic folks from a local Senior Citizens Center.

This unique approach to learning is the brainchild of Christine Bideganeta LaRocco, an English teacher at Boise High School in Boise, Idaho. Chris teaches students who sometimes have difficulty in school.

Convinced that the most important lessons aren't always learned in the classroom, Chris creates situations that teach her students valuable lessons about life from first-hand experiences which emphasize sharing.

This includes a host of activities with friends from the Senior Citizens Center. Afterwards, the students write about their experiences. The results testify to the power of these encounters.

Says Chris, "Their writing has revealed deep personal feelings which are the most poignant lines I have ever read in student compositions."

But good writing isn't the only aim. "Trust, understanding, empathy – these are values that must be taught to today's youth," says Chris. "When today's families can't provide experiences to develop these attributes in their children, school can fill the gap."

State Farm is proud to honor Chris with our Good Neighbor Award; we're also delighted to contribute $5,000 to Boise High School in her name.

Chris LaRocco. A good neighbor who shows us how a hand offered in friendship can reach across generations.

STATE FARM INSURANCE COMPANIES
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Good Neighbor Award

The Good Neighbor Award was developed in cooperation with the National Council of Teachers of English (NCTE).

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Who says "Ma doesn't cut

It should come as little surprise to anyone that some of the world's finest walk-behind mowers are made by Honda. They are, after all, Hondas.

What may be surprising, though, is that the only place they come from is our manufacturing plant located in Swepsonville, North Carolina.

In fact, Honda was the very first Japanese company to build a lawn mower factory in the United States.

Here, among 87 acres of Alamance County, you'll find hundreds of skilled Honda Power Equipment associates going about their business. Carefully casting, machining, welding, painting and assembling power mowers from the ground up. Even our four-stroke

de in the U.S.A." it anymore?

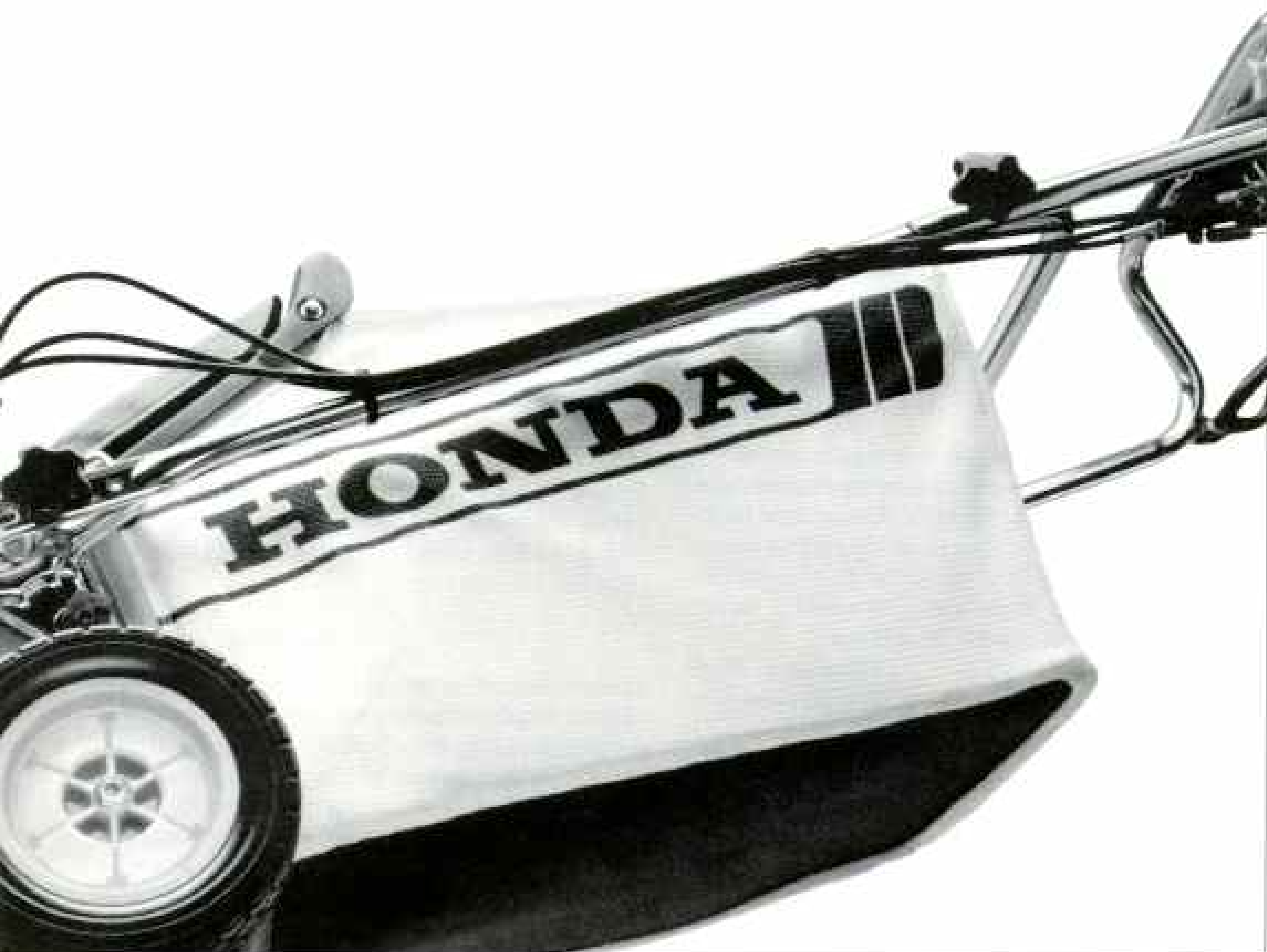
engines are made there, which is something no other U.S. lawn mower manufacturer does.

Like our associates in Ohio who produce automobiles, motorcycles and engines, they make sure every Honda is reliable down to the last steel bolt.

After dozens of rigorous quality checks, every mower is started before it is shipped. Whether it's traveling across the country or being exported to destinations as distant as France and Japan, each American-made Honda is built to go the distance.

Because before any Honda lawn mowers leave Swepsonville, we make sure they'll cut grass. And the mustard.

HONDA



Forum

The Baltic States

I returned from a three-week visit to the Baltics and was extremely pleased to read Priit J. Vesilind's timely article (November 1990). Yes, the Balts are determined to become independent. For them there is no other way, and the West is gravely unjust in remaining silent on the Baltic freedoms. I take exception to the statement of the Catholic priest in Paberže: "If a Lithuanian is an atheist, he is already a collaborator. . . . here, if you don't believe, what kind of Lithuanian are you?" I met many nonbelievers and persons of other faiths who are as patriotic as their Catholic countrymen. Many go to churches on national occasions to show their patriotic solidarity rather than to pray.

Vytautas J. Sliupas
South Lake Tahoe, California

The Baltic nations were not on their way to "modern economies and democratic institutions" on the eve of World War II but were ruled by dictators or authoritarian regimes. In Estonia the first president, Mr. Päts, abolished democratic institutions after a coup d'état in 1934, the same year that Mr. Ulmanis took over power in Latvia. Lithuania introduced a one-party parliament in 1926. Lithuania took part in the occupation of Poland in 1939 and got the area around Wilna (Vilnius). Now, forcing the Russians in the Baltic republics to fit into those cultures and trying to prevent them from voting does not show the tolerance we need in a peaceful "Common European House."

Oliver F. Nandico
Munich, Germany

Vesilind's piece shows just how fragile democracy is in this region. Rather than dismiss national intolerance and encourage fear of Russia, true Baltic democrats and their American supporters should cultivate a new spirit of respect and make the Baltics a democratic showcase. The world is sick of Ulsters and needs no new West Banks.

Richard L. Huff
Keithville, Louisiana

Your otherwise excellent article on the Baltic countries does not mention that the Nazis recruited large numbers of concentration and extermination camp guards in Lithuania, Latvia, and Estonia. Jews in these countries were hunted down. Having left Poland in 1940 just ahead of the Holocaust, which resulted in the annihilation of virtually all my family in that country, I have little sympathy for the Baltics' fight for independence.

Mark Firestone
New York, New York

As a second-generation Lithuanian-American, I wish to thank the Geographic for its moving articles on Ellis Island (September 1990) and the Baltic nations. The two are irrevocably joined. Many Lithuanians found the only escape to religious freedom was to America through Ellis Island. At the turn of the century three of my grandparents escaped tsarist Russia and found a new life here. They, together with other Lithuanians, Poles, and Slavs, settled in places like Shenandoah in the eastern Pennsylvania anthracite coalfields. They all brought their religious fervor with them. St. George's Lithuanian Catholic Church in Shenandoah is the oldest ethnic Lithuanian Catholic Church in this country.

Peter E. Franks
Somerville, New Jersey

The Erie Canal

Like author Joel Swerdlow, I grew up in Syracuse, but I cannot claim to have "loved the Erie" (November). In the 1940s it was an uninspiring freight waterway, but it has become today an attractive recreational asset to the state of New York. Locks have been refurbished, repainted, and planted with flowers. Town waterfronts have been constructed to attract boaters. Having recently traveled the length of the Erie, I was impressed with the transformation, particularly west of Syracuse.

Kenneth J. Shaver
St. Louis, Missouri

Thank you for a very interesting article on another of America's canals. I find it surprising in a way that every canal, although different, has many of the same characteristics. Your article on England's canals (July 1974) illustrates this point. Maybe the Erie should enforce a 4 mph speed limit again; it would help keep down maintenance costs.

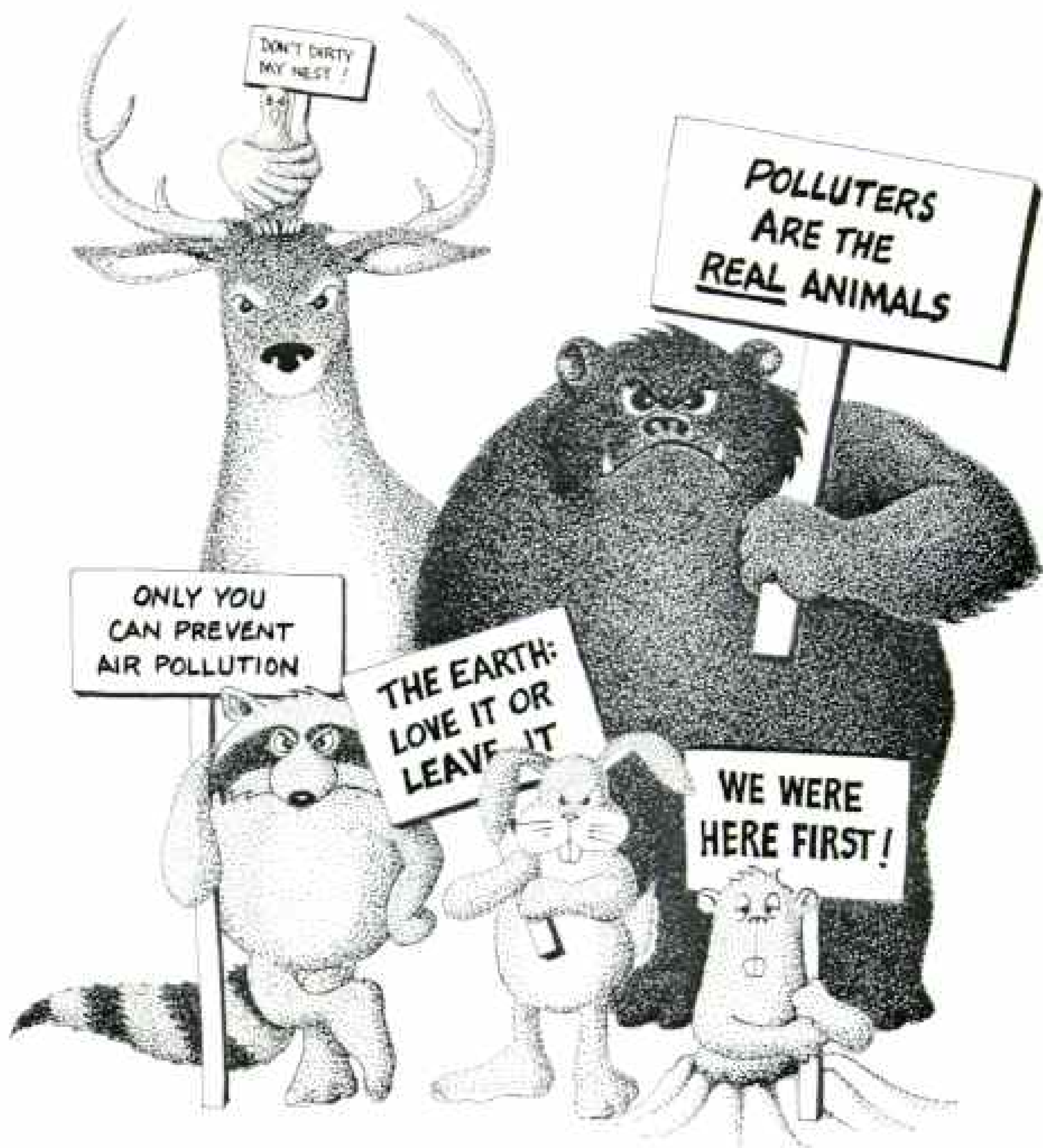
N. G. Taylor
Ruislip, England

Where was the coverage of the restored canal parks, museums, and towpath trails for bikes and hiking? Did the story need two photos in the Utica Blue Sox locker room?

Ted Reich
Port Byron, New York

I cannot remember a photograph as moving as that of Scott Stephens feeding his baby son in the locker room of the Utica Blue Sox. No mother could convey a stronger emotion of affectionate protectiveness. Thank you for a superb recording of a common human event in an uncommon context.

Perry Laukhuff
Amherst, Virginia



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My great-uncle Bert Wright told me about growing up near Albion, New York, at the turn of the century. He and his brothers followed a decades-old tradition selling fruit and vegetables to canal boatmen. The boys lowered baskets of produce from a bridge as the canal boat passed below. As it emerged from under the span, money and any unsold goods were attached to the rope and returned to the young entrepreneurs.

JEFF WRIGHT
Akron, New York

Apparently the author spoke to only one person about the chemical leak at the FMC plant in Middleport and failed to check the credibility of that report. Immediately after the leak the school district and community in cooperation with FMC began a review of safety procedures. The quote about arsenic levels in the soil of school property approaching 18,000 parts per million is totally untrue. The reason the citizen action group dwindled was the rational review of the data. When all studies were concluded, there was no basis for their cause. It was never a question of the community choosing jobs over safety.

NATHAN HERENDEEN, PRESIDENT
Royalton-Harland Central Board of Education
Gasport, New York

The author spoke with dozens of Middleport residents who were concerned about the high levels of arsenic in the schoolyard. Through an editing error we inaccurately reported that schoolyard dirt contained 18,000 parts per million. That level was actually recorded in a ditch just off school property.

If FMC had caused the chemical leak through neglect and had not acted responsibly afterwards in correcting the situation, I would lead the way out of this village.

SHIRLEY M. PRITCHARD
Middleport, New York

Antarctica Traverse

In your November 1990 issue you told us about the explorers skiing across Antarctica. They found out it was real cold. How about telling us what they did with their thousands of pounds of garbage.

JACK V. HUSTON
Miami, Arizona

All trash was hauled out on the sleds or airlifted out by resupply planes.

This was one of your finest articles. Will Steger's story swept up the reader and delivered him into the barren, cruel wilderness. My bones were chilled; I felt the extreme isolation and frustration. Mr. Steger is an excellent writer who allows the reader to experience his adventures.

KATHY ROZPAD
Miami, Florida

Kingdom of Kush

I have never been held as I was by your spread on the sacred mountain of Jebel Barkal (November). I was absolutely spellbound.

ROBERT B. PARKS
Crystal River, Florida

New Atlas

The remarkable portrait of the world from space (November) shows sediment plumes at the mouths of many rivers such as the Amazon and Nile. But what is the source of the plume along the Pacific coast of Central America? There are no major rivers there.

GLEN L. PORTER
Vancouver, British Columbia

The plume marks reflections picked up by the satellite sensor, most probably a result of variations in seawater temperature.

As a geographer who works in the Canadian Arctic, I was startled by the complete exclusion of the many large highland ice caps that cover roughly 100,000 square kilometers of Ellesmere, Axel Heiberg, and Devon Islands west of Greenland. That is comparable to leaving out Lake Superior, which would undoubtedly draw the attention of readers surrounding its shores. The same ice caps are well portrayed in your article on Ellesmere Island (June 1988), and I can assure you that they are still there. As an educator concerned about our northern lands, I realize that they are among our most treasured but misunderstood environments. The omission here simply underscores the problem.

JOHN ENGLAND
University of Alberta
Edmonton

Over the smaller Arctic islands the satellite sensor often picked up open water and patches of bare earth as well as ice, resulting in a mixed signal. The artist portrayed these areas in light gray or brown.

Geographica

In your item on the naming of celestial bodies you note that craters and other features on planets and satellites are named only after deceased persons (November). However, a special exemption was made in 1970 when the International Astronomical Union honored, with lunar craters, 12 living American and Soviet space venturers, including two members of the Society's Board of Trustees, Frank Borman and Michael Collins.

DAVID J. WOOKEY
Rosebery, Tasmania

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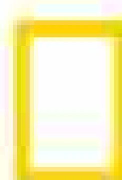

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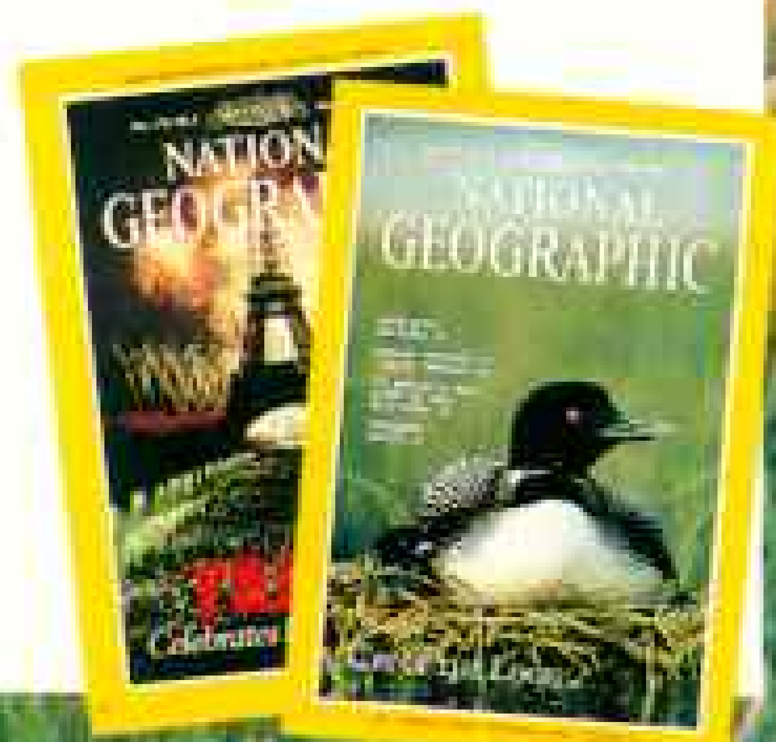

Geographica

Trust to Protect Tanzanian Rock Art

A nonprofit organization has been created to help preserve and protect the Stone Age rock art of Tanzania. Mary D. Leakey, who first saw the prehistoric paintings half a century ago with her late husband, Louis S. B. Leakey (NATIONAL GEOGRAPHIC, July 1983), is chairman of its board.

Ten local residents will be hired by the government to protect the art, painted several thousand years ago on cliffs and rock faces. The Preservation Trust for Rock Art hopes to provide them with bicycles, so they can patrol the 500-square-mile area more efficiently than can

JOHN READER

the two who now cover the area on foot. The guards would also serve as guides for visitors.

The paintings, which provide vital clues to the lives of Tanzania's Stone Age inhabitants, are being vandalized. Graffiti have defaced many, pieces of some have been chipped away, and rocks have been thrown at others. "Unless something is done, there won't be anything to protect," Dr. Leakey says.

Stephanie Kuna, the trust's managing director, says the group hopes to establish a laboratory to study the art and document new sites so that the area can be nominated for listing as a UNESCO world heritage site.

MICHAEL MACONOCHIE (BELOW); SHAWN G. HENRY

A Hurricane's Windfall for Old Ironsides

It's an ill wind that blows no good. Even a hurricane.

Stephen Riggs, a Charleston, South Carolina, insurance agent, wanted his son to know about sailing ships. So, late in 1989, he called Comdr. David Cashman, skipper of the U.S.S. *Constitution* in Boston Harbor, and asked him to sail Old Ironsides down to Charleston. This was impossible, he learned; the ship last sailed in 1881. But Cashman has a dream that she will sail again and has enlisted Riggs's help.

Hurricane Hugo had just devastated the state's forests, including live oaks, whose density makes them ideal for shipbuilding (GEOGRAPHIC, May 1990). What, Cashman asked, was being done with them? Riggs set up a meeting between local officials and the Navy. Now hundreds of live oaks have been marked for shipment north. They will be used, just as oaks were used in the original construction of Old Ironsides, when her restoration begins in 1992.

The *Constitution* is the oldest wooden ship still under U. S. Navy commission; more than a million people visit her annually. For the 1998 bicentennial of her first voyage, Cashman hopes for a cruise under full sail about 15 miles up the coast to Marblehead, where she took shelter while being pursued by British ships in the War of 1812. Old Ironsides made a three-year ceremonial tour of the nation after an overhaul in the late 1920s, but, Cashman notes, she was towed.

Geography Pioneer Gets a Day in the Sun

Britain's first professor of geography at the University of London and the first secretary of the Royal Geographical Society is getting belated recognition, 130 years after his death. An entry on Alexander Maconochie will appear in this year's new edition of the prestigious *British Dictionary of National Biography*.

Though he was known in the 19th century as a penal-reform pioneer in Tasmania and on Norfolk Island, he has been largely ignored ever since.

Maconochie was a naval officer in the War of 1812 but later turned to what he called an "idle life" as a

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writer. His major work was an 1818 geographic treatise on the Pacific Ocean in which he predicted the region's importance to trade.

A friend of such notables as Sir John Franklin and Adm. Sir Francis Beaufort, Maconochie in 1830 helped organize the Geographical Society of London, later renamed the Royal Geographical Society; he became its secretary and edited its journal. Three years later he was appointed professor of geography at the University of London, which now has a club for geographers called the Maconochie Foundation. He resigned the post in 1836 to join Franklin when the Arctic explorer became lieutenant governor of Van Diemen's Land, now Tasmania. In 1840 he was made superintendent of the penal colony on Norfolk Island.

Maconochie's humane principles about how to treat convicts then being transported to Australia made his reputation; one historian terms him "the one and only inspired penal reformer" to work there.

Celebrating 150 Years of "Terrible Lizards"

On August 2, 1841, an anatomist named Richard Owen rose to present a paper to the British Association for the Advancement of Science, meeting that year in Plymouth, England. Owen proposed a new name for a group of reptiles whose fossilized bones scientists had begun to find in great numbers: He used the Greek words *deinos*, terrible, and *sauros*, lizard, and suggested that these creatures be called dinosaurs.

This August the BAAS will hold its annual meeting in Plymouth to mark the 150th anniversary of Owen's paper. Since 1841 scientists have found many new specimens and devised numerous theories to explain them (GEOGRAPHIC, August 1978, June 1989). But Owen's term has retained an unequaled hold on the popular imagination.

The British post office will issue a set of five commemorative stamps to celebrate the anniversary. British postal officials say that final designs probably will feature dinosaurs central to Owen's paper: megalosaurus, hylaeosaurus, and iguanodon. It's likely too that the British will avoid the flap created by the U. S. Postal Service in 1989 when it issued a set of dinosaur stamps. It called one dinosaur a brontosaurus (left), a term that had been discarded by many scientists, who favored its lesser known name, apatosaurus.

MARILYN MOFFORD GIBBONS, NGS

U. S. POSTAL SERVICE (BELOW); JAMES P. BLAIR, NGS

A Life Carving Beauty in Cathedral Stone

When Vincent Palumbo came to the United States from his native Italy in 1961, his fellow stone carvers at Washington National Cathedral called him "boy." Now, he says, people at the cathedral call him "the old man."

It was Palumbo (left)—the last of five generations of carvers in his family—who carved the stone that was set in place last September to complete construction of the cathedral. That was 83 years to the day after work began (GEOGRAPHIC, April 1980).

Palumbo was already a professional carver when he came to this country at age 25 and joined his father and others who were carving limestone for the Gothic cathedral. The work required some adjustment. "I was trained in marble, and limestone is softer," he says.

Palumbo hopes to carve the statues, rosettes, and other decorations left uncarved during construction. "Just because you put a roof on the house doesn't mean it's finished," he says. "To me the cathedral is like a three-dimensional Bible, and all the stones that were left undone should be done. If we don't do it, it will be an insult to the architect and to the church itself."

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Geographica

GEORGE F. MOBLEY, NGS (BELOW), SAM ABELL

Shaker Ranks Dwindle as Two Leaders Die

The ranks of the Shakers (GEOGRAPHIC, September 1989) continue to decline.

Bertha Lindsay, the last eldress of the Shaker village at Canterbury, New Hampshire, died October 3 at the age of 93. Because the community "closed the covenant" in the mid-1960s, in effect ruling that no new members may join, Eldress Bertha's death means that Sister Ethel Hudson (above), now 94, is Canterbury's sole surviving member. But Scott Swank, the village's director, says it will continue to operate as a nonprofit educational institution, both as a museum of "the Shaker way of life" and as a historic site.

In January 1990, Sister Mildred Barker of the Shaker community at Sabbathday Lake, Maine, died at 92. Unlike Canterbury, the Sabbathday Lake group still accepts new members and, though small, is a working Shaker community.

Stressing celibacy, obedience to elders, and confession of sins, the Shakers were founded by Mother Ann Lee, who came to the United States in 1774. Known formally as the United Society of Believers in Christ's Second Appearing, they came to be called Shakers because they danced with religious fervor during worship.

Suggestions for GEOGRAPHICA may be submitted to Boris Weintraub, National Geographic Magazine, Box 37357, Washington, D. C. 20036, and should include the sender's address and telephone number.

My, Oh, Maya, How They Loved Chocolate!

Chocoholics can take heart: Addiction to chocolate has old and deep roots.

In 1986 epigraphist David Stuart identified a hieroglyph on a "lock-top" vase (right) found in 1984 at Río Azul, Guatemala (GEOGRAPHIC, April 1986), as the Maya symbol for chocolate. Stanley M. Tarka, Jr., and his team of Hershey Foods chemists confirmed that the residue in the 1,500-year-old jar was indeed chocolate (GEOGRAPHIC, May 1987).

Eyewitness accounts from the Spanish conquest had told of the frequent use of chocolate drink in Mesoamerican ritual as well as everyday life. But firm evidence was lacking before Stuart deciphered the glyph. The "chocolate" glyph now has been found on many other Classic period Maya vases whose use had been unknown. And careful analysis of the Río Azul jar and other painted vessels by scholars such as Barbara MacLeod of the University of Texas suggests that hieroglyphic "adjectives" distinguish the kinds of chocolate used, from a frothy beverage to a sort of pulpy chocolate mush.

An Earthquake's Toll in Colonial Jamaica

Marine archaeologists have completed a ten-year excavation of the business district of Port Royal, Jamaica, one of the New World's largest English towns before an earthquake dropped most of it into the sea on June 7, 1692. Amid thousands of artifacts, they found the skeletons of two young children who were among the quake's 4,000 victims.

Port Royal has lured researchers for three decades (GEOGRAPHIC, February 1960, December 1977). The latest team, backed by the Jamaica National Heritage Trust, was led by D. L. Hamilton of Texas A&M University.

With 6,000 residents, Port Royal was rivaled only by Boston among English towns in the Western Hemisphere. It was a major trading center—and a pirate haven.

Hamilton and his fellow divers excavated five large buildings that the quake sent straight down into the sand below. Beneath the rubble of the port's collapsed walls, they found intact floors littered with artifacts from a pipe seller, a vintner, a victualler, and other businesses.

The victualler's shop intrigued Hamilton and his team. Excavators found 35 plates made by Simon Benning, a Port Royal pewterer, engraved with the initials N C, presumably those of the unidentified victualler. They also recovered a monogrammed fork, a nutmeg grinder, porcelain, and silver.

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• Room For Six	• Room For Six
• Dual Electric Mirrors	• Dual Electric Mirrors
• Stereo Sound System	• Stereo Sound System
• Automatic Speed Control	• Automatic Speed Control
• Fully Reclining Seats	• Fully Reclining Seats
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WILDLIFE AS CANON SEES IT

Giant Kangaroo Rat

Genus: *Dipodomys*
Species: *ingens*
Adult size: Body length, 35 cm; tail, 20 cm
Adult weight: 180 g
Habitat: Dry, open grasslands in California, USA
Surviving number: Unknown
Photographed by B. "Moose" Peterson

The giant kangaroo rat emerges from its burrow at night to gather seeds and sprouts. Hopping across the sandy soil with cheek pouch filled, it carries food back to the burrow for the dry season when vegetation is sparse. As grasslands disappear, so does the giant kangaroo rat. And as with other kangaroo rat species, populations continue to decline along with their shrinking habitat. To save endangered species, it is essential to protect their habitats and understand the vital role of each species within the earth's ecosystems. Color images, with their unique ability to reach people, can help promote a greater awareness and understanding of the giant kangaroo rat and our entire wildlife heritage.

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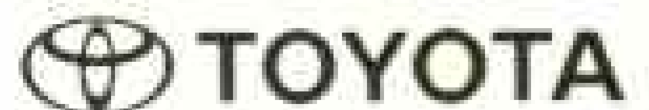

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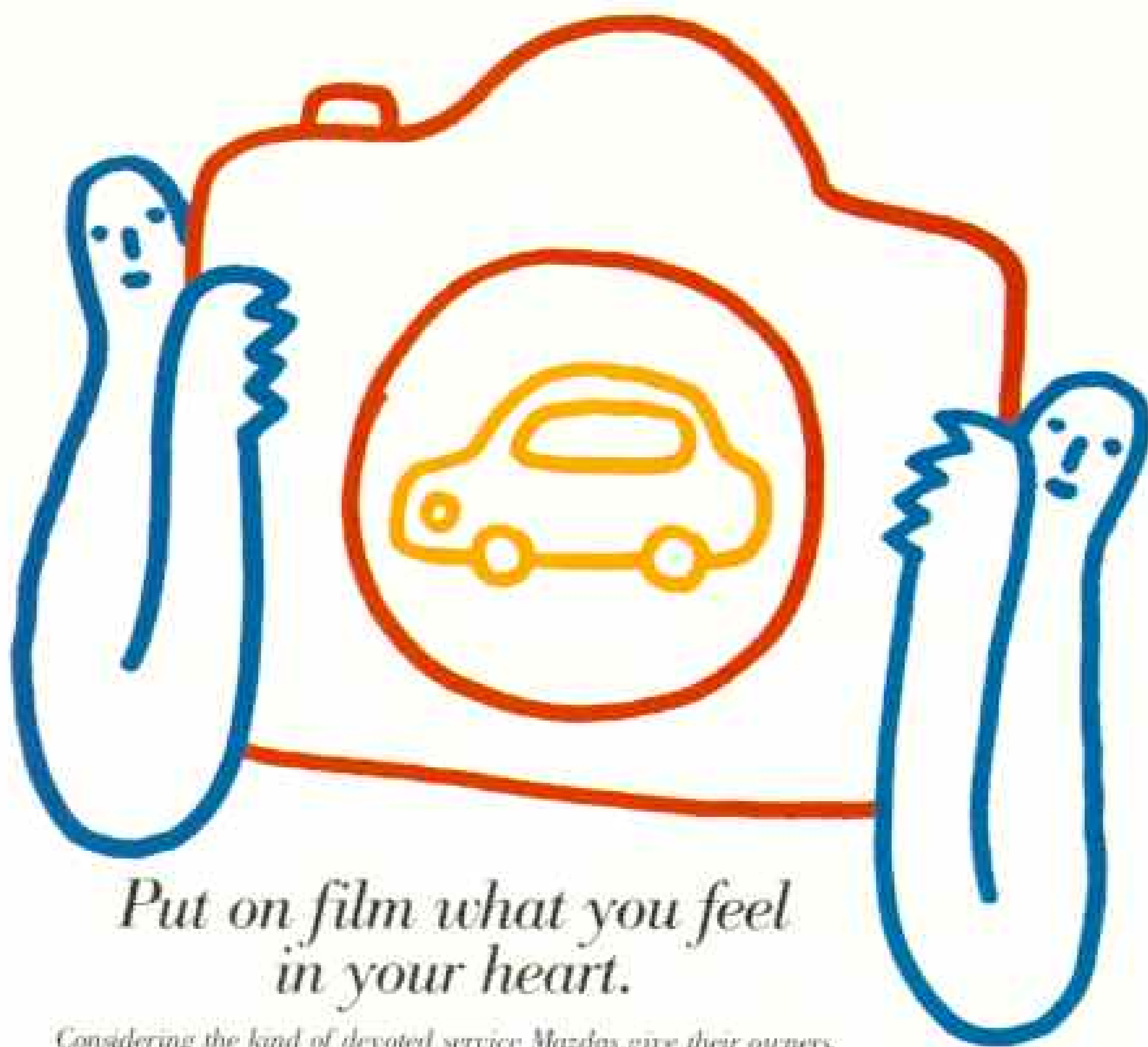

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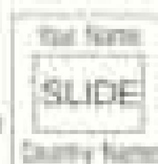
APPLICATION RULES

1. This contest, sponsored by Mazda Motor Corporation at 3-1, Shinchi, Fuchu-cho, Aki-gun, Hiroshima, Japan, is open to any photographer, whether amateur or professional. The contest theme is "Having Fun With Mazda Cars And Trucks." Purchase of or ownership of a Mazda vehicle is not necessary to enter the contest.
2. **Entries must be 35 mm COLOR SLIDES horizontally mounted,** and the entrant's name and country must appear on the slide mount. Each entrant may submit as many entries as desired. Each entry must be accompanied by a signed Application Form (available at your nearest Mazda dealer) or a signed sheet of paper giving the following details. Please type or print clearly: (1) Name; (2) Age; (3) Sex; (4) Address; (5) Nationality; (6) Occupation; (7) Telephone Number; (8) Photo Title; (9) Date of Photo Shooting; (10) Location of Photo Shooting; (11) Names of the Persons Shown in the Photo; (12) Source of Motivation: 1. Magazine 2. Dealer 3. Family/Friends/Acquaintances 4. Others (please specify)
3. Entries should be mounted horizontally as in the diagram.



4. **Entries must be received between February 1, 1991 and June 30, 1991 inclusive, at the following address:**

Mazda Photo Contest
P.O. Box 93, Kyobashi Post Office
Tokyo, Japan

Mazda will not be responsible for the loss of or damage to entries, or for entries which are delayed or misdirected.

5. Fifteen first-prize winners will be selected to receive US$3,000 each. Forty-five second-prize winners will receive US$500 each. Prize money will be remitted either in the currency of the winner's country based on currency exchange rates then prevailing or in U.S. dollars. Only one prize will be awarded per household. Prizes are not assignable, nor exchangeable.
6. Entries will be judged by the Photo Contest '92 Committee, an independent panel of experts, based on originality, composition and photographic technique. The panel's decision will be final.
7. Winners will be notified by mail and their names will be announced in the December 1991 issue of "National Geographic" magazine. (issue date subject to change).
8. Entries are accepted and prizes are awarded on the condition that the entries are original photographs, are the sole property of the entrant, and have not been submitted or accepted for publication elsewhere.
9. All entries will be retained by Mazda and will not be returned.
10. Mazda reserves the right to reproduce, publish, or exhibit any entries in connection with the Photo Contest '92 or related promotional activities, and reserves all rights to winning entries, including the right to reproduce, publish, or exhibit the photograph in Mazda's consumer advertising or elsewhere. It is the obligation of each entrant to obtain any necessary consents for these purposes from persons appearing in the photograph and for other objects appearing in the photograph. The entrant shall hold Mazda harmless and indemnify it against any claim or liability arising as a result of the publication or exhibition of his or her entry. For the foregoing purpose, all winners will be required to execute a consent form to be supplied by Mazda and to be returned to Mazda within 20 days as a condition to receiving their prizes.
11. This offer is void where prohibited by law.
12. The prize winner will be responsible for paying tax in connection with receiving a prize.
13. Any breach of the above rules will entitle Mazda to disqualify any entry.

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Earth Almanac

THOMAS E. KNIGHT

Megamouth Reveals a Phantom Shark's Realm

It is still true that there are stranger things in the sea than anyone can imagine. One of them is called megamouth, a bizarre shark with massive jaws and a bulbous snout. Megamouth was discovered in 1976, and until last October, when one became entangled in a fisherman's gill net south of Los Angeles, only four specimens had been recorded.

"The fact that it was alive—and survived—that was real excitement," said Robert Lavenberg of the Natural History Museum of Los Angeles County, who coordinated rescue efforts. A Geographic crew also on the scene filmed the creature for a future Television Special.

When no facility could be found for keeping the 16-foot shark, Lavenberg called Don Nelson at California State University, Long Beach. If the shark was released, could Nelson track it? He and his research team raced to implant two transmitters in the shark, then followed it at sea for more than two days.

They discovered that megamouth, known to be a plankton feeder, is also a vertical migrator. The night it was released, the shark remained in 50-foot depths. At dawn it dived to 500 feet. "When it made a dramatic ascent back to shallow water at dusk, we knew it was in good shape," said Nelson.

STEPHANIE MAZE

Cars Stay Home: Mexico City Fights Air Pollution

Children of Mexico City don't leave for school until after rush hour, to avoid breathing the noxious fumes. Even birds—robins and cedar waxwings—have fallen dead from the poisoned sky.

So drivers are now doing without their cars and trucks once a week, on staggered days. It's part of a 2.5-billion-dollar assault on some of the world's worst air pollution, fueled by three million vehicles and 35,000 factories, then amplified by winter air inversions in the 7,000-foot-high valley.

The "Today No Driving" decree, regulated with stickers, removes half a million vehicles from the streets every day. Additional measures include unleaded gasoline, catalytic converters in new cars, and other antipollution devices in buses and industrial plants. Planners also intend to expand the subway system and plant 100,000 trees.

Los Alamos National Laboratories and the Mexican Petroleum Institute have joined forces to analyze the pollutants. The U. S. team, for example, wheeled in a truck-mounted laser and telescope in order to track the hazardous paths of industrial smoke plumes.

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Tighter Ships: Tanker Designs to Avert Spills

The clamor for safer supertankers increased in the wake of the **Exxon Valdez** *disaster in March 1989, one of 528 tanker mishaps worldwide that year—up from 451 in 1986. The ideal tanker of the future might incorporate all the safety features shown below.*

Fuel tank

Fuel tanks, often punctured in accidents, are protectively located.

Ballast tanks between the double hull add protection.

DRAWING BY MARK HOLMES, NGS. SOURCES: TANKER ADVISORY CENTER, INC., AND NATIONAL RESEARCH COUNCIL

1. Ship has double-hulled construction. **2.** Fifteen percent of the cargo tank is left empty; if the hulls rupture, incoming seawater's hydrostatic pressure prevents oil from escaping. **3.** Inert gas pumped into the empty space prevents buildup of explosive fumes. **4.** Bow thrusters aid slow-speed maneuverability. **5.** Emergency transfer pumps are easily accessible. **6.** Satellite navigation gives ship's location with pinpoint accuracy. **7.** Black box records data in case of emergency.

Used-oil Pollution Outweighs Tanker Spills

Do-it-yourself mechanics often dump their cars' used oil down the nearest storm sewer or otherwise improperly dispose of the mess. Each year the waste gives the environment a 200-million-gallon black eye—nearly 20 times what the *Exxon Valdez* spewed into Prince William Sound.

And this is only one-sixth of the 1.2 billion gallons of used oil disposed of annually. About half is recycled, a tricky process, since the waste is laced with heavy metals and toxic compounds. Critics say that the Environmental Protection Agency should regulate used oil as hazardous waste. The EPA fears that this onerous designation would cause gas stations to halt the collection service they now perform.

A hodgepodge system of disposal is evolving, by community and by state. Rhode Island sets up roadside containers to accept oil as part of a "user-friendly system."

PATRICIA CAULFIELD, PETER ARNOLD, INC.

Florida Panther Faces Roadblocks to Recovery

Hidden within the saw grass of the Everglades and Big Cypress Swamp, only 30 to 50 Florida panthers survive after decades of habitat loss. Now they may lose their endangered status because of a newly discovered genetic impurity.

Nearly all the Everglades panthers carry genes normally found only in South American panthers, according to testing by Melody Roelke of the Florida Panther Project and Stephen J. O'Brien of the National Cancer Institute. Cats with the genetic markers may be descendants of animals crossbred with the South American subspecies and released into the Everglades 30 years ago.

"This is of real concern," says O'Brien, noting that Endangered Species Act interpretations limit protection to nonhybridized animals. He believes that the alien gene may provide diversity to retard the tiny population's vulnerability to inbreeding.

Last year, efforts to take panthers from the wild and breed them in zoos to restock the natural population were blocked. Pressure groups argued that preservation and expansion of the habitat should take precedence. "When a species gets down to such low numbers, it's difficult to rank the problems," O'Brien observes sadly. "The important thing is to get the numbers up."

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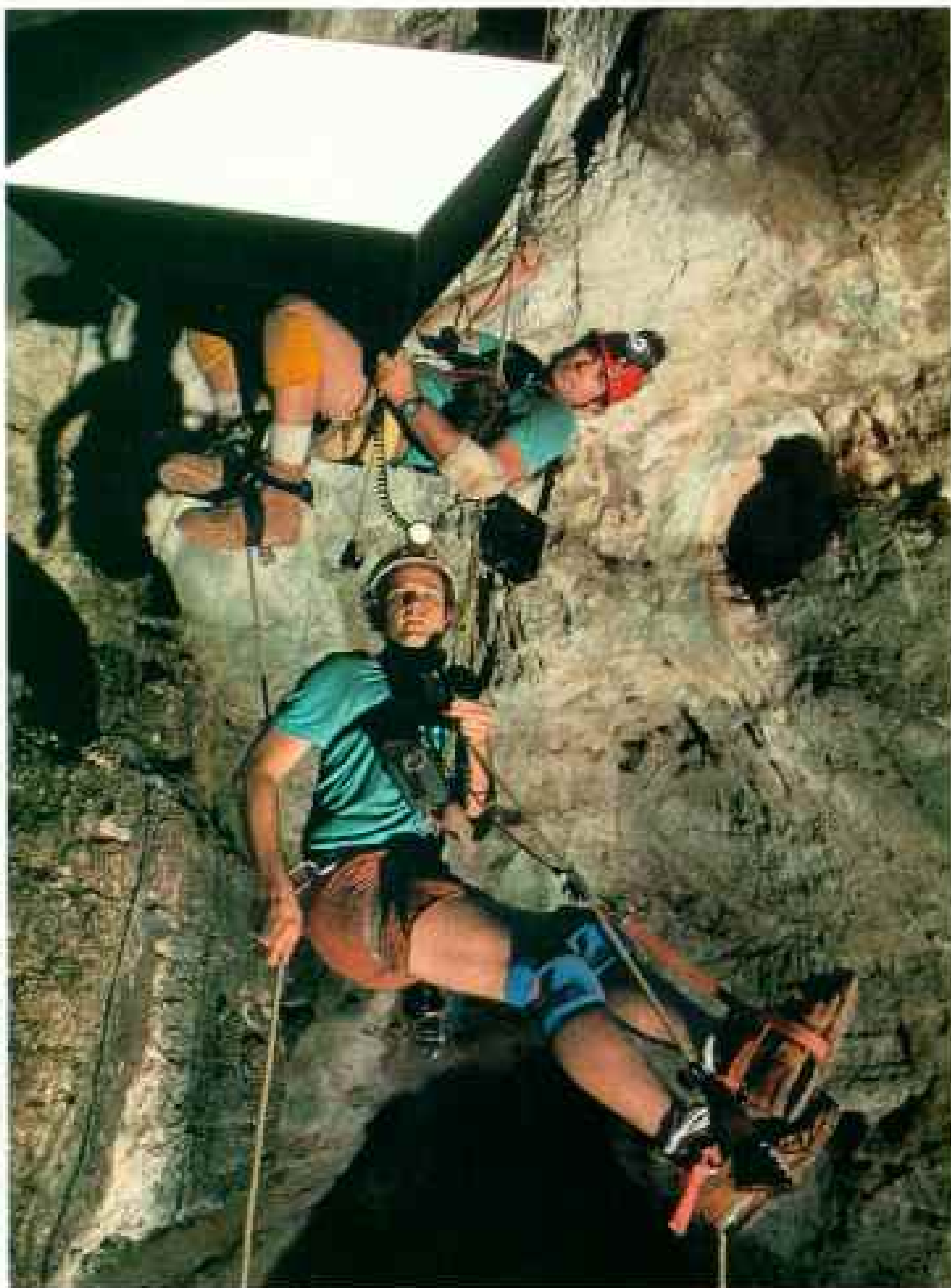
On Assignment

Putting subjects in their best light is crucial to the photographer's craft. Merely bringing light to the utter blackness of Lechuguilla Cave was a big challenge for free lance MICHAEL "NICK" NICHOLS on his first GEOGRAPHIC assignment. In an 80-foot shaft, Nichols hangs below his chief assistant, David Modisette, who maneuvers a "soft box," a cumbersome unit that provides diffused light to smooth out harsh shadows.

"I felt it was almost a mandate for me to photograph Lechuguilla," says Nichols, who as a youngster explored caves near his northern Alabama home. After college he was drafted into the Army and became a photographer with the 101st Airborne Division at Fort Campbell, Kentucky, where he did more caving on weekends. After his discharge Nichols embarked on a series of daring assignments: flying into the eye of a hurricane, sliding 3,000 feet down a rope suspended from an Arctic cliff, rafting the Indus River in Pakistan. Magazines gave Nichols such nicknames as Nick Danger and Indiana Jones.

Now living in Charlottesville, Virginia, with his wife and two sons, he views his mission as a documenter of a fragile world. "Seeing so many things destroyed really woke my environmental consciousness," says Nichols, currently preparing a GEOGRAPHIC article on apes and humans.

Lechuguilla marked the sixth collaboration—their first for NATIONAL GEOGRAPHIC—of Nichols and author Tim Cahill, grimacing during a difficult crawl, right. Cahill is a contributing editor of *Rolling Stone*, a founding editor of *Outside*, and the author of several books. He makes his home in Montana. Nichols and Cahill have scaled Venezuela's Mount Roraima and walked from the lowest point in the conterminous United States (Death Valley) to the highest (Mount Whitney). But to have undertaken the rigors of Lechuguilla, Cahill says jokingly, is a "pure demonstration of psychological aberration."



KRIS GREEN (TOP); MICHAEL NICHOLS, MAGNUM

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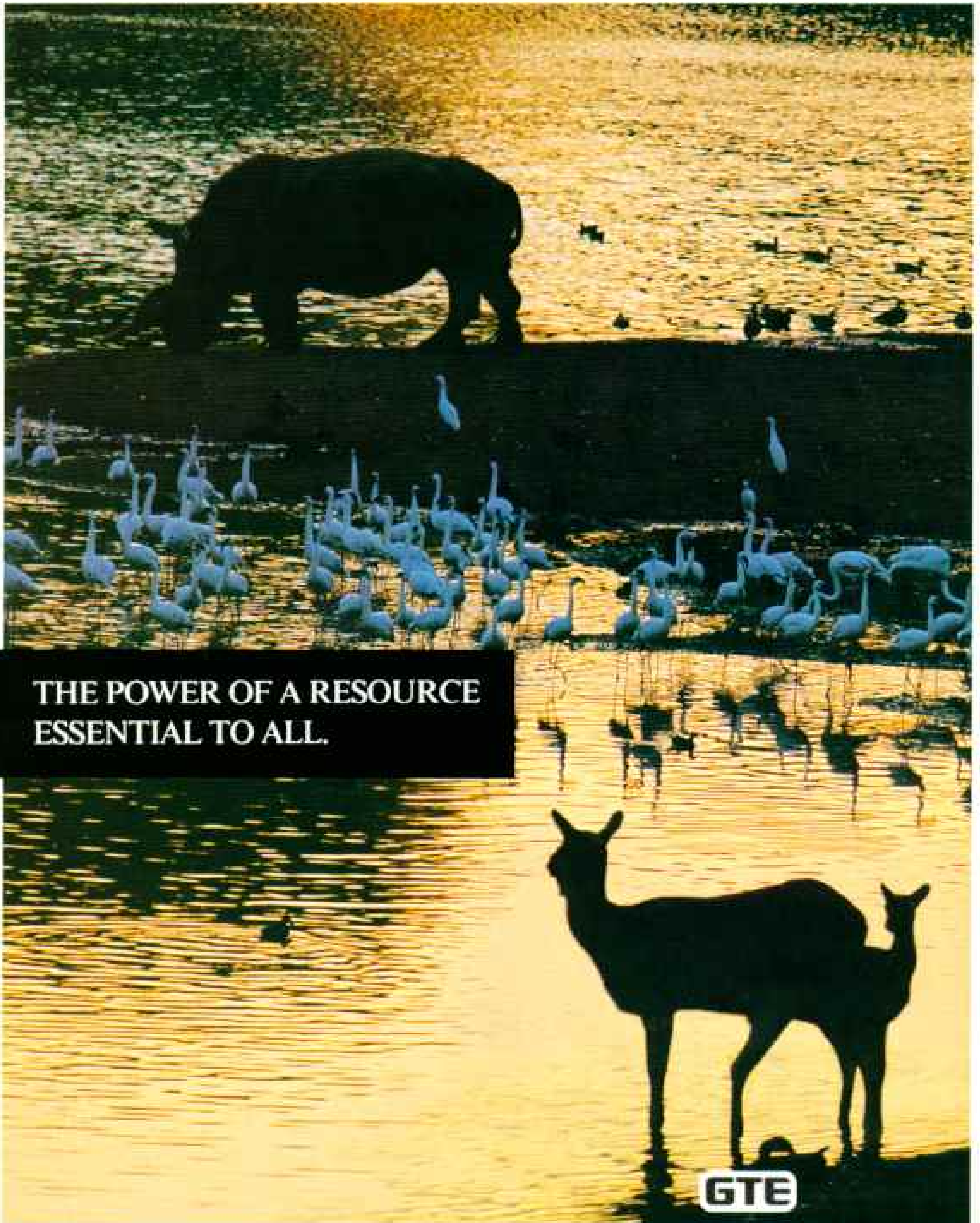

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