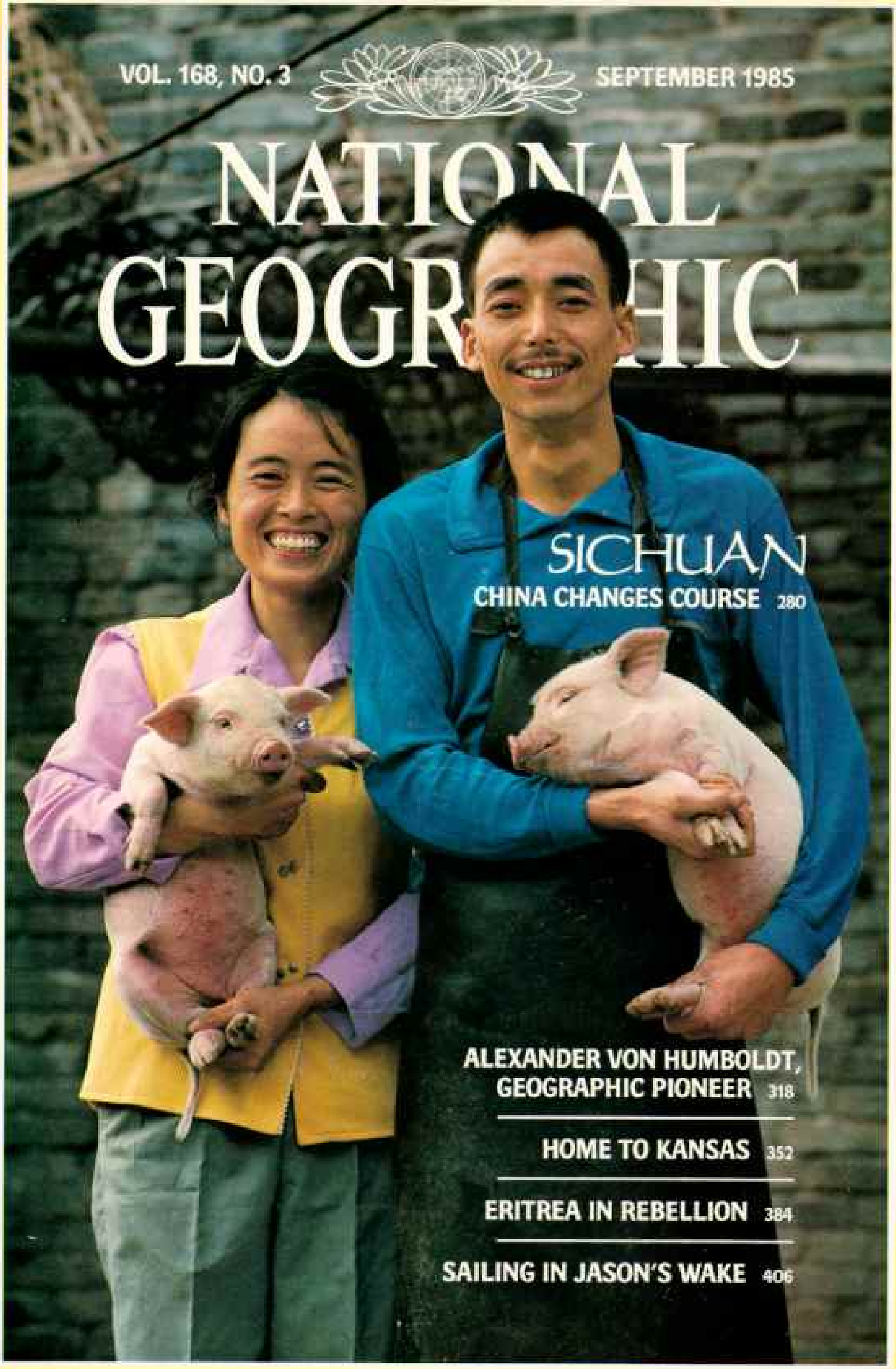
THE MAKING OF AMERICA: CENTRAL PLAINS

VOL. 168, NO. 3 SEPTEMBER 1985

NATIONAL GEOGRAPHIC



SICHUAN
CHINA CHANGES COURSE 280

ALEXANDER VON HUMBOLDT, GEOGRAPHIC PIONEER 318

HOME TO KANSAS 352

ERITREA IN REBELLION 384

SAILING IN JASON'S WAKE 406

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

THOSE OF US who write, photograph, and edit for NATIONAL GEOGRAPHIC insert a fudge factor in evaluating readership surveys. Since 1982, four to six of the ten top "stories" each year have been maps. It has been suggested by writers that they be removed from the rankings as unfair competition.

Staying on top is never easy. To complicate our cartographers' already complex task of making maps accurate and comprehensive, yet readable and attractive, we added the element of history for "The Making of America" series, begun in November 1982. It was like asking someone to pour a quart of milk into an already full bottle without spilling any.

The next readership survey signaled the new maps' success. The first, **The Southwest,** ranked second out of 75 articles and maps published that year. The lowest has been **Atlantic Gateways** (tenth in 1983)—but five of the nine slots above it were occupied by other maps. And in 1984 maps of the series ranked second, third, and fourth. The only consistent complaints received concern the omission of someone's hometown or a local historical tidbit. All

of which is to say, those folks in Cartography must be doing a lot of things right.

With **Central Plains** in this issue, we reach the halfway point in our series. It's another good map, but they did leave out my father's hometown (population 86). I thought it was a serious oversight, but it probably won't keep this map from making the top ten list for 1985.

Wilbur E. Garrett

EDITOR

NATIONAL GEOGRAPHIC

September 1985

COVER: *A Chinese couple hold pigs from their Sichuan farm, which earns them about $2,500 a year. Photograph by Cary Wolinsky.*

THE NATIONAL GEOGRAPHIC MAGAZINE
IS THE JOURNAL OF
THE NATIONAL GEOGRAPHIC SOCIETY
FOUNDED 1888

Sichuan: Where China

By ROSS TERRILL

"ARE YOU BLIND, dog's eyes?" barks my driver at a woman on a bicycle who veers too close to our Toyota and rams her elbow into the side-view mirror. She murmurs a weak reply as the driver swings into West Jade Dragon Street in the heart of Chengdu, 2,000-year-old capital of Sichuan.

"That was a bit rude," I say, but the driver merely grunts. Few in Sichuan worry these days about keeping up a false appearance of civility before the foreigner.

Compared with the 1970s—when I made five journeys through the People's Republic—the lid is off China. And Sichuan, where China's chief, Deng Xiaoping, was born and Premier Zhao Ziyang cut his teeth as Communist Party boss from late 1975 to 1980, is a seedbed of the reforms that are altering the economy and the everyday life of China. The changes startle the visitor who remembers the slogans and the puritanism of the country in the last years of Mao Zedong.

In the nine years since the death of Mao, Deng has moved China from totalitarianism to authoritarianism; from a mentality that clung to revolutionary values as to a talisman to one that considers economic results the test of socialism's validity. China, for so long its own world, holds out a tentative hand for give-and-take with the outside world. Government and people seem, at last, to be pulling in the same direction.

Nowhere is the new, pragmatic mood of the Deng era more vividly expressed than in Sichuan. Beneath the mists where the Yangtze gathers momentum and a wide plateau rises toward Tibet, among people more ready to look a visitor in the eye and say what they think than any I have ever encountered in this huge and uneven country, I found the human face of China.

Chengdu, lying near the center of the province on a plain of remarkable fertility, is Sichuan's proudest metropolis. On a chilly March morning people swarm through the streets, many in old-style baggy blue trousers and jackets, others in jeans, with a scattering of multicolored sweaters, men wearing broad felt hats that recall Western styles of the 1950s, women clicking by on high heels. "Leave Home for Work Happily," a billboard advises. "Return Home From Work Safely." I was told it used to urge: "Carry Through Revolution to the End."

China's fresh new face steps out, *as five friends stroll down a street in Chengdu, capital of Sichuan. Economic reform in this bellwether province has shifted focus from collectivist austerity to individual enterprise. But the changes produce a certain nervousness. For Communist China the course is new—and uncharted.*

Changes Course

Photographs by CARY WOLINSKY STOCK, BOSTON

Giving it a whirl, *couples pair off on a Chengdu dance floor beneath portraits of Engels and Lenin—not so much a political statement, the author says, as evidence the Sichuanese are too busy to take them down.*

The two-story shops, half-timbered and whitewashed, have a Tudor look. Benign old men with square leathery faces sip tea, chew sunflower seeds, and smoke long pipes as they loll in cane armchairs, monitoring the scene.

Cassette recorders, huge as suitcases, blare out Hong Kong love songs and English lessons. Young men with rakish mustaches and jaunty caps sell black-market cigarettes. A good Yunnan Province brand goes for four yuan (one yuan is worth 35 cents), though the same pack—when available—goes for one yuan at the Jinjiang Hotel.

A middle-aged man, helped by family members, is painting the facade of his new box-shaped shop in yellow and white. Inside, two sons are proudly putting in black-lacquered shelves to hold the products. "Private or state?" I ask the man. He laughs. "Private, of course."

"A Foreign Language Is a Weapon in the Struggle of Life," says a notice in a foreign-language bookshop, as if to reinforce the remark of a mother of two who is buying life insurance nearby: "These days if you don't care for yourself, no one else is going to care for you."

In a long line I jostle into position to buy a ticket in a lottery run by *Movie Fan*, a popular magazine. My ticket, No. 1,866,666, costs 60 fen, about 20 cents; first prize is a motorbike, a coveted possession in Sichuan.

IF SICHUAN, the "land of heavenly abundance," were a nation, it would be the eighth most populous in the world, with 104 million people of 15 ethnic groups spread over 220,000 square miles. Here the goals of the Deng era have a special poignancy, because this is a realm of vast unfulfilled

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Author **Ross Terrill** has written five books and more than 30 articles on China since his first visit to the country in 1964. Photographer **Cary Wolinsky** has traveled worldwide for the GEOGRAPHIC since his first assignment in 1977; this is his ninth for the magazine.

*Sichuan's upbeat new governor, Jiang Minkuan, stands outside the Sichuan Province People's Government offices (**above**). One of Jiang's priorities will be to develop the province's natural-gas and steel industries.*

Sichuan has close ties with China's current top leaders. Former Sichuan Communist Party chief Zhao Ziyang moved up to become premier. Deng Xiaoping, leader and architect of post-Mao China, was born here.

*In Chengdu a statue of Mao Zedong (**left**) fronts the Sichuan Exhibition Center. Mao, who brought the Chinese Communist Party to power in 1949, launched the strict "reforms" of the Cultural Revolution in 1966. He died in 1976, and many of his policies have been discredited. Despite debate, the statue stands and gets an annual scrub (**right**).*

"Should the statue come down?" the author asked a young woman. "Why pick on a dead man?" she replied.

potential. Until the late 1930s Sichuan was virtually preindustrial, having 10 percent of China's population but only 0.5 percent of its electric-power capacity. And no province suffered more than Sichuan under the policies of the late Mao era. By the time of Mao's death Sichuan, a great granary, was a net importer of grain from the rest of China.

The current rate of growth is excellent—1984 industrial and agricultural production was up 13.1 percent compared with 1983. The province is rich in natural resources—in hydropower potential it leads China—but ranks 22nd or 23rd among China's 27 provinces and autonomous regions in per capita income.

In the western swath of the province Yi, Tibetans, and other non-Han races till poor soil and raise scraggy animals in isolated backwardness. Technical methods often are not advanced, and until recently population growth swallowed up economic gains. And each year Sichuan's farmland shrinks by 700,000 *mu* (115,000 acres) as new roads, homes, and industries encroach upon it.

AT GUANGYUAN, northern gateway to Sichuan, a billboard with red characters on white reads "The Railroad Is the People's. The People Should Love It." I munch a boiled pig's foot and a *shao bing*. These greasy buns disappear like lightning as customers jostle each other and scream, "Give me four!" "I'm next!" "Get out of the way!"

The fascination of the scenery, and of the people I chat with on Guangyuan's long station platform framed against smoky blue hills, is that we are not in North China, harsh in its winter browns and grays, stern in its Mandarin self-consciousness; but neither are we in South China, with its glistening wet rice fields, terraces in toylike miniature on gentle hills, and small people with round faces and busy tongues.

I begin to sense another realm, the happy compromise of Southwest China, its terrain ample and varied, its people of medium size with solid legs and large bones, modest yet self-confident, vigorous without being loquacious, and blessed with a no-nonsense straightforwardness. These hinterlanders tend to view Beijing, Shanghai, and Guangzhou (Canton) as remote and irrelevant.

In Sichuan I read ads for technicians, put up by private companies, offering to double the salary of a state worker who makes a transfer. I come upon vandalism in the industrial city of Zigong, where a statue of a boy fishing has been smashed by a gang ("jealous of its beauty," the local newspaper comments). Dai Xueming at the Sichuan Planning Commission tells me there are 200,000 unemployed youths in Sichuan's cities. In Chongqing I buy a laudatory collective biography of notable millionaires in the city's pre-1949 history. The current movies in Chengdu include *Jade Butterfly*, *Pink Skirts in the Street*, *Gypsy Boy*.

"Would you like to have a little brother or sister?" I ask a group of tots in the tranquil town of Rongxian, where a Buddha 120 feet high is carved into the side of a hill.

"No, I don't want a brother or sister," says one girl, aged six. "I'd have to share my candy with her."

A former student of mine who has come down from Beijing to join me for a while, whom I'll call Ni, shrugs and turns away. "The spoiled-child generation has arrived," he remarks.

THE RED-AND-WHITE banner across the ballroom on the ninth floor of the Jinjiang Hotel in Chengdu reads "75th Anniversary of International Women's Day." Beneath it a fashion show begins with a roll of drums just as we take our seats. International Women's Day is usually a fairly heavy occasion in the Communist world. Only last year the theme of its celebration in China was the protection of females from discrimination at work, unwanted abortion, and other abuses.

But now a pretty model in a crimson *qipao*, her alabaster face heavily made up, minces from behind a curtain to face a large audience, mostly women, as a cassette recorder plays 1950s dance music, and from a veranda an overflow crowd stares in fascination. Next comes a young man in a purple blouse and lemon walking shorts, his lipstick glinting in the spring sunshine. A wedding couple arrives, she in a white satin frock and lace veil, he in an ivory linen suit with a red tie and a red carnation at the lapel. Hardly a garment is Chinese style.

Old things go and new things quickly

SICHUAN

CHINA'S HIDDEN HEART,

Sichuan Province covers 220,000 square miles, an area slightly larger than France. With more than 100 million inhabitants—nearly half the population of the United States—it is the nation's most populous province.

become old. In Chengdu, Wang Jiayou, a researcher at the Sichuan Provincial Museum, regrets, as do other intellectuals I meet, the razing of the city walls after liberation. "We could have built roads on top of the walls and through the walls—so keeping history." In his agitation, Wang's fur hat bobs around furiously. "Our wall was 40 feet wide, enough for two buses."

"Who made the decision to demolish the city walls, Mr. Wang?"

A long pause. "Stupid people."

Today, although there are limits to Deng's goals imposed by the rigidity of the political system—after all, a Communist Party still rules—and by the high expectations of a huge populace, there is pride in Sichuan (which is 87 percent rural) that the agricultural reforms began here and that China's central leader is, probably for the first time ever, a native Sichuanese.

In and out of the revolving door of Chinese politics, Deng has been seen both as "old" and as "new." He was twice purged by Mao as a relic of capitalism: the first time during the Cultural Revolution, in response to reforms that Deng and others pushed through in the early 1960s; the second time in early 1976. Today Deng, 81, subtly anti-Mao, is head of the most

popular Chinese government since that of Mao himself at the height of his powers in the mid-1950s.

ON A STEAMY JUNE MORNING I drive westward from Chengdu to see the agricultural changes in Wenjiang County. Now administratively linked with Chengdu in a municipality of eight million people, Wenjiang County is as dense a belt of rural humanity as the world knows. Lush fields of corn and rice and wheat surround a cluster of six or eight farmhouses from which elegant bamboos rise like sentries guarding the crops.

An hour and a half's drive from Chengdu, I enter a new two-story concrete villa with a flat roof and blue and yellow eaves, windows, and doors. The house is huge and flamboyant by the standards of the Chengdu plain. Within it dwells Wang Yongdi, who at age 40 hauls in an annual gross income of some 80,000 yuan ($28,000).

Wang grows flowers and potted plants on ten mu (1.64 acres) of flat, damp land, helped by his 39-year-old wife, other family members, and two "students" from Chengdu (they were unemployed, I think).

"I got my land on contract from the production team [a subsection of a commune] in 1979," Wang explains as we inspect azaleas. "At first the contract was for three years, but things have gone well, so the contract has been extended to 15 years."

This is tenant farming, and the commune is vanishing. Wang pays 3,200 yuan a year to the team for the land, and his house, which cost 10,000 yuan, sits on the team's land. Otherwise he is on his own, in most respects king of the village, and a symbol of the commercialization of rural Sichuan.

During a lull in the conversation, Yu Zaisan, a Communist official of the county, asks Mrs. Wang the family's net income last year. This is a moment of high drama: Yu is a man of sinking power; the Wangs are a family of rising wealth. Mrs. Wang looks as if she wishes her husband would come back.

As we sip tea, lids clinking against cups in the silence, I notice on the wall a crimson banner. Its gold characters electrify me: "The Government and Party of Wenjiang Warmly Congratulate the Wang Household for Encouraging the Schools of the

A great truck bazaar *organized by the provincial government sold some 75 trucks, including 20 new Japanese imports, to newly wealthy farmers and "specialized householders" of Xindu County* ***(below)****. This purchaser* ***(right)*** *counted out 25,000 yuan ($8,750) in cash for a reconditioned vehicle. The idea of the specialized household, an arrangement allowing individuals to set up private businesses, made its debut in Xindu County, spread to the rest of China, and has largely displaced the commune system. Now farmers can keep profits after paying taxes.*

*How to succeed in business: Raise four million yuan and offer better service than government-run competition. Lu Guoji of Minsheng Shipping (**left**) started with two tugs and eight barges. This year he will add 47 barges, eight tugs, and passenger service.*

*Xie Song, with his wife, Wang Junying (**right**), guessed that houseplants and flowers, banned during the Cultural Revolution, would be popular. His nursery will total the equivalent of $10,000 in sales this year.*

County With a Donation of 10,000 Yuan."

Philanthropy has returned to China!

So too has begging, it seems. As I stroll alone behind the house—waiting for Wang, who had to call in at a customer's wedding—I see a group of villagers standing, silent and mournful, at one of the gates of the Wang property, beyond walls topped with broken glass.

"We have lent 2,000 yuan to neighbors," Mrs. Wang says a trifle uneasily, after I press her about the people at the gate.

Party official Yu, who has been fairly quiet during the visit, takes my arm. "In this county more than a hundred households earned more than 10,000 yuan last year," he says with apparent pride, giving a figure that is 35 times the average Sichuan farmer's income. "Some earned upwards of 100,000 yuan. It's all good."

We drive 120 miles southwest from Chengdu to the Buddhist mountain of Emei. Town follows town, and between them the narrow, twisting road is alive with commerce. It is amazing what can be carried on a bicycle when a hungry market beckons: a double bed with a vivid floral mattress; boxes of live hens tied together with string into a huge load eight feet high; a purple velvet sofa precariously coupled to a wardrobe.

A man leads dozens of mice, whether for pleasure or commerce (will someone eat them?), on a string divided into many strands, his little son holding his free hand.

Suddenly fat quacking ducks are on all sides, pecking at roadside crops. A boy with a face like a peach, gripping the leash of a fierce-looking dog, emerges from a tent pitched by the side of the road. He and his uncle, who is over the hill obtaining pork and vegetables for lunch, are practicing a rural commercial specialty of the Chengdu-Chongqing area, *gan ya*, "leading ducks."

Shy but direct, the boy explains: "We buy chicks in Chongqing for 25 fen [nine cents] each. It's usually a three-month walk to Chengdu, and during that time the ducks grow fat, eating by the roadside. In Chengdu we sell them for more than ten times what we paid."

And the eggs? "When possible, we sell them as we go through villages—15 fen each." The boy and his uncle eat eggs "only when they're cracked and can't be sold."

"AFTER the economic reforms," explains Li Pingfen, a casually dressed man with long sideburns, "people's lives got richer, and they needed more things to do." He is telling me the story of the West

China Coffeehouse, a lively café and meeting place in Chengdu that he owns.

Li raised 130,000 yuan capital, 80,000 of it from friends and organizations ("I had no credibility at the bank") and a hefty 50,000 from his own funds, mainly profits from a soft-drink business he had started on the side. Now the coffeehouse's takings are 1,500 yuan each day, and 10 percent of that is profit. A completely private outfit, the coffeehouse employs 38.

Late at night the West China can become a racy place by Chinese standards. I see a couple full length on a couch, some drunkenness, minor altercations with weapons visible. I wonder if Li has rules.

"Originally," says Li, with a wry smile, "we forbade drunkenness, dancing, and loud games. But with increasing numbers of customers, and with people becoming more liberal as a result of the economic reforms, we've become much more flexible."

"Do the police ever come by?"

"They *should* come, but they seldom do." Li, who is in his 40s and divorced, laughs and brushes cigarette ash from his leather jacket, then lights another cigarette. "We pay them 60 yuan a month security fee, but we never see them."

I press my question about loose behavior. "Look," Li bursts out, "we're not the police! These people are our customers!" It is pleasant to find in China someone who believes that freedom is more important than what people do with it.

GREEN CITY MOUNTAIN, where Taoist leader Zhang Daoling preached 1,800 years ago, is a nest of 36 peaks that rise like city walls. A red clay path leads us up through lofty forests. We meet Taoist pilgrims, ordinary tourists,

Build a better mosquito net, *and the people of Chengdu will beat a path to your door. Investing 1,000 yuan, Yang Yian, known as Millionaire Yang* ***(above)****, began producing brightly colored mosquito nets. In three years he has grossed 700,000 yuan. The emergence of a wealthy class has also produced the "red-eyes," those who are not rich . . . and are jealous. The still new notion of product choice has given birth to advertising. The state-run Chongqing Advertising Company turned out political posters in the 1960s. Now its posters tout products like vacuum cleaners* ***(left)****. The message: It's all right to make money; it's all right to spend it too.*

Sitting and sipping *are traditional pastimes in a Chengdu park (**left**). Western dress has gained popularity, despite a 1983-84 "spiritual pollution" campaign aimed partly at erasing foreign influence. The campaign tapered off. By last March, the author says, "even my drivers always wore ties. I began to feel underdressed."*

*For those who must drink and run, a tea-shop attendant ladles out bowls of "quick tea" (**right**).*

and tiny, undernourished boys who carry baskets of coal to the temples at the summit.

"Those boys should be at school!" I exclaim. A guide replies complacently: "They're from peasant families."

I ask one stooped, filthy boy how much he earns. "Less than one yuan for carrying 50 *jin* [55 pounds] up the mountain. Sometimes I carry coal, other times people."

"Which is better?"

"A person. Fits in easier with the movement of my body than a basket of coal."

Atop the mountain, in an airy room by the Cavern Facing the Sun, Miss Wu Ju, a Taoist nun, tall and pale, invites me to a lunch of fried leaves and flowers. "Let me tell you the main, simple principles of Taoism," she says. "It is in nature that the Great Way is to be found." Gently, she quotes another principle: "*Qing jing wu wei*—pure and calm, striving for nothing."

"Does the Taoist life have any link with the policies of Deng Xiaoping?"

"Oh, yes—our mountain is a boon for the travel service, which is part of the Chinese government and so serves the policy of 'four modernizations.' "

Later, in Chengdu, I delve further into Sichuan's surprisingly vigorous religious life. Pastor Li Lianke, 84, eyes sharp, white hair cut neatly over his square face, escorts me into the city's main Protestant church. A congregation of 500, about one-quarter of them young people, huddle in overcoats in the black-lacquered pews and in the aisles.

"One of our new members is an interesting young man," Li remarks. "During the Cultural Revolution he saw a pile of books, confiscated and ready to be burned. A Bible was there and various Christian books. He read them and other books of Western literature, fascinated by the discovery of new things. He came to the conclusion that the great achievements of the West, which everyone in China from Deng Xiaoping on down now acknowledges, are linked with Christianity." The young convert singled out three concepts: "individual autonomy, compassion for the welfare of others, and respect for personality."

THE WATERS of the three rivers that converge at the ancient city of Leshan, in central Sichuan, turned by the soil to the color of lobster bisque, are alarmingly swollen. "Last night's rain raised the level of the Min by 20 feet," a boatman tells me as we embark to sail to the Buddha, 233 feet high, that watches over the confluence of the Min, the Qingyi, and the Dadu.

"More than 100 people can sit on the foot of the Buddha," the boatman announces as we crane our necks to see this eighth-century

wonder. When a warlord bombarded the statue in the 1920s, it took 62 tons of cement to repair the stern, impassive face.

In Leshan itself I find a lively small-city spirit. A shop advertises "Birth Control Books and Equipment Here Free of Charge," but I am turned away.

"Only free for Chinese," a pretty clerk tells me. "Foreigners would have to pay."

"I'll pay. What is available?"

The girl looks panicky. "I'm sorry, everything is out of stock."

The Communist Party is still very nervous about Western cultural influence. Outside a bookshop sits a sentry with a list of "forbidden acts" and a pile of what seem to be confiscated tape cassettes. "Unhealthy music," he explains.

"A healthy song will make you cheerful and make you work well," a neighborhood official in Chongqing tells me a few weeks later, bursting into "In the Fields of Hope" and "In the Female Dormitory"—examples of songs that in her experience have a good effect on listeners.

"Mrs. Wu, those songs are quite pretty, but during the Cultural Revolution, when everything had to carry a political message, they too would have been judged risqué."

"You're right—but no longer."

Change can come, if slowly, in these matters. At the Sichuan Fine Arts Institute in Chongqing, China's largest hinterland city, director Ye Yushan says: "I thought my sculptures of four nude athletes would show the beauty of the human body, but what a storm they caused."

Because of that storm the statues of two men and two women, which stand at the Yangtze River bridge, are draped in scarves at the waist. One of 40 letters received by Ye that was critical of the nude statues (a sketch of which appeared in *Chongqing Daily*) objected that if a driver saw naked figures at the bridge, he'd drive his car into the river.

"Some drivers came to the gallery," Ye

says, "and I asked them about this. They said they would never drive their cars into the water upon seeing a naked statue. Only the silly type of person who wrote that letter would do such a thing, said these drivers.

"Had the struggle occurred in 1985," sculptor Ye says, "rather than four years ago, the outcome would be different—my athletes would be nude."

XICHANG IS THE CAPITAL of the Liangshan ("cool mountain") Yi area. In this serene city of 150,000, set in a world of blue hills and cactus and blossoming trees, most people are Han (ethnic Chinese). Ducks and cranes fly overhead as I sit on the veranda of 1,200-year-old Bright and Prosperous Temple, above the lake of Qiong Hai, chatting with its curator, Li Jingpo, aged 62.

"In 1983 the temple and lake took in 60,000 yuan in tourist income, but in 1984, 120,000 yuan," Li says, as the rays of early spring sunshine light up his eager eyes and turn his wrinkled face to copper. "It's the farmers—since the economic reforms they

have lots of money. They want to travel and see some culture."

In the Liangshan area, which contains 3.3 million people, most rural dwellers are the sturdy, round-faced Yi, China's fourth largest minority. The governor, a pudgy Yi with glasses and a crew cut, is full of hope for the future: "Some geologists say the region from Dukou in south Sichuan, northwest to the Tibet border and north to the Qinghai border, has the richest mineral deposits in China."

As I drive into the mountains, a huge round basket appears—then I see a pair of legs beneath it. Round shapes by the roadside turn out to be the heavy capes of farmers who squat at rest after the day's work, or mothers and children who sit gazing or sleeping in that same tranquil posture. Sometimes two people bulge from inside one pear-shaped cape, an unsettling sight.

A jeep appears in front of our mini-van. A lively, handsome man wearing horn-rimmed glasses and a pleated gray cape springs out and shouts a welcome. It is Vice-mayor An of Zhaojue, chief town of the Yi

Working out, *a young man lifts weights at a housing project in Chongqing* ***(left)****. A young woman at a city shipyard takes a break from welding a cruise boat's swimming pool* ***(above)****. Productive workers can earn bonuses equal to 40 percent of their salary. Now families for whom radios and bicycles were luxuries covet color TVs and motorbikes.*

heartland. He hands me a weighty overcoat, apologizing for the cold at this altitude of 10,000 feet. "Vertical weather," he says. "On one mountain you can have three different climates at once."

THE TOWN OF ZHAOJUE, center of a county of the same name whose population is 93 percent Yi, is well laid out, with plane and *bai* trees (the bai looks like a hybrid of palm and cypress) lining the streets. Zhaojue is backward. There is very little industry. Mining of coal, copper, and iron is being developed. Per capita annual income is less than 300 yuan. There are only 2,100 high-school students (and no colleges) in a county of 190,000 people. Over drinks one night, Vice-mayor An observes that fewer than 40 percent of the children of primary-school age actually go to school.

We huddle in our overcoats, warmed a little by small round charcoal braziers. "When possible," Vice-mayor An says, "Yi youth marry an offspring of the father's sister or the mother's brother. We Yi are not so romantic as to marry a stranger." A young couple typically get engaged in the early teens, then enjoy conjugal visits, and only years later marry, set up house, and have children. "Marriage and intercourse are two separate things among us," says An.

Creative expression *in face and form is the time-honored tradition of storytellers. Yang Yunyao* (**left**) *entertains in a Chengdu tea shop on a Sunday afternoon. Two thousand years earlier an artisan captured a similar visage on a ceramic statue of a storyteller* (**right**). *The 26-inch tomb figure from the Han Dynasty is in the collection of the Sichuan Provincial Museum.*

At dinner we eat the boiled head of a pig, tearing it apart with our fingers, and a soup of dried vegetables, using large brightly painted wooden spoons. (Most Yi in Zhaojue do not use chopsticks.)

Here we seem far from the China I know. I ask about the "spiritual pollution" campaign, a 1983-84 drive against Western and liberal ideas begun by some Beijing officials who felt unhappy with certain consequences of the economic reforms. "It meant nothing in Zhaojue," Vice-mayor An says jovially, downing another glass of red spirit, "because we have no spiritual pollution here."

Unable to bear the cold early morning bedroom, I don two overcoats and stroll in the town. Notices and building names are all in both Yi and Chinese. Joggers breathe fog into the air. A tiny boy is walking to school with an abacus and a schoolbag bearing the slogan "Looking After Small Trees Is Everybody's Responsibility."

The Yi are dark-complexioned, comely, and not very clean. A Han companion says to me with a straight face: "The Yi think that if they bathe, the buckwheat won't grow."

Yi men wear trousers with extremely wide cuffs that flop like gowns under their ubiquitous capes. A few wear the traditional knife belt, adorned with bones, a symbol of courage. Women wear many layers of clothes and favor embroidered bags and shoes. Both sexes pierce their ears (left side only for males) to accommodate gold or silver jewelry.

The official estimate is that only some 30 percent of the people can understand Chinese. At the main middle school in Zhaojue there are 800 pupils, 300 of them Yi, and only one Yi teacher—the physical education instructor.

"It's very difficult to teach them English," a Han teacher (who does not speak Yi) says to me with a shrug, pointing to his class of bright-eyed pupils in colored headdress, "because their Chinese is not good."

As I leave, Vice-mayor An presents me with the remains of the pig's head we had tackled at dinner. "It is a Yi custom for the guest to take it. You may do what you like with it—but you must take it."

"One Only Is Good," proclaims a notice seen in every Sichuan city. It does not refer to beer but to children. An accompanying poster depicts a smart young couple with a lovely daughter.

"Why, children bring happiness!" replies a mother of six in her kitchen in Mianyang, a northern city noted for textile and electronics plants, when I ask if it really was a good idea to have so many.

Family planning is an explosive issue. Only 11 percent of China's land is cultivable, and population pressure contributed to the fall of the last dynasty, the Qing, in 1911. Under Mao, family planning was not resolutely pushed. Now alarm bells ring.

In A.D. 2 Sichuan's population was some 3.5 million; in 1840 it was 38 million; in 1949, 57 million. By the 1970s, says Luo Huiquan, a pleasant, well-organized man in his 50s who is a leading official of the Sichuan family-planning agency, a norm of two children per family was established, with the suggestion that three was too many. By the 1980s the policy was stricter—"difficult to have two; a third must be stopped."

"In the cities," Luo says, "a couple that pledges to have only one child receives five yuan per month up to the child's 14th year. The penalty for a second child is a reduction in salary of five yuan per month—also until the 14th year of that child.

"The situation is desperate," Luo says. "Per capita farmland in Sichuan is less than one mu [0.164 acres]." In the U.S.A. it is more than ten mu.

The new policies work, despite a current tendency of peasants to beget extra children to exploit the moneymaking possibilities of family farming. Chengdu's "first baby" rate—the proportion of first babies among total births—is 97 percent. Sichuan's is 77 percent. In Mianyang, housing averaged 12 square feet per person in 1978; in 1984, 14 square feet.

"By the year 2000," Luo says grimly, "the population of Sichuan will have risen to 120 million." He gathers up his notes. "That will be the peak—then our numbers will start to come down."

BY THE ROAD TO ZIGONG, a city of salt and dinosaurs, a man of about 60 is tied to a tree. A woman of about 30 is beating him furiously with a thin green bough. A crowd of some 50 people watch as the old man cries out in pain and the woman


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shouts back in anger, continuing her blows.

"Miss Deng!" I gasp, but my host from Chengdu is not very interested in this surrealistic event. "He must be a thief," she murmurs, awakening from her slumber. "Or else she is a lunatic." We drive on.

Before reaching the town of Rongxian, we find a pleasant hill by the road for a picnic lunch of eggs, *sa qi ma* (glutinous rice, formed into what looks like congealed spaghetti cut in blocks), and red wine.

"Five yuan each," says a boy with a crew cut and dirty fingernails, as he pushes two boxes of live rabbits under my nose. "Excellent rabbits. I raised them myself."

I see from the apprehension in Deng's eyes that she realizes I am going to buy one.

Rain starts, and the dirt road turns into a bog. We come upon a truck stuck in the mud. Our car, the smallest of the vehicles in a long line backed up behind it, will be able to squeeze past, the driver feels, but in trying to do so we also get stuck in the red mud.

An elderly farmer scrambles down onto the road with a shovel in his hand. Within a few minutes the car is out of trouble. Ni, my student friend, and I reach for some money for the farmer, but neither of us can find any small notes.

"Give him the rabbit," cries Ni.

The old man, 67 years old with a white beard, is extremely happy. His eyes shine as he grips the rabbit. The two of us pose by the rescued car for a photograph, and a group of his fellow farmers cheer from a roadside hill.

"Everyone Should Do Something to Add Some Beauty to the City of Mountains,"

***Confronted by evidence**—a bloody shirt—Chen Renkun (**above,** right) confesses to attacking a brother and others of his family in Chengdu. He was convicted and sentenced to four years in prison. In 1983 the national government launched a crackdown on crime and executed thousands. Executions have abated, but threat of severe punishment remains. As a deterrent, a poster (**left**) pictures criminals and states their crimes. Young offenders, convicted of lesser crimes such as picking pockets, exercise in the courtyard of the Chengdu Juvenile Detention Center (**far left**).*

The long, winding road *linking Sichuan and Tibet snakes along for more than 1,400 miles—a two-week drive. Sichuan's isolation prompted the eighth-century poet Li Bo to remark: "It is more difficult to go to Sichuan than to get into*

heaven." Not until 1956 did a railway link the province with Shaanxi to the north; the first railway link to the south was completed in the 1960s. Air service connects Chengdu and Chongqing with several mainland Chinese cities and with Hong Kong.

Pitching in on a gigantic scale *at the request of the Central Committee, peasants who live along a 30-mile stretch of road between Chengdu and Guanxian widen*

says a notice at the entrance to the cable car that will whisk me across the Jialing River at smoggy, scruffy Chongqing. But the stairway is littered with cigarette butts, chewed-up red peppers, and bits of discarded paper.

A city of hills and ferries and fog lying at the confluence of the Yangtze and Jialing, Chongqing can call on nearby deposits of coal and iron, and the hydropower possibilities are enormous. At the same time, the city's problems are fearsome: pollution, overburdened transport, lack of trained personnel, remote location, management weaknesses.

Here the new pragmatism is raw. "Can a company from outside Sichuan come here to buy and sell?" I ask at Chongqing's spanking new trade center. Swift as a bullet comes the answer from a man who looks more like a Hong Kong tycoon than a Communist official: "*Ren qian, bu ren ren*—We recognize money, not people."

Cut deep into the hills of Chongqing—more familiar to World War II veterans as Chungking—are tunnels built as a defense against Japanese air attacks. Cool in the humid summer and not frigid in winter, the tunnels now serve as teahouses, inns, meeting places—and recently as dance halls.

I pay four fen and go down a tunnel in the university suburb of Shapingba. I chat with one young man who is spending freely on his girlfriend; it turns out he's been receiving a high bonus at his factory. "It's all different now," he says as he sips a soda. "You can get

the roadbed in just one week. Each worker received five yuan a day and a portion of the wood from the trees cut down. At its peak the project involved some 200,000 laborers.

a bonus equal to as much as 40 percent of your salary; it depends on how well you work." He grins. "With bonuses, the top is topless and the bottom is bottomless."

THE MOTORBIKE is a symbol of prosperity. Proud owners treat bicyclists and pedestrians as a king might treat beggars. Most of the motorbikes in use in Sichuan were made under license from Honda at the Jialing Motorbike Factory.

"For more than 30 years this was a machine-tool and weapons factory, partly owned by the Ministry of Ordnance," the vice-director explains over a cup of tea. "Then after the new economic reforms in 1979, we decided to make motorbikes."

The Ministry of Ordnance making motorbikes? "Look," says the plant's chief engineer, "in today's world you can't just produce artillery all the time."

In 1984 the ministry took ten million yuan profit from the factory, leaving 700,000 yuan profit for worker welfare, production development, and year-end bonuses.

I come upon a thin, tough, cheerful young man surrounded by a crowd that is staring hungrily at his red-and-cream motorbike. "Do your friends envy you?" I ask. He looks at me almost pityingly. Having heard that the waiting list for a bike is huge, I ask how he managed to get one. "Through people I know," he says simply.

"It is not our normal way," explains the vice-director of the factory later. "But we do sometimes sell through contacts."

Shy bride and groom, *Yang Tongqun and Li Fushuang, both 23, respond to questions asked by a Wenjiang County clerk while applying for their marriage certificate* ***(facing page)****. After the civil ceremony the newlyweds receive visitors at their new home; neighbors bring baskets piled high with gifts* ***(below right)****. Some families spend as much as 4,000 yuan on weddings. At the home celebration a friend swings candy between the bride and groom as they try to bite it at the same time* ***(below)****.*

The government discourages early marriages as part of toughened population-control regulations instituted in 1979. The measures are aimed at limiting China's population to 1.2 billion by 2000, and the 1982 constitution declares birth control a civic duty. A system of incentives—monthly bonuses and priority in school enrollment, jobs, and housing—rewards couples who pledge to have only one child. Those who exceed the one-child limit face loss of benefits.

One evening in Chongqing the problems of the People's Liberation Army are unveiled by a young woman from an army family whom I shall call Chen. "I've been in this damned army for ten years," she snaps. Chen enlisted in Beijing during the Mao era, when it was glorious to do so. "The alternative was feeding pigs in the countryside," she explains, flicking ash from her cigarette.

"Now everyone's getting educated and making money—we're left behind. For the first six years my pay was only six yuan a month [plus board; only officers receive real salaries]." She now wishes she had not left Beijing when her father, a middle-level army officer, was transferred to Sichuan.

To Chen her father seems out-of-date, meek about the PLA's sagging fortunes, and mildly corrupt to boot.

"Those Communists!" Chen says she recently said to her father. "After 40 years in their army, they treat you no better than an ex-Chiang Kai-shek Nationalist!"

Her father was shocked. "What, then, do you believe in?" he asked her, hardly daring to think that she rejected Communism.

"Father, I believe in myself."

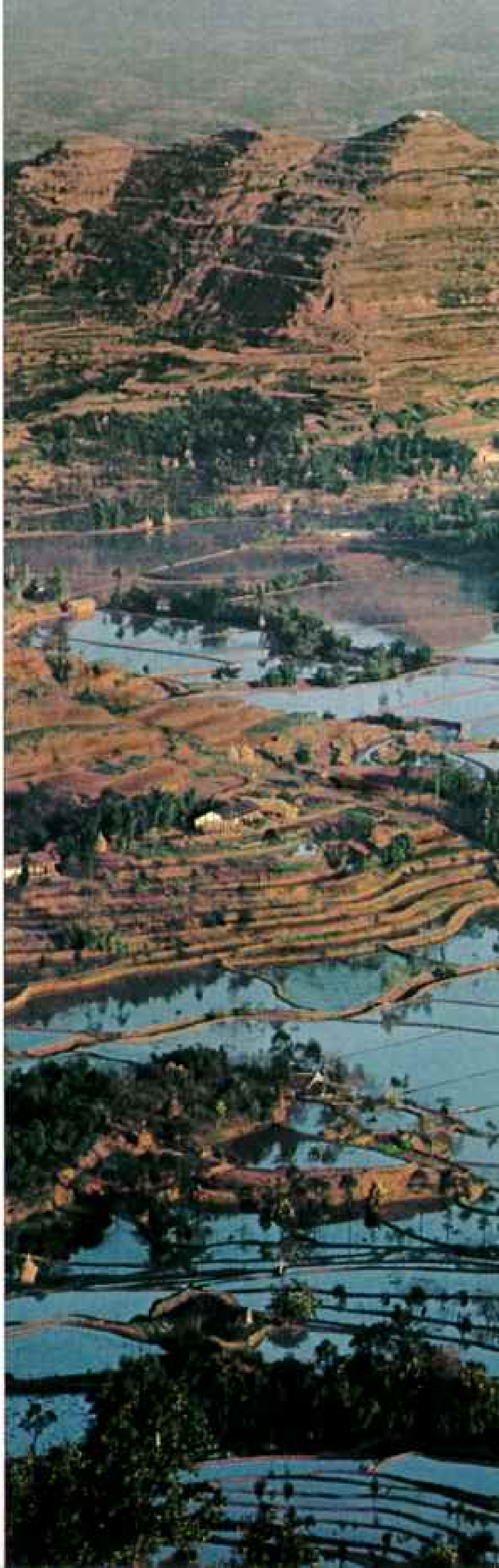
"If you young people go much further," he rejoined, "there'll be trouble."

"WERE YOU NERVOUS when you cooked in Deng Xiaoping's house?"

"Not nervous," replies Chen Zhigang, a jovial master chef at the Garden of Taste, one of Chongqing's best restaurants. "I just concentrated a bit more than usual."

That evening in Beijing, Chen prepared a dish that Deng likes very much: Double Taste Fiery Pot, a fish from the Yangtze cooked in a divided pot so that part of it is spicy and part is salty. Afterward, a group photo was being taken.

"The photographer was ready to press the button—but where was Deng Xiaoping?" Chen grins. "Deng Xiaoping was found



Land of a million steps, *the fertile basin in Sichuan's midsection, yields two grain crops a year. In winter the flooded paddies harbor an additional crop: fish, which are forced into pools at the fields' far end during the growing season.*

A dash of concentration *is the final ingredient for a fish sauce at the Wei Yuan Restaurant in Chongqing* ***(above)****. The restaurant trains more than 40 chefs at a time and is a professional springboard for exported chefs who preside at Sichuan restaurants around the world. The eight-page menu features the hot-and-spicy cooking of Sichuan, including the house specialty—hot chicken with chilis, peanuts, and shallots.*

The cuisine is American style at a trendy, new, run-for-profit restaurant in Chongqing, where the offerings run to the likes of chicken cutlets, French fries, and coffee ***(left)****.*

back in the dining room, upturning the bowl of my Double Taste Fiery Pot, scooping out the fish sauce, drinking down every drop!"

WHILE in Chongqing I ask Qing Yuancai, my host, if I can visit the Sino-American Cooperative Organization compound, where Americans in the 1940s trained Nationalist police, and an adjacent Nationalist camp for political prisoners.

"We don't recommend it," replies Qing. "When Americans go there, debates arise."

At a museum in the compound, called Exhibition of the Crimes of U. S. Imperialists and Nationalist Reactionaries, I see rolls of martyrs' names, read sad inscriptions by prisoners ("There are no days and nights here"), and note allegations of "new tortures introduced by the Americans"—including bamboo slivers under fingernails.

These sorrows and puzzles retreat into their own time when a friend from Hong Kong and I dine at the Huishen Hotel. The modest restaurant is crowded. At a huge round table we are joined by two construction workers, and after a few beers and some spicy bean curd, they begin to chat. I shall call them Yang and Xu.

"We each earn just over a hundred yuan a month at the factory," says Yang, a rugged man of 27. "But we also have a sideline business that brings us 200 yuan more." Xu explains that the pair buy motorbikes in Chongqing and sell them downriver in Shanghai, where the price is higher.

"Chongqing is great for commerce, you know," says Yang, with touching local pride. "Take gold rings. You can sell a whole box in half a day. In Shanghai it might take weeks."

Soon we are interrupted as the room stirs with furniture moving. Musicians wearing three-piece Western suits and orange ties mount a platform, fingers drumming and feet tapping as if they can hardly bear to wait for the start of their music making.

Young people, faces shining with excitement, arrive in throngs to occupy the three rows of chairs by each wall. "Dancing fever!" murmurs my Hong Kong friend.

Yang and Xu snap up tickets for all four of us. "You can't delay," Xu says tersely. "They're only allowed to sell 300 tickets,

Huffing along *with roof bags full of natural gas, commuter buses line Binjiang Road in Zigong. The contents of the 1,000-cubic-foot bag propel the bus for 50 miles*

and hundreds of people are waiting."

Tango music begins, and couples, about a quarter of them dancing with partners of the same sex, dressed in everything from Western suits to army uniforms, from qipaos to miniskirts, materialize before the dance band like ants gathering around sugar.

"Dance with me?" a grinning man asks. Girls hover speechlessly nearby with the same question in their eyes. But Yang is grabbing my arm: "Did you know the prettiest girls in China are from Anhui Province?" This is a well-known prejudice, but what is Yang's point?

"We have some downstairs—ten yuan. Or 20 yuan for the night."

"SERVING YOU," says a sign at a stand in the Chongqing Lantern Festival, "you" replacing "people" in the famous Maoist slogan "Serve the People," a startling shift from collective to individual values.

"How to create a socialist economy?" Mayor Xiao Yang of Chongqing repeats my question and smiles wryly. "Look, we ourselves have no idea yet how to do it!"

"Equality?" Lin Ling, a Chengdu economist, spits out the word as if it were the most distasteful in the dictionary. "Absolutely not. Let some go ahead and get rich—it will help China."

Socialist values (if not forms) are out the window. The vehicle is hurtling, but no one is too sure where the road leads. Supporters of Deng, remembering the past, hope that he will hang on and that his "new" ideas will never again be denounced as "old." The rulers of Sichuan are staking the political, social, even the cultural future of the province on what its former governor, Yang Xizong, tells me is a "shift from a self-sufficient to a commercial economy."

"There are three types of planning in China," economist Lin says with a smile. "One, this is required. Two, you'd better do this. Three, do what you wish." Businessmen can never be completely sure which type they will have to face at any moment.

At times the leaders of Sichuan speak as if scales have just fallen from their eyes. "We

without refueling, at less than half the cost of gasoline. Sichuan's third largest municipality is known for its salt wells, which provide 70 percent of city revenues.

made housing a welfare industry," cries Governor Yang, "whereas it should be *profitable*."

What *is* "socialism with Chinese traits?" I often ask, but no one can tell me. Mayor Xiao Yang laughs and falls silent. Lin Ling says "economic competition" and "linking wages to performance" define Chinese-style socialism. Groping, he adds the "special economic zones" in southeastern China—"you can't find those in Marx and Lenin."

"Socialism with Chinese traits" seems to mean socialism, basically Russian, plus a growing number of capitalist twists.

Some results of the reforms are unexpected. Inflation appears as controls loosen and purchasing power grows. Public services sag in the countryside. "No one wants to be a teacher any more," a teacher laments. "My children are interested only in a business career." The decline of political supervision, excellent in itself, opens the door to crime and delinquency. Programs to equalize opportunities for women have been de-emphasized, and Governor Yang—replaced last May by the younger Jiang Minkuan (page 284)—confesses that only one-fourth of the province's college students are women, and that 60 percent of the urban unemployed are female.

Many intellectuals are cautious. "Deng Xiaoping does not intend the economic reforms to bring political change," a teacher in Chengdu remarks. "If they did, he would change course."

Much changes, but some things remain unchanged. At Zigong, Sichuan's third largest municipality, I see a notice, dated February 1985, redolent of tenacious feudalism, on a wall not far from the midtown hotel where I am staying: "It Is Strictly Forbidden to Kidnap and Sell Women and Girls; This Activity Will Be Strictly Prosecuted."

AT 11 P.M., on the eve of departure from Sichuan, I am sitting in bed with my notebook at People's Hotel in Chongqing, making a list of what has changed since Mao and what has not. There is a distant noise of shouting or singing.

"That's not a wedding after all," says my student companion. "It's something else." We dress and go downstairs. "Where are you going?" asks the man at the reception desk. "For a walk." He looks stern. "It is too dark for walking." We brush past him.

A chanting, swaying crowd covers an expanse of hillside steps opposite the hotel, near the gate of the Chongqing city government offices. *"Give us back our lives!"* The cry rolls down the hill.

As a foreigner I cannot go through the gate unnoticed, but my Chinese friend slips inside. The 300 to 400 demonstrators are students from the chemistry department of Chongqing University. According to their banners an explosion rocked a chemistry laboratory at the university four days ago. Cobalt was released, they say. Though nobody was killed, no satisfactory explanation of the mishap has come from the university authorities. No preventive measures have been taken. The students are bringing their view of the matter to a higher level.

"It is purely a student demonstration," a young man in spectacles says. "To our disappointment no teachers would join us."

"Give us back our lives!" The cry goes up more loudly. Students with arms locked surge toward the door of the building, blocked by a jeep. The faces of onlookers outside the gate are wary, anxious, fearful.

Toward 1 a.m. I look across to the hill from the hotel balcony. The commotion continues. The students, as far as I can see, still have not entered the city government building. Nor have the military or police who are present attacked them or driven them away.

"Not since the Cultural Revolution," says my companion, "have I seen a demonstration that big." But this is more concrete than the ideological protests of the Red Guards.

ON THE *EAST IS RED* passenger boat heading down the Yangtze River, I sit at the railing and ponder materialism, democracy, and the tie if any between the two. On the news broadcast from Chongqing Radio there is a long account of strikes in South Africa—but nothing about the chemistry students' demonstration opposite People's Hotel.

"The reforms will not work without a better framework of law," a Sichuan official, who is also a friend, said to me. When I remarked that law can hardly be a strong protector of political rights in a Leninist system, he replied: "We're stuck with party dictatorship. To get rid of it would mean civil war. So we have to try other means. Economic development is that means. Later, perhaps, we can try for democracy."

That is why there was some fear on the onlookers' faces at the midnight protest in Chongqing: The dictatorship is a given, and it cannot be mocked. Yet that is also why the chemistry students were rather fearless: The dictatorship, fearsome as a Leninist force, has run dry as a fount of Marxist truth—it may be confronted, even contradicted, when the court of appeal is the rationality required for economic development.

At ease: *Members of an investigative police force take a boat ride on Shiniuhai Lake (**facing page**) in the resort area of Jiuzhaigou.*

*The province's expanding economy has opened a new world of leisure activities to Sichuanese like these Jiuzhaigou sightseers (**above**).*

On the brink of splendor, *Tibetan horsemen pick their way along the crest of Jiuzhaigou's Pearl Shoal waterfall. The rough, calcified riverbed at the crest*

I take out my notebook, find the list I was working on when the demonstration flared outside the hotel in Chongqing, and add a line: "Changed: a real protest was allowed to continue. Unchanged: the protest will never be read about in the Chinese press."

As the *East Is Red* moves out of Sichuan into Hubei, what lingers in my mind are the faces—square, strong, with high foreheads, flattish noses, thick lips, a certain sensuality. The faces mean more than the abstractions of the state: A girl bent over a book at midnight, the light from a kerosene lamp by a food stall in Zigong catching black strands of hair, held flat to her cheek by sweat. A deformed beggar boy on a sun-dappled street in Xichang, his jaw twisted by some trick of genes or by injury, his beautiful eyes asking the passerby not to look but to think.

A trendy man-about-town at the Lantern Festival in Chongqing, in a Western jacket, with tie and waistcoat, and a felt hat with an

of the falls provides sure footing for the horses, making the crossing easier than it looks. The region has recently been designated a national park.

orange feather, his cheeks pink from a few glasses of fiery *xiang bin*, his lips kept apart by a Double Happiness cigarette. A man of 70 in the Mianyang post office, hand shaking, brow getting more furrowed by the minute, as he tries, tries, and with yet one more piece of paper tries again to write his letter to some far-off family member.

A meat vendor in a lane on the hills of Wanxian, the river port in eastern Sichuan, the stomach of a cow draped heavy and wide on a bamboo mat before him, pushing his face toward mine, the gravy-colored jaw enclosing a mouth with many absent teeth, urging a pig's intestine for my dinner.

A factory worker in Chongqing, his dark glasses whipped off to reveal eyes at once sincere and shrewd, slightly misunderstanding my question—"What is China's greatest problem?"—and replying, with a quick flip of his tongue against a gold-filled tooth, "I don't have enough money." □

PIONEER OF MODERN GEOGRAPHY

Humboldt's Way

ARTICLE AND PHOTOGRAPHS BY
LOREN McINTYRE

"ALEXANDER VON HUMBOLDT has been with me for some hours this morning; what an extraordinary man he is! Though I have known him so long, I am always newly amazed by him," the old man exclaimed to his assistant, a writer entrusted to copy down his every word.

"Humboldt possesses a versatility of genius which I have never seen equaled. Whatever may be the subject broached, he seems quite at home with it, and showers upon us treasures in profusion from his stores of knowledge," declared the old man, an Olympian celebrity who seldom showed enthusiasm for anyone, genius or not.

It was 1826, and Johann Wolfgang von Goethe, 77, revered giant of world literature, was talking about a man, 20 years his junior, who was rapidly becoming a legend.

Alexander von Humboldt, indefatigable traveler, author, and father figure of science, was perhaps the most widely admired man of the 19th century. More places around the world are named for him than for any other scientist. Fourteen towns in the United States and one in Canada. Mountains in Antarctica, North and South America, Australia, New Zealand, and New Caledonia. An ocean current off Peru. The largest glacier to reach the sea in Greenland. A bay, a county, a university, and a redwood forest in California. Streams, parks, and city streets, and even a mare—a "sea"—on the moon.

Oddly enough, Humboldt saw only one or two of the places eventually named for him. A history of the town of Humboldt, South Dakota, says, "It was named in honor of the great German naturalist-botanist-scientist, the Baron Alexander von Humboldt, who was known to have accompanied the railroad builders on their way west to the land of the buffalo and the Indian." In truth the baron never traveled west of Washington, D. C., in the United States. He spent several days there in 1804 with President Jefferson—but that was 21 years before the first steam locomotive ran on rails in America.

MUSEUM FÜR KUNST UND GEWERBE HAMBURG

Scientific celebrity *of his age and perhaps the last universal man, Alexander von Humboldt turned his knowledge of the natural world into 19th-century best-sellers. He visited South America and the young United States and traveled across Russia. In 1847, at age 77, his image was recorded by the new technique of photography.*

Humboldt in the Americas

INTO THE ORINOCO RIVER system pushed Humboldt and botanist Aimé Bonpland in early 1800. Ahead loomed a huge grassland, then rivers thronged by jungle and saturated with myth.

Spoonbills, scarlet ibises, and egrets spooked as the dugout passed, but no one-eyed men, no headwaters lake of the Orinoco fulfilled the tall tales. Humboldt measured aspects of physical geography, while Bonpland collected thousands of botanical specimens. They retired to Cuba, then traveled down the Andes before returning to Europe in 1804 by way of Mexico, Cuba, and the United States. At 34, Humboldt had a life's work ahead to publish their findings.

MEXICO

ATLANTIC OCEAN

TO U.S. APRIL 1902

Havana

CUBA

HISPANIOLA

CARIBBEAN SEA

TO CUBA NOVEMBER 1900

TO CUBA JULY 1900

SPAIN

TO MEXICO FEBRUARY 1903

Cartagena

Turbaco

Caracas

Puerto Cabello

Calabozo

Caripe

Cumana

Angostura (Ciudad Bolivar)

LLANOS

Magdalena

Honda

Guatavita

Bogota

Orinoco

GREAT CATARACTS

SERRA PARIMA

Esmeralda

Popayan

San Carlos

Casiquiare River

PICHINCHA 4,794 m 15,728 ft

CHIMBORAZO 6,310 m 20,702 ft

Quito

Negro

EQUATOR

Guayaquil

Riobamba

ANDES

SOUTH AMERICA

Amazon

Meraflon

CHAN CHAN

Trujillo

Callao

Lima

Yet I learned what a trailbreaker Humboldt was as I followed his way up the mountains and down the rivers of South America and into the mines of Mexico. He pioneered in geology, botany, zoology, anthropology, archaeology, oceanography, meteorology, and half a dozen other ologies. His five-year sojourn in the Americas, 1799-1804, was lauded as the scientific discovery of the New World. That trip alone yielded 30 magnificent volumes. His masterwork, *Cosmos*, a five-volume description of the physical universe, sold tens of thousands of copies in several languages—even though its index ran to 1,110 pages.

I also learned that few Americans today know anything about the man. Nary a clue to his identity can be found at the Humboldt Museum in Winnemucca, county seat of Humboldt County, Nevada. The map of northern Nevada is salted with Humboldts: the county, a town, a canyon, a mountain range, a huge national forest. . . . Explorer John C. Frémont started the trend in the 1840s when he bestowed Humboldt's name on the river that marked the westward trail of the pioneers.

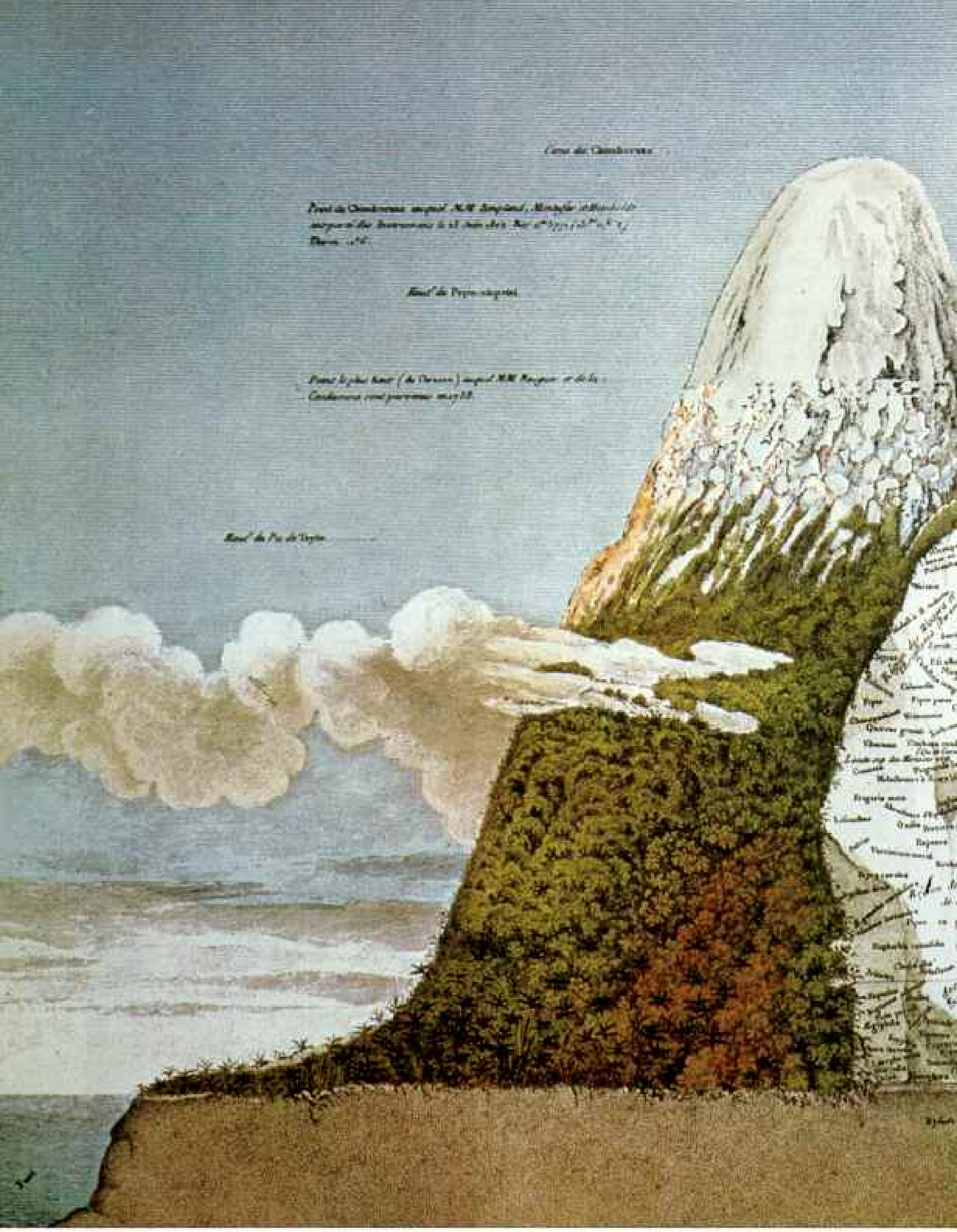
Why has he almost been forgotten? I think he spread himself too thin, seeking to excel in so many fields that he achieved immortality in none. His brother, Wilhelm—a famous diplomat and one of Europe's leading philologists—wrote that "Alexander maintains a horror of the single fact. He tries to take in everything."

Humboldt's main contribution to knowledge lies in the one great field that drew all his travels and observations together: geography. Geography, the mother of many sciences, is now defined as embracing all the earth and life thereon. Until Humboldt, most geographers were content to study the earth's shape and describe its regions.

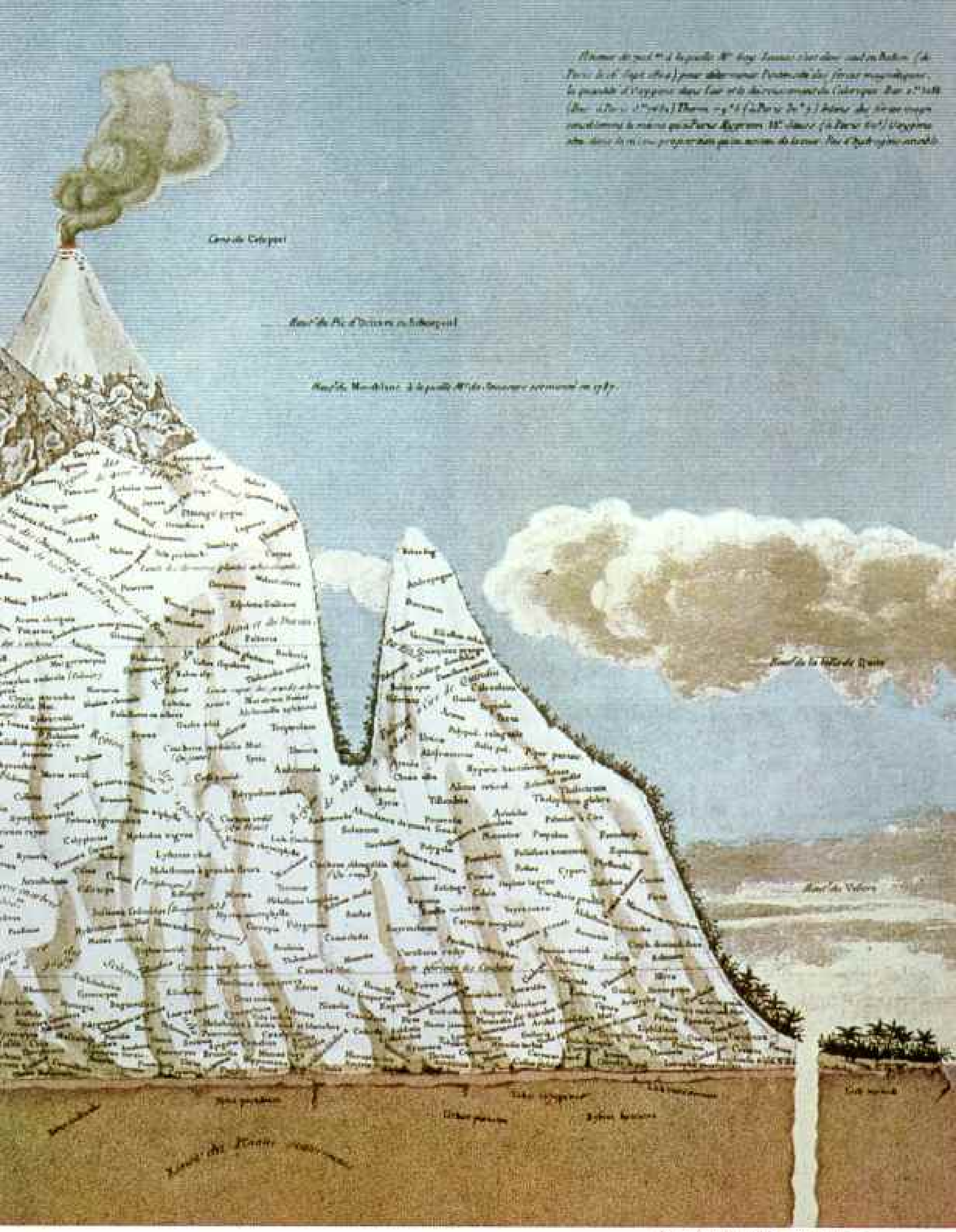
With Humboldt a new era began: measuring phenomena in the field, classifying the

Pressing flowers *in a romanticized 1806 portrait* ***(facing page)****, Humboldt was pictured in one of the expedition's main occupations. Though thousands of specimens were lost in transit, some collections* ***(right)*** *survive, and some flowers* ***(above right)*** *even retain a hint of color.*

NATIONAL GALERIE, BERLIN/DDR (FACING PAGE)



In this pioneer study of ecology, *"Geography of Equatorial Plants,"*
Humboldt noted vegetation on a foreshortened view of Ecuadorean volcanoes.



ARCHIV FÜR KUNST UND GESCHICHTE, BERLIN

By relating growing zones to an interplay of altitude and temperature, he followed his thesis that nature's parts can be brought into comprehensive unity.

findings, and comparing them with observations elsewhere. Climbing to extraordinary heights on equatorial volcanoes, Humboldt observed that plant forms were changed by colder temperatures, as if they were nearer the poles. His *Geography of Plants With a Physical Portrait of the Equatorial Regions*, a book about plant ecology published decades before the word ecology was popularized, may have led Darwin to theorize on adaptation of species to their environment.

His methods now seem obvious, but they were not in 1769 when Alexander von Humboldt was born in Berlin—then a provincial place where little science was taught. Alexander's search for order in his universe began early. A lonely boy and often ill, he drew maps and collected plants and stones.

ONE AUTUMN I wandered through woods behind Schloss Tegel, the estate where Alexander and his elder brother, Wilhelm, grew up and where both are buried. Their father, Maj. Alexander Georg von Humboldt, who had campaigned with Frederick the Great, died when Alexander was nine. The boys' strong-willed mother demanded achievement and showed little warmth.

From childhood on, wanderlust goaded Alexander. He read *Robinson Crusoe* and George Forster's *A Voyage Round the World*, a popular mixture of travel and science. Forster had been a natural history illustrator on Capt. James Cook's second voyage of discovery to the Pacific Ocean. In 1790, with Forster as his mentor, Humboldt journeyed to England, where the industrial revolution was underway. The two took notes about everything they saw, from the shape of seashells to the excavation of coal. They came back through Paris on the eve of the first anniversary of the fall of the Bastille, and joined exuberant crowds in the streets. Hope was high for liberty, equality, and the idea that men could be authors of life's drama, not mere puppets of fate.

He studied at the Freiberg Academy of Mines under A. G. Werner, a geologist whose fame drew students from places as diverse as Russia, Transylvania, and the United States. Driven to excellence, sleeping little, Humboldt pursued many projects

Man's greatest pyramid, *measured by volume* ***(right)****, was at the time of Humboldt's travels through Mexico a self-evident wonder of the world.*

Now eroded, overgrown, and capped by a church ***(above)****, Cholula stands before the volcanic pyramid of Popocatépetl.*

While in Mexico, Humboldt used his early training as a mining engineer and inspector to assess and map a large part of the country's mineral potential.

LIBRARY OF CONGRESS (BELOW)

Could all knowledge of *the physical world be assembled, integrated, edited, and published—by one man? That was Humboldt's quest, and he proceeded against two intractable presences.*

First, 19th-century scientific knowledge was flowing like an endless and rising Orinoco. Second, Humboldt's own mortality advanced with the years as he labored to complete his great work, Cosmos, *whose very title seemed to mock his efforts.*

Behind him lay his thorough fieldwork, such as careful notes on a Venezuelan hot spring (**above**), *and his published works* (**right**), *that included an exquisitely engraved 30-volume set on the New World.*

In 1856, still a vigorous scholar at age 87, he was surrounded by his books, maps, and specimens in his Berlin study (**above**). *Chamberlain to Prussia's king and known to every educated person of his day, Humboldt still found time to encourage young scientists, often with his own funds.*

Eventually Cosmos *was published in five volumes—tens of thousands of copies in several languages. Its index alone exceeded 1,100 pages. Humboldt did not live to see it completed, but by then he had long accomplished what could be expected of any mortal scholar.*

DEUTSCHE STAATSBIBLIOTHEK, BERLIN/DOR (FAR LEFT); ROYAL GEOGRAPHICAL SOCIETY, LONDON (ABOVE)

outside school. "I find it difficult to spare myself. . . . impetuosity is always necessary to ensure success," he once wrote.

His brother said Alexander showed off knowledge "as if he desperately needs either to dazzle people or to beg their sympathy. . . . All this wanting to impress others really stems from a desire to impress oneself."

Humboldt went to work at 22 as a government inspector of mines. The young bureaucrat made whirlwind trips all over eastern Europe to improve salt mines and gold mines. He organized a free school for miners with his own funds. He wrote a book on subterranean flora and another on animal electricity and begged friends to influence publishers, asserting that "To blow one's own trumpet is part of an author's trade."

WHEN ALEXANDER was 27, his mother died, leaving him a fortune and the freedom to carry out his dreams of discovery. He quit mining to train himself to travel on a scientific expedition. He wanted to climb Vesuvius, but Italy was overrun by troops of Napoleon, a man almost exactly Humboldt's age. So with geologist Leopold von Buch, he spent the winter of 1797-98 in the Alps, measuring magnetic inclination, atmospheric pressure, humidity, and oxygen content of air. He honed his skills with the sextant, learning to determine latitude.

That summer, to equip himself with the latest instruments, Humboldt found his way to Paris, then the intellectual capital of the world despite the recent Reign of Terror, when guillotines severed many a savant's head. He wangled a French passport that described him as "five feet eight, light brown hair, gray eyes, large nose . . . open forehead marked by smallpox."

Then came a year of frustration.

He had arranged to join an expedition up the Nile. Napoleon's Egyptian campaign scotched that. A British blockade thwarted a sailing to the West Indies. A French admiral invited Humboldt on a five-year expedition around the world. Near sailing date, funding was cut off because of the war. With the expedition botanist, Aimé Bonpland—who would be his companion for the next five years—Humboldt traveled to Marseille. The friends hoped to join a camel caravan in Africa to overtake the 175 scientists who had accompanied Napoleon to Egypt. The plan failed; all French arrivals in Tunis were being clapped into dungeons. Humboldt eventually picked up more than 20 visas—all useless—on his French passport.

INSTITUT FÜR GEOGRAPHIE UND GEOÖKOLOGIE, LEIPZIG

"**Bruised and bleeding,** [*the Indians*] *extricate themselves with difficulty from the whirlpools,*" *Humboldt wrote of wading the dugout past the Great Cataracts of the Orinoco, a peril modern travelers* (**right**) *still face.*

When their fame spread through Europe, Humboldt (**left,** *at left*) *and Bonpland were painted in a stage-setting jungle with their instruments of discovery. Humboldt wrote of the reality that "it is impossible not to be constantly disturbed by the moschettoes, zancudoes, jejens, and tempraneroes, that . . . pierce the clothes with their long sucker . . . and, getting into the mouth and nostrils, set you coughing and sneezing. . . ."*

*"**As in an ancient inheritance,**" wrote Humboldt of a vast region in Venezuela in which animals had primacy and "in which man is nothing." There a finger-size tree snake (**above**) has dominion, and the call of a howler monkey (**below**) in the distance sounds the approach of a rainstorm. Humboldt kept a monkey for a pet and sketched it in his diary (**below right**).*

*Of a coastal cloud forest (**right**), he observed that "nature presents herself under an unexpected aspect. . . . the earth, overloaded with plants, does not allow them space enough to unfold themselves. . . . by a continual interlacing of parasite plants, the botanist is often led to confound the flowers, the fruits, and leaves, which belong to different species." But even passing in wonder through "the deep silence of those solitudes," he and Bonpland did not omit the careful habits of scientific collectors.*

STAATSBIBLIOTHEK PREUSSISCHER KULTURBESITZ, BERLIN

"I am so hampered in all my projects," he wrote to a friend. "I wish I had lived either 40 years earlier or 40 years later." But 40 years earlier many of the instruments he used to blaze a scientific trail through Latin America were not available. And 40 years later the Spanish Empire would be broken up, and he would have missed a marvelous stroke of luck that awaited him in Spain.

A German diplomat who knew all the right people in Madrid arranged an audience with King Charles IV for Humboldt. His knowledge of precious metals and his offer to gather scientific data for the crown at his own expense impressed the court. The king granted passports to Humboldt and Bonpland, ordering authorities in the dominions to collaborate with el Barón de Humboldt in his investigations of land, sea, air, sky, plants, animals, seeds, minerals,

As daydreams remain unexplored territory, *so for Humboldt did the Orinoco's headwaters beyond Esmeralda, near where this young Makiritare woman*

and mountains . . . and to impede in no way the use of his scientific instruments.

Never before, in three centuries of royal rule, had Spain permitted a foreigner unsupervised access to Spanish America.

Humboldt wrote to a friend: "I intend to walk from California to Patagonia—what a pleasure. . . . I'll collect plants and animals. I'll analyze heat and electricity, and magnetic and electric content of the atmosphere . . . I'll measure mountains, but my true purpose is to investigate the interaction of all the forces of nature."

Evading a British blockade, Humboldt and Bonpland sailed for Cuba on the mail boat *Pizarro*, pausing at the Canary Islands, as Columbus did. On Tenerife they scaled 12,198-foot Pico de Teide volcano. "Vapors burned holes in our clothes while our hands were numb with cold," Alexander wrote.

and her pet toucan take their rest. He counted her people among the "mild, tranquil tribes" with a language "softer . . . and fuller of ambiguous expressions."

Crossing the Atlantic, the Prussian dissected flying fish, the Frenchman got seasick, and a passenger died of typhoid fever. The scientists left the ship as soon as it touched the first New World port: Cumaná, Venezuela, on the Caribbean coast east of Caracas. It was July 16, 1799.

EXCITEMENT BURSTS from the pages of the first letter Alexander wrote his brother from the New World. "What magnificent vegetation! How brilliant the plumage of the birds, the colors of the fish! Even the crabs are sky-blue and gold! We have been running about like a couple of fools! For the first three days we got nowhere, since we kept dropping one thing to pick up another. Bonpland declares he'll go crazy if these wonders don't let up."

Days were scorching. At nightfall, Cumaná townsfolk sat on chairs half-submerged in the little Manzanares River, smoking cigars and talking about the weather and the luxuries of Caracas or Havana.

Cumaná, the oldest existing European settlement on the continent, was Humboldt's first and greatest love in the Americas. So I was disappointed to find no fitting monument to him (only an unkempt cinema and an ice-cream parlor bear his name).

In a gigantic cavern near Caripe, 45 miles inland from Cumaná, Humboldt first saw the night birds *Steatornis caripensis*—"oilbird of Caripe." Capuchin monks led Humboldt and Bonpland to the mountainside cave they called the Mine of Fat, where Indians rendered cooking oil from the belly fat of oilbird squabs. Entering with torches, the explorers disturbed thousands of oilbirds, or guacharos, the size of crows.

On the Caripe trek Alexander turned 30, in a village where no one had ever heard of Prussia and the Indians ran stark naked. I have heard the calls of the unseen birds that Humboldt described—sometimes like three mournful notes of an oboe player lost in the woods, sometimes like the liquid toll of a bell dropped into a deepwater well. And the coming of rain is still announced by the basso profundo roars of howler monkeys, the loudest animal noise in the jungle.

Humboldt wrote to Europe about "the boa constrictor, which can swallow a horse," and declared, "We are surrounded by jaguars and crocodiles ever ready to regard white man or black as a dainty morsel," although he was mainly herborizing—gathering unknown plants. Such tall tales crept into letters he fired off to influential friends to build his public image as an adventurer as well as a scientist. But when he got down to writing books about his journey, he seldom strayed from fact.

Less exact were painters hired to illustrate his books from his sketches. I tried to shoot matching photographs and often failed, so embellished were the originals.

In Humboldt's day the sky was so clear in Cumaná that he often stayed up all night compiling a scale of magnitudes of stars of the Southern Hemisphere. And he could observe by telescope the instant that Europa, one of Jupiter's brightest moons, disappeared behind the planet. The exact time of the event, predicted in his almanac, enabled him to set his chronometer to determine longitude and thus map his travels.

Early on November 12, 1799, a magnificent meteor shower lit the eastern sky. Humboldt later determined that the shower had been observed from Greenland to Germany. He was one of the first to point out the periodicity of meteor showers, and postulated the theory—now accepted—that some such meteors are the residue of comets.

THE END of that year found Humboldt and Bonpland in Caracas. Their Caraqueño friends enjoyed discussing Rousseau and revolution. But none cared about mathematics, painting, biology, geology—or about scrambling with the scientists up one of the peaks of the Silla de Caracas, an 8,661-foot mountain, which today overlooks a noisy valley studded with skyscrapers.

And the gentlemen of Caracas surely rolled their eyes when the two friends announced a decision to chart the headwaters of the Orinoco. The river curves through Venezuela like a fishhook, the point stuck into the legendary Parima Range whose mysteries Humboldt proposed to unlock. The shank ends in a delta of multiple mouths. To reach the Orinoco, they had to cross the llanos, dusty plains larger than California arching across the northern reaches of the continent (map, pages 320-21).

The explorers stuffed their hats with leaves or rode by night to avoid sunstroke. At Calabozo they met a rancher who had read Benjamin Franklin's memoirs and who had invented static electricity machines which Humboldt equated with Europe's finest. They also saw ponds full of five-foot electric eels. Horses driven into one pond to arouse the eels thrashed in panic when stricken by 650-volt shocks. Several died, but gradually the batteries of the eels ran down and five were captured.

Tests and dissection began then and there before the eels decomposed in the heat. "After four successive hours of experiments, Bonpland and I felt weak in the muscles, pain in the joints, and were ill the rest of the day." When the astonishing report of the struggle with creatures whose bodies were half made up of electric cells was later circulated in Europe, it won acclaim for the romantic travelers.

Humboldt's guide to the upper Orinoco was a Spaniard, Father Bernardo Zea, Franciscan patriarch of the missions. At a beach where Indians were digging thousands of turtle eggs from the sand, Humboldt bought a canoe, a 40-foot tree trunk hollowed by hatchet and fire. "The fore part of the boat was filled with Indian rowers. . . . naked, seated two by two. . . . Their songs are sad, and monotonous." Cages containing birds and monkeys were everywhere.

Humboldt's account of the Orinoco voyage fairly buzzes with bugs and futile attempts to escape them: sleeping in Father Zea's tree houses, or buried in sand, or daubing with rancid crocodile grease. Bonpland sought relief inside Indian smokehouses. The torment was worst at the Great Cataracts, which took several days to traverse in April 1800.

Descendants of those insects still hunger for blood, but I had it better than Humboldt: I spoiled their appetites by taking 500 milligrams a day of Vitamin B_1 and spraying myself with repellent.

However, Humboldt had it better than I when it came to passports: Mine was confiscated, and I was confined for two weeks at Puerto Ayacucho, Venezuela, a town at the foot of the Orinoco rapids. With other U. S. citizens—and with an entry and sailing permit issued by the Guardia Nacional de Venezuela—I had cruised 11 days along primeval waterways that Humboldt mapped. One day as we neared the cataracts, guardia officers—with no explanation—seized us at gunpoint. Four of us were held incommunicado in a seven-by-nine-foot cell without sanitary facilities. I got out briefly by pretending illness: I swallowed pills that turned my urine red. But I found no way to escape.

Eventually we smuggled word to the U. S. Embassy in Caracas, and the embassy plane came to our rescue. Afterward we learned that the governor of Amazonas Territory had decreed that no foreigners could travel the interior of his Missouri-size fiefdom without his written order—our official permit notwithstanding.

Had I been able to see beyond the graffiti-scrawled walls of my cell, I could have just about made out the rocks over which Humboldt portaged his gear as he began his great voyage of discovery.

"BEYOND the Great Cataracts an unknown land begins," wrote Humboldt, "the classical soil of fable and fairy visions . . . nations with one eye in the forehead, the head of a dog or the mouth below the stomach." The Indians said that the stars were reflections of silver stones in Lake Parima. The mythical lake lay between the Amazon and the Orinoco. On its shore stood a golden city, the Villa Imperial de Manoa, ruled by El Dorado, the Gilded Man. The El Dorado legend had lured pursuers to the Andes and across the continent to the Orinoco, where even Sir Walter Raleigh had futilely taken up the chase two centuries earlier.

Humboldt's scientific motive for exploring the upper Orinoco was partly to get Lake Parima off the map and partly to put the Casiquiare on the map. The Casiquiare is a navigable offshoot of the Orinoco that strays across a flat, almost imperceptible continental divide and eventually reaches the Río Negro, largest of the Amazon tributaries. Some European mapmakers scoffed at reports of such a waterway connecting two major river systems and drew mountains in its place.

On his upriver voyage Humboldt left the

Orinoco and portaged the huge canoe ten miles overland to the Río Negro. In contrast to the murky Orinoco, polluted with putrescent flesh of caiman and manatee, the Río Negro was sweet and clean. From the Portuguese frontier post at San Carlos, Humboldt steered eastward into the lost world of the Casiquiare, where Indians called meteors urine of the stars and the morning dew spittle of the stars. The 200-mile struggle up the swift, bug-ridden Casiquiare was Humboldt's most miserable week in the Americas. The canoe now held great batches of pressed plants, 14 birds, 11 mammals, a crew of 9, and the Europeans—far too many to sleep decently on board. Yet there were no beaches to set up camp; thick forest overhung the banks. Wood was too wet for fires. They had nothing left to eat but raw cacao beans. A jaguar carried off their pet mastiff.

They regained the Orinoco at its fork and paddled to Esmeralda, the last Franciscan outpost, set in a meadow studded with termite hills and pineapple plants. The caretaker mistook them for traders when he spotted Bonpland's pile of paper used for drying plants. He advised the paper would be hard to sell, as they didn't write much.

Humboldt and his crew were too exhausted to venture farther upriver into regions controlled—then and now—by hostile tribes. Informants assured him that no Lake Parima existed at the headwaters. And I saw no settlements at all during a flight along the green ranges that separate Brazil from Venezuela. Fewer humans now live in the torrid Casiquiare region than in Humboldt's time, despite his optimistic prediction that with freedom from Spain the waterways would become richer with commerce than ancient Mesopotamia. He disregarded evidence that the real rulers of the realm are insects.

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A wonder in their time, *the mud volcanoes of Turbaco, Colombia* ***(above)****, have eroded since Humboldt observed them, becoming traps for blundering cattle. An active one rises at Galerazamba* ***(facing page)****.*

Volcanism continued to intrigue Humboldt throughout his career and led him to change his view of the origin of earth's crust—from oceanic deposition to igneous intrusion—and to affirm that volcanic forces "are not seated near the surface . . . but deep in the interior of our planet."

ON MAY 24 Humboldt's big dugout sped for civilization, some 700 miles downriver. At the Great Cataracts Father Zea, enfeebled by malaria, stayed with his Indian flock. At the end of the voyage in Angostura—now Ciudad Bolívar—Bonpland nearly died of typhoid.

Alexander—unable to curb his penchant for hyperbole—led friends to believe that he had traveled 6,443 miles by river, stretching the truth by a factor of three. He told them, "We scarcely ever entered a hut without encountering the horrible remains of repasts on human flesh!" Yet his published journal reveals no closer approach to the cannibalism once rampant along the Orinoco than an Indian's remark that his tribe preferred the flavor of the palm of the human hand.

In November 1800 the two friends made a stormy voyage to Cuba. Their monkeys and birds were entrusted to a French squadron that lost them all. In Havana they found half their plant collection ruined by rot and insects. They divided the rest—thousands of new species—into three shipments; one for France, one for Germany, and one to be

held for their eventual return voyage to Europe. The French shipment foundered in a wreck off Africa, along with Bonpland's insect collection and skeletons from a cave near the Orinoco cataracts. World War II bombings of Berlin destroyed the Dahlem Botanical Garden library where one of their splendid herbariums was stored—but I found it had survived in a vault, and some blossoms still hold color (page 323).

In March 1801 Humboldt and Bonpland returned to South America. With their arrival in Cartagena, Colombia, their encyclopedic, disorderly, yet fascinating *Personal Narrative of Travels to the Equinoctial Regions of the New Continent* suddenly ends.

SINCE 1977 I have been piecing together the details of their final three years in the Americas with the help of Humboldt scholars in many countries. At the state library in East Berlin I saw

The legend of El Dorado, *the Gilded Man, drove 16th-century Spanish conquistadores and Sir Walter Raleigh to search northern South America for a man or a city of gold. Humboldt cited the crater Lake Guatavita (***bottom***) near Bogotá as a likely source of the legend and illustrated it in one of his books (***below***). The discovery of gold artifacts when a British company drained the lake at the beginning of this century tends to bear Humboldt out. A royal figure on a gold raft (***left***), found in 1968 in a Colombian cave, seems to illustrate the myth of a king who went to a lake for a ritual washing of gold dust from his body. But El Dorado's mischief persisted. Mythical Lake Parima, supposed source of the Orinoco and haunt of the Gilded Man, was printed on a 19th-century map, its location attributed to Humboldt—thereby perpetuating the geographic myth he had traveled far to disprove.*

LIBRARY OF CONGRESS

Humboldt's 12 volumes of diaries, hastily scribbled in French, German, Spanish, and Latin. Only scraps have been published.

From Humboldt's air and sky observations, Colombian astronomer Jorge Arias de Greiff has been able to reconstruct the explorers' day-by-day progress through Colombia from the Caribbean coast to Ecuador. Humboldt logged his positions by shooting sun and star sightings by sextant wherever weather permitted. His guides hand-carried barometer boxes containing his fragile meter-long tubes of glass to fill with mercury for measuring elevations above sea level.

The expedition penetrated Colombia's heartland by poling up the shallow Río Magdalena in a *champán*, a larger version of their Orinoco craft. During eight weeks of steaming temperatures, the crew fell ill with foul-smelling sores. Bonpland shivered and sweated with malaria, but Humboldt, who

Children of the Andes *head home at sundown along the way Humboldt and Bonpland took in crossing from Ecuador to Peru in August 1802, now a road near the modern Pan American Highway. In Ecuador the explorers had traveled the Avenue of the Volcanoes, which included Chimborazo on whose flanks Humboldt climbed*

higher than any European ever had. Their route was the old Inca highway, to Humboldt more extraordinary than Roman roads in Italy, France, and Spain.

boasted to his brother, "The tropics are my element," seemed to thrive on hardship.

From Honda, where the Magdalena runs swift and narrow, they made a hundred-mile climb to the chill savanna of Bogotá at 8,600 feet elevation. They were on their way to meet José Celestino Mutis—priest, physician, astronomer, designer of sewers and cemeteries, and dean of South American botanists. Letters announcing their visit paid off. Sixty dignitaries and the archbishop's six-horse carriage rode out to welcome the ailing Frenchman and the 31-year-old Prussian baron who wore a high hat and theatrically clutched a barometer. Mutis, then about 70, threw open his house and his collection of 20,000 plants.

While Mutis treated Aimé with quinine, Alexander toured the countryside that may have spawned the El Dorado legend (pages 340-41). It told that an Indian chief rafted out on a lake and took ritual baths to rinse from his skin a dusting of gold. Humboldt found the lake, Guatavita, at nearly 10,000 feet elevation in a crater that Spaniards had long since tried to drain to recover the gold.

In September 1801 the scientists pushed south along the Andes, trying to keep some two miles above sea level—Humboldt's way of avoiding fetid swamps that gave off *mal aria*—bad air. He repeatedly searched for causes of malaria and yellow fever—"black vomit"—which he greatly feared. He correctly associated mosquitoes with the diseases, but never hit on the germ theory of infection.

ON NEW YEAR'S DAY the travelers, with 12 oxen carrying their equipment and ever heavier collections of plants and rocks, crossed the Equator and for the first five months of 1802 set up base in Quito, Ecuador. The city rests high on a ledge of Pichincha volcano, and they climbed twice to its summit. From the rim of its smoldering crater at 15,728 feet, I counted at least 20 volcanoes, some capped with massive glaciers.

Humboldt was put up in a fine house by a nobleman whose son, Carlos Montúfar, accompanied the scientists on the rest of their New World travels. Carlos's pretty sister Rosa reported that "The baron. . . . never stayed at meals longer than it took to satisfy

his appetite and pay proper attention to the ladies. He always seemed anxious to get out of doors again, to examine every stone and collect plants. At night, long after we were all asleep, he would be gazing at the stars."

I discovered more about Humboldt's way of life in Quito in letters to friends from Francisco José de Caldas, a self-taught scientist and ascetic who later became a famous Colombian revolutionary and martyr. Caldas stuck close to Humboldt, copying his notebooks and learning to use his instruments. "Whatever has been said about this great man falls short of the truth . . . what a painstaking and wise astronomer! . . . this Newton of our time. . . . Instead of 120 stars which I had in my catalog, I am now the owner of 560."

Caldas begged to join the expedition. Humboldt turned him down.

Stricken, embittered, Caldas wrote again. "How the baron's behavior has changed since Bogotá! The atmosphere of Quito is tainted; you breathe only pleasures. . . . The baron has entered this Babylon, he has befriended dissolute and obscene young men; they drag him to houses of impure love; shameful passion seizes his heart. . . . I can see Newton, who never had a woman, saying to the young Prussian, 'Is this the way you carry out the example of purity I left to my successors?'"

If Humboldt, for once in his busy life, relaxed with the ladies, I have only Caldas's remarks to hint that he did so in this remote Andean town; for the baron was very discreet and burned most of his letters from friends before he died.

Humboldt's way south from Quito led down the Avenue of the Volcanoes, his term for the old Inca high road—now the Pan American Highway—flanked by lofty snow cones named for ancient gods. Along the way he ventured into archaeology, measuring and sketching Inca ruins.

In Riobamba, a town leveled in 1797 by an earthquake that took 40,000 lives, the earth quivered while he measured the heights of three huge volcanoes nearby. Amid so much evidence of earth convulsion, Humboldt forsook the Neptunian theory espoused by Werner, his influential professor at Freiberg, that continents were formed by precipitants from a primeval sea that once covered the earth. Thereafter he championed the Plutonian theory—a fundamental concept in modern geology—that the oldest rocks are of igneous origin, forced from the hot interior of the earth and eroding to form sedimentary layers.

Ecuador's loftiest snow peak, 20,702-foot Chimborazo, was then believed to be the highest in the world. With Bonpland, Montúfar, and a guide, Humboldt strove for the summit. They were stopped by altitude nausea, soft snow, and impossibly steep slopes. Their boots were soaked. It began to snow. They had reached 19,286 feet by their calculations and stayed only to collect pieces of rock. "We foresaw that in Europe we should frequently be asked for 'a fragment from Chimborazo.'"

In Europe, Humboldt was lauded for climbing higher than anyone in history. Some 30 years later, however, British surveyors of the Himalayas reached greater elevations. The baron got upset. "All my life I have imagined that of all mortals I was the one who had risen highest in the world—I mean on the slopes of Chimborazo!"

In truth, he never did hold the record. In the 15th century Incas worshiped the sun on at least 24 Andean peaks higher than 18,200 feet, the actual altimeter reading at the vertical wall that stopped Humboldt. I reached it with Marco Cruz, an Ecuadorean who has climbed on five continents.

EAST OF THE ANDES the explorers plunged into the upper Amazon basin. A month later they regained the heights of northern Peru. At 7° south latitude Humboldt noted that the pointer of his dip compass held level, inclining neither north nor south—the first time anyone ever detected the earth's magnetic equator.

Humboldt marched down the western slope of the Andes, sighted the Pacific Ocean for the first time, and waded into the surf near Trujillo, thermometer in hand. At 16°C the sea was cooler than elsewhere in the tropics. Altogether he made but 12 readings of the cold current that flows north along the coast. So when cartographers put Humboldt Current on maps, the baron protested that he only took its temperature; the Peru Current had been known to mariners for centuries. Both names are in use today.

The scientists then hurried 300 miles on down to Lima on the Inca coastal road. They advanced 20 to 40 miles a day along a desert so dry that rain was a curiosity difficult to describe to children. Biased perhaps by good times in Quito and age-old animosities between Ecuador and Peru, Humboldt later wrote a friend that at night Lima's "filthy potholed streets, adorned with dogs and dead donkeys, impede travel." He saw ladies riding around in fine carriages, sucking cigars and spitting tobacco juice—to clean their teeth, they claimed. Nowhere in the world, he thought, did people talk more and do less.

MY FRIEND Georg Petersen, geologist and author, said the baron reacted to Lima's sloth with furious activity. "His notebooks brim with data on Indians and llamas, earthquakes and tsunamis, mining, smallpox vaccination, seabird excrement used for fertilizer by the Incas, and simultaneous observations in Lima and Callao of the transit of Mercury to correct the country's clocks."

On Christmas Eve, 1802, the travelers sailed on the current to Guayaquil, Ecuador, to await a ship for Mexico. Oblivious of Guayaquil's enervating heat, Alexander began to write his *Geography of Plants*, the classic that shows how plant life varies with elevation and temperature. The concept led him to invent isotherms—lines of equal temperature drawn on maps.

Humboldt, Bonpland, and Montúfar entered Mexico at Acapulco and left a year later from Veracruz. The baron enjoyed Mexico City so much that later in life he hungered to return to the "splendid city of palaces"—which then had a population of about 140,000. In turn, Mexican scientists and officials were so impressed by the baron that they opened offices and archives—even military records—to their learned guest as to no foreigner before him.

Much of this data he incorporated into superb maps of Mexico showing precise locations of 312 mining sites, native tribes, and roads leading to California missions. One map shows the vast Louisiana Territory, whose purchase had just doubled the size of the United States.

Humboldt arrived at Havana in March 1804 to pack for home. The U. S. consul recognized that his maps and his knowledge of the new frontiers of the U. S. were priceless and encouraged his return to Europe by way of Washington. The Prussian, the Frenchman, and the Ecuadorean disembarked in Philadelphia with 27 chests of plants. They reached Washington June 1, 1804.

Humboldt became the talk of the town. Dolley Madison, President Jefferson's hostess, wrote her sister, "All the ladies say they are in love with him. . . . He is the most polite, modest, well-informed and interesting traveller we have ever met. . . . He had with him a train of philosophers [scientists] who, though clever and entertaining, did not compare with the Baron."

Albert Gallatin, Swiss-born Secretary of the Treasury and no mean linguist himself, wrote that the very extraordinary Baron von Humboldt speaks "twice as fast as anybody I know, German, French, Spanish and English, all together. But I . . . swallowed more information of various kinds in less than two hours than I had for two years past in all I had read or heard."

They dined at the White House and with Washington society, where hostesses played piano and "sang pleasing Songs in English, french, & Italian, in a high Stile of Execution"—as one diarist put it. At such moments Humboldt probably wished he were back on the Orinoco; for him, music was a "social calamity."

President Jefferson was delighted with Humboldt's maps, which he sent to be copied, and the baron had free run of the White House. During the next 20 years Humboldt sent Jefferson copies of his books and Jefferson responded with long letters, sometimes discussing the future of Latin America.

Humboldt went sight-seeing to Mount Vernon about the time a German newspaper announced that he had died in Acapulco. He then mailed from New Castle, Delaware, a 20-page autobiography and summary of his trip for U. S. publication and set sail from the New World that summer of 1804.

Baron von Humboldt, 35, the explorer reported dead, was lionized in Paris. He loved it. His rocks from Chimborazo elicited the oohs and aahs that moon rocks do today. He attended Napoleon's coronation, although the emperor of the French was not fond of

Prussian barons. On meeting Humboldt, he said, "So you're interested in botany? So is my wife."

TO PUBLISH his New World findings at his own expense, Humboldt gave himself three years. But so many and so lavish were his books and so enormous the cost of engraving full-color plates that it took him a quarter of a century, and in the end he himself could not afford to own a complete set.

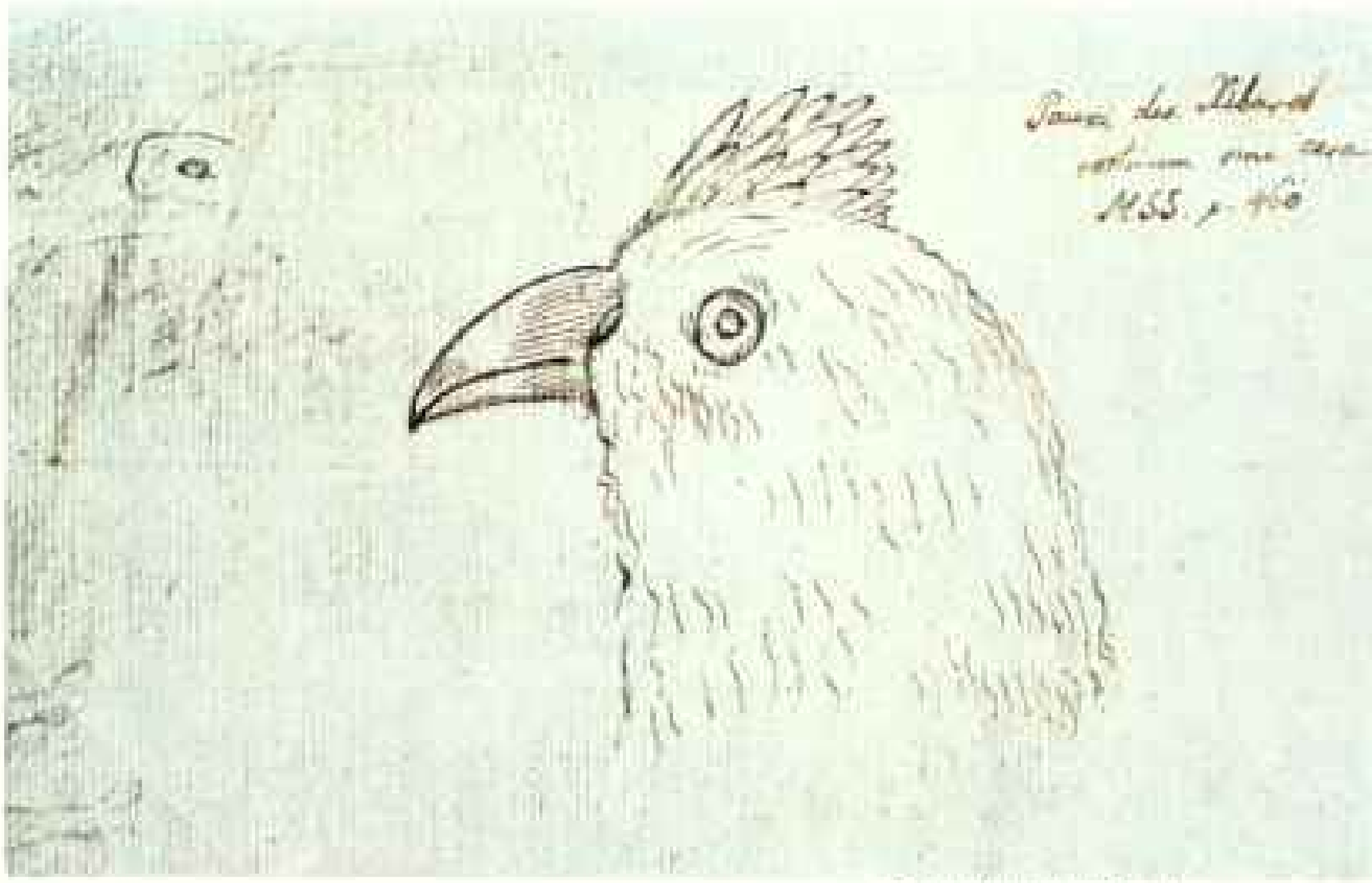
Aimé Bonpland, ill at ease indoors and happier creating Empress Josephine's lovely gardens near Paris, actually authored only 4 of 17 weighty volumes on botany published by "Al. de Humboldt et A. Bonpland." After Waterloo, Bonpland returned to South America to teach, and endured nine years of captivity by the paranoid dictator of Paraguay for no crime whatever. He lived until 85 on the Uruguay-Brazil border in a mud hut surrounded by flowers and his children by his Indian housekeeper.

In Spain, Carlos Montúfar fought Napoleon and later led Ecuador's rebellion against Spanish rule. As every Quito schoolchild learns, he faced a firing squad at 35.

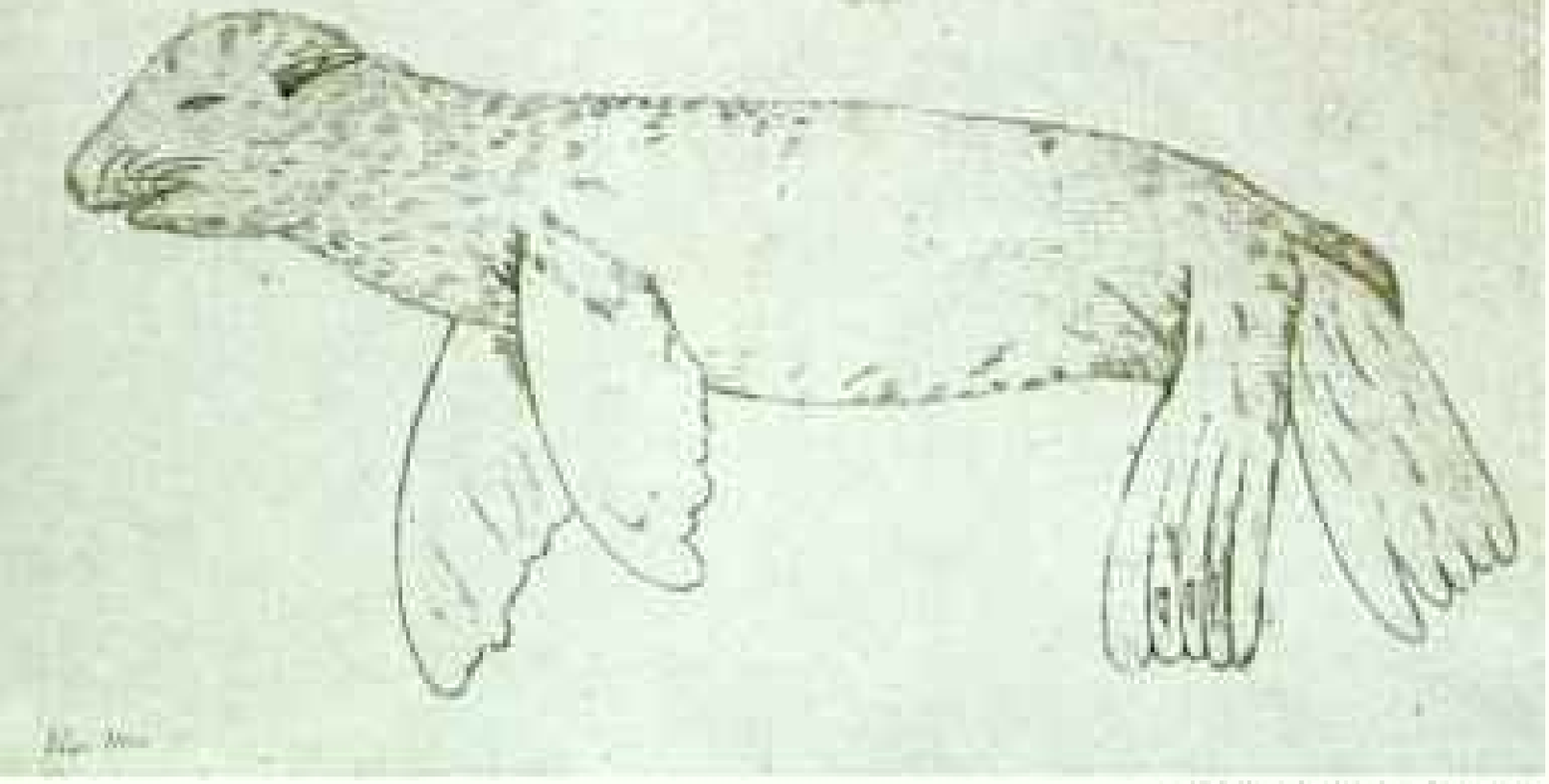
In Paris, Humboldt formed friendships with great men and small. Among the great were Albert Gallatin, who had become U. S. minister to France, and Simón Bolívar—a

Among the headshrinkers *the two explorers made their peaceful way, having detoured from the Andean heights into Amazon tributaries. There the Aguarunas, part of the once feared Jivaro nation, still use dugouts (***above***) as boats of burden on Río Marañón.*

*As was his custom, Humboldt observed and noted whatever came into his ken, including sketching a turkey-size black curassow (***right***) that he labeled a pauxi.*



COURTESY WILFRID TSCHUDI



COURTESY WILTRUD TSCHUDI

Pelicans to the horizon *cover one of the Lobos de Afuera Islands off Peru's coast. The guano dropped by these and other seabirds was fertilizer for the Incas, and the samples Humboldt sent to Europe excited curiosity, leading to massive guano trade. The naturalist sketched a sea lion* (**left**) *and took temperatures of coastal waters of the Peru Current, still often called the Humboldt. These cold waters support penguins* (**right**) *also named for him.*

shy youth who would become liberator of the South American countries Humboldt had traveled. Among the small were many aspiring scientists and landscape painters—especially those bound for the Americas. Charles Darwin credited Humboldt, "the greatest scientific traveler who ever lived," with shaping the course of his life.

To Humboldt a blank space on the world map was more tempting than a siren. He was preparing to travel to Siberia and Tibet for the Russian tsar when Napoleon once more foiled him by invading Russia. A project for Himalayan exploration was turned down by the British East India Company, which had little stomach for the meddlesome Prussian who openly espoused self-rule in the Americas.

And so Humboldt stayed 23 years in Paris, with trips to Vesuvius, London, and only when need be to Berlin—a city he still considered boorish. But when his inheritance melted away in the heat of his activities, he had to move to Berlin, where he lived most of his 32 remaining years. He served as court chamberlain—the king of Prussia's personal sage.

THE DREAM of a journey to Asia came true in 1829. The tsar sent the now white-haired baron across Russia to survey mines. During the lavish nine-month, 11,500-mile expedition, Humboldt and two scientist colleagues made 53 river crossings and exhausted 12,244 coach horses. The most important result of the journey was the formation of an international group for magnetic studies, the first worldwide organization for the study of earth sciences.

Back at the reactionary Prussian court Humboldt was shunned by almost all but the king as a liberal, a prattling old man.

Since his early 20s he had worried about aging prematurely from exertion, and by 60 was calling himself an "antediluvian" fossil. Yet he was in his mid-60s when he began to carry out his lifelong "crazy notion to depict in a single work the entire material universe . . . from the nebulae to mosses." He named it *Cosmos*, after the ancient Greek concept of an orderly universe—as opposed to *chaos*.

Cosmos was the gift of perhaps the last great generalist to a new age of specialists.

I find it hard to read. It rambles on with an outpouring of the baron's views of tropical foliage, racial equality, seismic waves. . . . New learning was rushing past the old man so fast that he kept sending drafts of his nightlong writings to dozens of consultants, encouraging them to hurry with scientific updates, since "death rides a swift horse."

DEATH had been ruffling his coattails for half a century. Yet the swift rider did not overtake Alexander von Humboldt until he was 89 and working on the fifth volume of the massive *Cosmos*. That was in 1859, the year Charles Darwin published *The Origin of Species* and Louis Pasteur was developing the germ theory of disease.

Many nations held a Humboldt centenary on September 14, 1869. A statue was unveiled before a crowd of 25,000 in New York City, and orators extolled his deeds in Boston. A celebration in Dubuque, a Mississippi River town in Iowa that did not even exist until the baron was 63, attracted visitors that must have doubled the population that day. A parade that stretched two miles was led by a wagon exhibiting the baron's bust and carriages full of young women dressed to represent the 37 states. Then came hundreds of floats and marching units of stalwarts such as butchers, barbers, brewers, cigar makers, ice makers, stonemasons chiseling grave markers, a man 103 years old, and even some bears both alive and stuffed. Banners praised Humboldt, The Observer and Expounder of the Mysteries of Nature.

An orator in Peoria, Illinois, said, "We associate the name of Humboldt with oceans, continents, mountains. . . . and with every star glittering in the immensity of space."

And so do I, at the end of my long journey following Humboldt's way. One night on the Orinoco I gazed at Alpha Crucis, to Humboldt "the beautiful star at the foot of the Southern Cross." I imagined Alexander measuring its altitude with his sextant. At his side, Aimé Bonpland held a flame to note the exact time on their treasured chronometer at the instant Humboldt called, "Mark!"

But all I could really hear was the only music Alexander von Humboldt ever loved: the night calls of unseen creatures in the tropical forest. □

Lethal game *between Amazonian denizens ended with the jaguar a victor and the caiman a meal. Humboldt would have made meticulous notes on the*

encounter as he did on such subjects as why stars twinkle and the quality of colonial butter. A transitional figure, he stood between the traditions of earlier armchair naturalists and later academic specialists. Though his fame has waned—he made no single great discovery—Humboldt remains a model for scientists in the field.

***Lightning crackles** and the wind whips wheat heavy with the promise of rich harvest. The flourishing hard red winter grain, planted here by Mennonites who emigrated from Europe in the 1870s, has boosted Kansas to the premier wheat-growing state. Far from an agrarian backwater, Kansas also builds more than half the world's general aviation aircraft, draws international acclaim in mental health treatment, and has given the nation notable politicians.*

HOME

By CLIFF TARPY
NATIONAL GEOGRAPHIC EDITORIAL STAFF

Photographs by
COTTON COULSON

THE STATE OF KANSAS cultivates many things, not the least of them thick hides, patience, and a sense of humor. If you were born and raised there, as I was, you need these qualities. When you come from Kansas, you get used to a polite, uncertain stare, an Easterner's story about that endless drive to Colorado—and, of course, a little joke about Dorothy and the Wizard of Oz.

Whenever I chance upon fellow Kansans

TO KANSAS

anywhere, I sense a deep kinship born of that levity but underpinned by a kind of stubborn pride I think ripens only under prairie skies. What, we wonder, do others really know about Kansas?

More to the point, which Kansas? Can you lump the coal mines, hickory groves, and the Ozark Plateau of the far southeast with the sagebrush and sunflowers around the Cimarron River? Do cottonwoods whispering in ravines befit the image of Kansas and its golden oceans of wheat? Do the steep bluffs of the northeast or clusters of slowly bobbing oil wells belong with the rolling majesty of the Flint Hills and their riotous spangles of wildflowers?

As a youth building grain silos, I was baked brown by the generous Kansas sunshine and whipped by the prairie winds. I've witnessed the grandeur of an afternoon storm, the sultry air hanging beneath a glowering purple sky that spits devil's forks

of lightning, holds its breath, then sends its thunderous voice rolling over the plain. I've curled up under a metal-frame bed in a basement for shelter as a nighttime tornado roared overhead, ripping bricks from the chimney. But also have I awakened to strangely silent Kansas mornings, bitter cold and silver white, the ice-glazed boughs of elms hanging brilliant and motionless above billows of snow that muffle shouts and laughter.

I have swum in enough of her lakes, fished enough streams, and climbed enough hills to assure you that Kansas is not as flat and dry as a pool table, though often as green.

I remember my first exhilarating ride on a horse, my cousin Jon's dapple gray named Tony. At night I have walked fields redolent of sweet, fresh-cut alfalfa beneath an inky sky whose only cloud was the Milky Way. And I recall my uncle's booming voice, talking of the Dust Bowl years when he toiled an 18-hour day for about 50 cents.

THAT'S KANSAS. Fertile, unpredictable, and volatile. On a sunny morning last March, Kansas showed its paradoxical nature in the state capital of Topeka. While the perfect spring weather was a boon to farmers, it also held down attendance at a gathering organized to help their cause. In this bastion of individualism, members of the Kansas Coalition of Farmers and Labor stood shoulder to shoulder, protesting the plight of American agriculture (page 362).

After steady growth through the 1970s, land values were dropping and farm income was down, but the bills kept mounting. Farm foreclosures were rising, and even the banks were showing signs of trouble.

"We came here today to deliver a message," Flint Hills farmer Stephen C. Anderson told the crowd of more than 500. Wearing overalls, a red cap, and plaid shirt, he drew a cheer when he shouted: "The ripple of farm foreclosures will turn into a tidal wave that will destroy America."

Governor John Carlin had proclaimed this Kansas Rural Crisis Day. From the capitol steps he told of efforts to get state funds to reduce farm-loan interest rates and joined in a plea for federal help: "This rally won't mean a damn thing unless we get action!"

Keeping things neat, *Orie Heinold helps out during a visit to his relatives in Lawrence. Founded in 1854 by*

abolitionists, Lawrence was torched by Quantrill's Confederate raiders in 1863. In the TV movie The Day After, *this progressive town suffered a nuclear holocaust, prompting impassioned debate in the home of the University of Kansas.*

Two days earlier Flint Hills rancher Ken Horton saw the beginning of the end of his days as a family farmer. A crowd of 400 milled about, bidding on tractors, a combine, discs, and other equipment that sold for about half their worth.

"It's always been a gamble," he told me. "You have a bad year, but you think you'll make it back and you go at it again. You finally get to where your banker shuts you down, and rightfully so. They can't carry you forever.

"I'll soon be 51, and I've farmed since I was a kid. I won't say I've worked 30 years for nothing, but close to it. I'm sad, but I'm not bitter. Nobody made me do it."

THROUGHOUT WEEKS of travel crisscrossing the state, I saw plenty of evidence of prosperity, but mostly among the considerable urban population. In rural Kansas, so vulnerable to nature and the fluctuations of the marketplace, fears of a depression are quick to surface.

I heard more strong talk from former Governor Alfred M. Landon, a man who reaped his own bitter harvest in the Great Depression—his loss to President Franklin D. Roosevelt in the 1936 election.

"I took the farmers through the drought and the dust storms," he told me. With violence breaking out in surrounding states, Landon said, he once stopped a foreclosure sale by telling a banker he was prepared to send the sheriff.

"If he can't handle it, I'll send in the troops," Landon recalled saying. "I asked him, 'Is that worth it to you?' "

He sat in an overstuffed chair in his spacious book-lined study. Relaxing in a canary yellow cardigan, he had just returned from the first of his two daily walks: "I'm 97 years old and enjoying life. I walk a mile every day. Have for the past 15 years."

Roosevelt's victory was so great that Landon failed even to carry his home state. (Kansas claimed its first President 16 years later with the election of Dwight D. Eisenhower.) But Landon has no regrets about running, and his interest remains keen in current Washington goings-on. And in the career of his daughter, Nancy Landon Kassebaum. She recently won reelection to a second term in the U. S. Senate.

KANSAS

THIS FRUITFUL LAND owes its past bounty to rich soil and ample groundwater. But the Ogallala aquifer in the west is dropping, and farmers are in trouble.

The Flint Hills and other rolling sections belie Kansas' image as tabletop flat. Once threaded by trails west, the state now boasts one of the most extensive road systems in the nation (see **The Making of America: Central Plains**, a supplement to this issue).

AREA: 82,264 sq. mi. **POPULATION:** 2,438,000. **MAJOR CITIES:** Wichita, 288,000, Kansas City, 162,000, Topeka (capital), 120,000. **INDUSTRY:** Aircraft, petroleum refining, and meat products. **AGRICULTURE:** Livestock and dairying, wheat, hay, sorghum, corn.

NEBRASKA

Geographic center of conterminous U.S.

Lebanon

Hays

Russell

Salina

Lincoln

Hastings

Republican

Concordia

Nicodemus

Solomon

Smoky Hill

Saline

Ellsworth

Junction City

Manhattan

FORT RILEY

Abilene

Kansas

Topeka

Marysville

OREGON TRAIL

POTAWATOMI INDIAN RESERVATION

PONY EXPRESS

CORN

Hiawatha

Atchison

FORT LEAVENWORTH

Leavenworth

Oskaloosa

Lawrence

Kansas City

Overland Park

Missouri

Kansas City

Great Bend

McPherson

Lindsborg

SANTA FE TRAIL

Arkansas

Hutchinson

Newton

CHISHOLM TRAIL

Cassoday

Emporia

Ottawa

Marais des Cygnes

Yoder

Wichita

El Dorado

Augusta

Derby

Haysville

Pratt

Medicine Lodge

Danville

Argonia

Wellington

Winfield

Arkansas City

Independence

Coffeyville

Iola

Fall Scott

Chanute

Pittsburg

Parsons

COAL

CEMENT

PRAIRIE HAY

BEEF CATTLE

WHEAT

OIL

SALT

FOOD PROCESSING

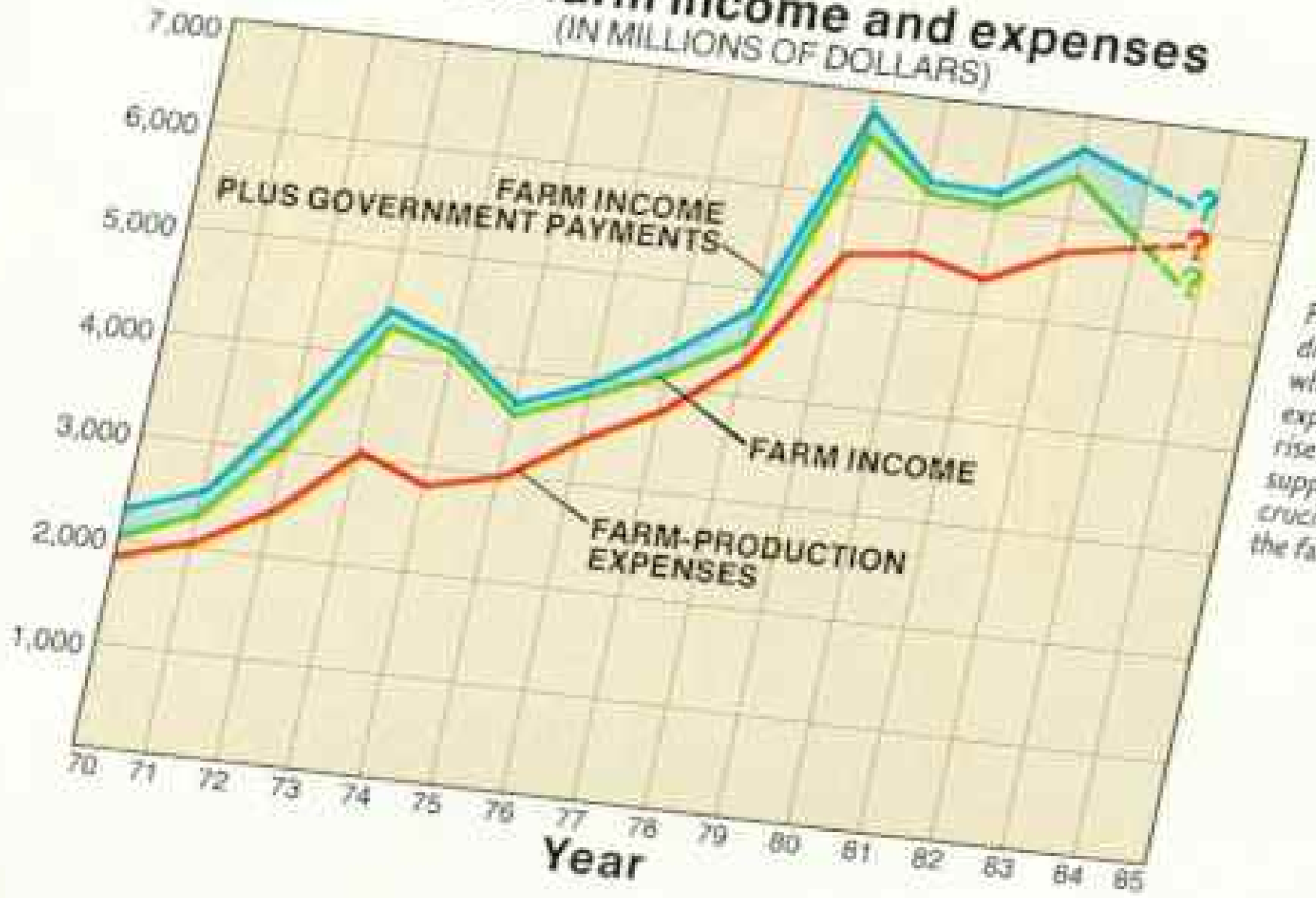
AIRCRAFT, PETROLEUM REFINING, FOOD PROCESSING, RECREATION EQUIPMENT

OKLAHOMA

MISSOURI

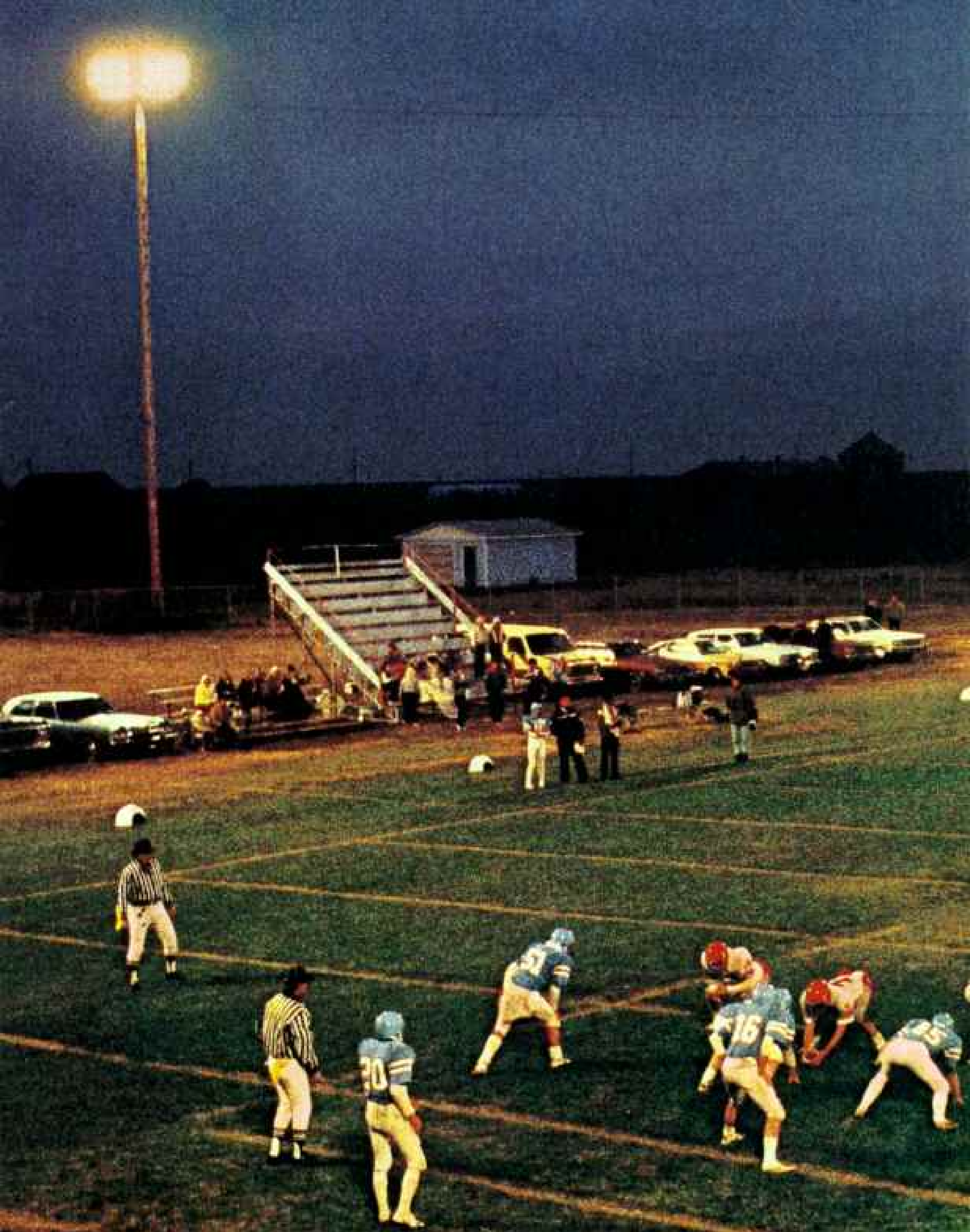
Kansas farm income and expenses

(IN MILLIONS OF DOLLARS)



FARM INCOME dropped in 1983, while production expenses continued to rise. Government support has been crucial in keeping the farmers afloat.

NGS CARTOGRAPHIC DIVISION
DESIGN: NANCY SCHWEICKART
PRODUCTION: JAMES E. MCCLELLAND
RESEARCH: DOROTHY A. NICHOLSON, WILLIAM C. BLEWETT



BOTH TEAMS *down by three, Winona's blue-shirted Vikings meet the Tribune Jackrabbits in eight-man football. Some rural high schools are too small to field 11-member squads—or even to fill the stands on frigid nights when some fans watch from their cars.*

Grand old tradition: *Republican U. S. Senator Nancy Landon Kassebaum campaigns at a ranch outside Wichita* ***(right)****. Playing on the image of Dorothy in the Wizard of Oz, she once regaled a National Press Club audience by gazing about and saying, "Toto, I don't think we're in Kansas anymore." Her father, former Governor Alfred M. Landon* ***(below)****, led the GOP ticket in 1936. At 97, he is the dean of Kansas politicians.*

Landon embodies a spirit and awareness typically Kansan, qualities I found reflected in his daughter.

"We have an extraordinary history, conditioned by our role before the Civil War, when Kansas was fighting against becoming a slave state," she told me in her Capitol Hill office. "It's a very independent sort of state.

"The populist movement began in Kansas. We had the first all-woman city council in the United States, in Oskaloosa, and the first woman mayor, in Argonia. I've always felt that this is a tradition of the pioneer spirit. People in Kansas are willing to stand up and take risks."

Perhaps Senator Kassebaum's entry into politics was inevitable. "As a girl, my bedroom was right over the library," she confided with a smile. "Through the heating vent, I could hear all the discussions of the machinations of politics and the campaigns."

WHILE DRIVING Interstate 70 for 425 miles between Kansas City and the Colorado border, you can take in a spectacular sunset and rest

assured that this is indeed the Wheat State. Yes, Kansas still ranks first in wheat growing, though cattlemen claim an even bigger segment of the economy, placing Kansas among the top three beef-producing states. Yet Kansas factories, not farms, today generate more income.

If you've ridden in a light airplane, chances are better than even that it was built in Kansas; my hometown of Wichita turns out more than half the world's general aviation aircraft, and Kansas City, Kansas, ranks high in automaking. The Hugoton natural gas field is one of the largest in the world. Kansas ranks eighth in the U. S. in crude-oil production and third in oil and gas wells drilled.

The state ranks remarkably high in familiar names and faces too: To the list of presidential aspirants, add Colorado Senator Gary Hart (born and raised in Ottawa) and Kassebaum's partner in the Senate, Robert J. Dole, who rules as majority leader. Lee Iacocca may run the Chrysler Corporation, but it was founded by Walter Chrysler, born in Wamego. And Amelia Earhart of

Atchison achieved immortality in aviation.

Pulitzer Prize-winners? *Emporia Gazette* editor William Allen White, playwright William Inge *(Picnic)*, photographer Brian Lanker, and the *Hutchinson News* for combating the "one cow, one vote" rural-dominated state legislature. Athletes? Pitching great Walter "Big Train" Johnson, milers Glenn Cunningham and Jim Ryun, and a diesel-powered running back named John Riggins of the University of Kansas and the Washington Redskins.

The infamous left their marks too: gangster Alvin "Creepy" Karpis, the Dalton brothers of Coffeyville, and, before them, gunfighters whose blood stained the dusty streets of Abilene, Wichita, and Dodge City. In the bad and bawdy days, fame came to Bat Masterson, Doc Holliday, Wyatt Earp, Buffalo Bill Cody, Wild Bill Hickok—and later to Carry Nation, chopping up saloons with a hatchet in furies of prohibitionist zeal that she called "hatchetation."

Today the faces of Kansas vary as much as the landscape: the descendants of Swedish immigrants who maintain their ethnic culture in Lindsborg; the beards, wide-brimmed hats, and plain dress of the Old Order Amish around Yoder; Indians on the Potawatomi reservation; Italians and East Europeans in the "Balkans" of the state's southeastern corner.

GEORGE OLSON

Angry, vocal, *and fearful of losing their land, more than 500 Kansas farmers gathered last March in front of the state capitol in Topeka to demand an end to foreclosures—currently threatening 5 percent of the state's 74,000 farms.*

One sign pungently appraises the Reagan Administration's effort to slash federal farm support by 60 percent over five years; another suggests a solution for that plan's chief supporter.

BUT THE MOST FAMILIAR face—creased and, more often than not, concerned—is that of the farmer. In a wheat field early one July morning, Don Crane grabbed a handful of grain off a stalk and rolled it in his hands. A compact man with dark, wiry hair, he peered at the small wheat berries.

"We call this hand threshing, so you can look at what you've got. Look—you can't even feel the weight. It was shriveled by the hot wind, and it caught a little hail."

In another, more sheltered part of the field, his face brightened. "This is decent wheat. The heads are hanging, which means the berries are heavy. That's good-quality wheat."

The day broke hot and dry, prime harvesting weather. We climbed into the combine, and Don revved the engine and turned on the air conditioner. Soon we were lumbering through the fields at five miles an hour. Below me the 24-foot paddle reel above the sickle fed the wheat stalks to the auger, which pulled the grain and threshed it into a bin behind our heads.

"Could I take the wheel?" I asked.

"Sure."

Nothing to it, I thought—until I glanced behind. I had left a swath of standing grain. Don laughed. "We call those ducktails.

Don't worry, I do it myself. We'll just turn around here and pick it up."

A hawk darted up, frightened, and dropped its breakfast, a young rabbit.

"He'll go back and pick it up," Don said. "They follow us along, hoping we'll flush out rabbits or field mice. In tall wheat you'll even find a deer or two." Before the long day was over, I spotted doves, redbirds, and plenty of western meadowlarks, the state bird.

We ate lunch in the field, and that afternoon, riding an older, open combine, I tasted dust and wiped the chaff from my sunburned neck before we trucked the last load to a nearby co-op elevator.

By now the flow of wheat from fields throughout Kansas was becoming a torrent. I followed it to Hutchinson, where I climbed on a vertical conveyer and rose 127 feet to the enclosed roof of one of the world's longest grain elevators. It stretches just 67 feet short of half a mile. Below, a line of railroad hopper cars dumped the grain into a pit; conveyer belts sped it along to the proper bin at the top.

"We usually use bicycles up here," said manager Ed Sorenson as we walked beside a fast-moving belt heaped with grain. "We'll load a 120-unit train to Galveston tomorrow. From there it may go to Russia or China. This is all hard red winter wheat, the best baking wheat you can find."

THINGS WERE HEATING UP back in Dodge. At high noon three mangy buffalo hunters grabbed a girl and burst out of the saloon. But there stood the sheriff and his deputy. "You boys have done worn out your welcome," he growled. The six-shooters flared; gunsmoke drifted toward the somber sky. Now, three outlaws sprawled lifeless on Front Street.

But before the varmints could be dragged off to Boot Hill, they up and dusted themselves off. The clicking of tourists' cameras turned to polite applause. Photographer Cotton Coulson and I joined a crowd queuing up for buffalo burgers. Welcome to Dodge City, folks—Hollywood style.

Throughout the summer more than a thousand visitors a day stream into this western Kansas town. Drawn by an endless fascination with the Old West, they visit the Boot Hill Museum and stroll by the general store, the dry-goods shop, and the Long Branch Saloon—all re-creations of Dodge in its hell-raising days of the 1870s and 1880s.

The showdown on Front Street drew scant notice from the heavy traffic on nearby Wyatt Earp Boulevard. The days of the cattle drives from Texas are long gone, but Dodge City is still very much a cattle town. With a population of 20,000, it serves as a

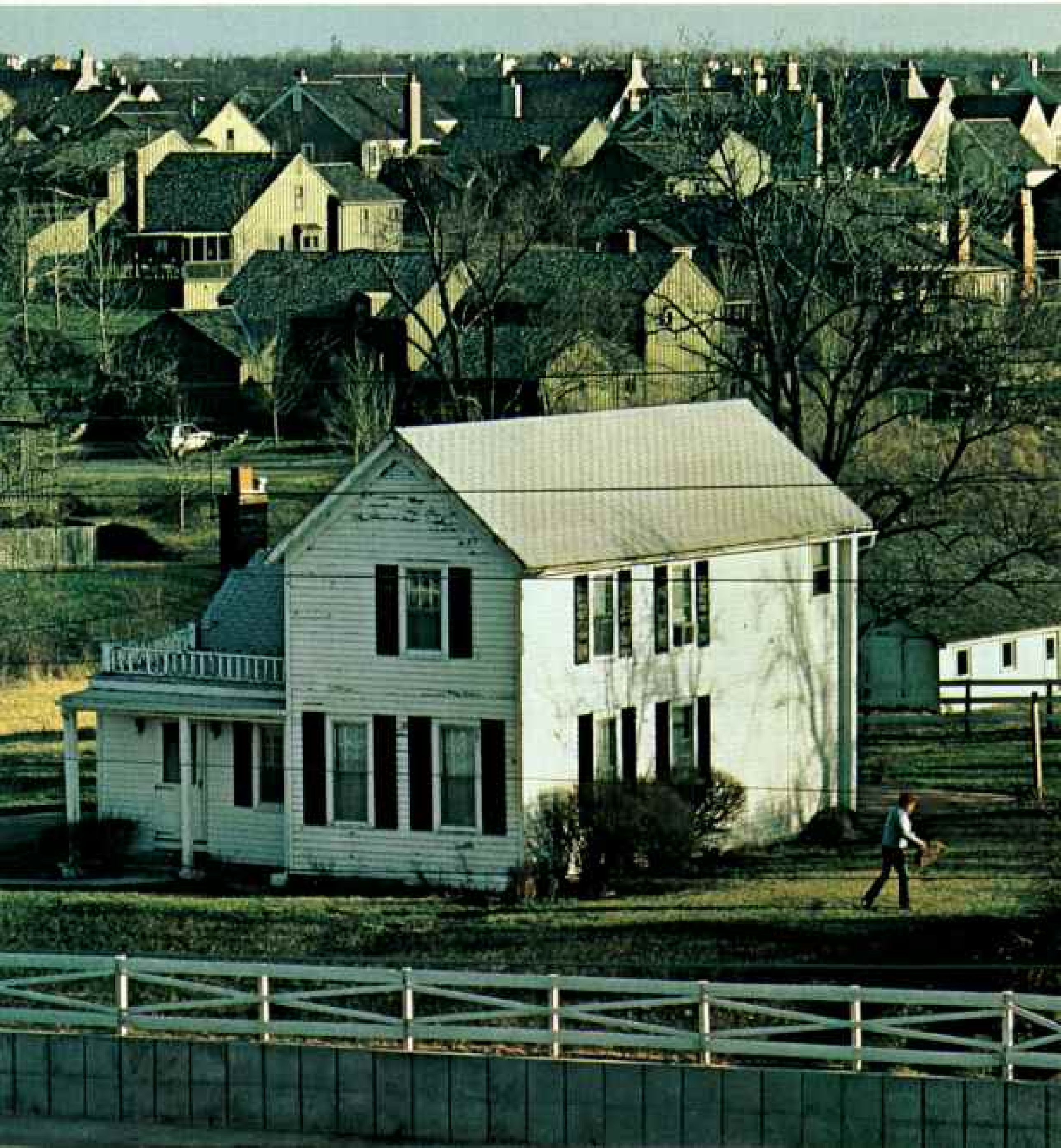
Tale of the tape *gets grimmer each year, particularly in the dry regions of western Kansas where irrigation depends mainly on the groundwater of the Ogallala aquifer. At Colby agricultural engineer Freddie Lamm holds a 300-foot steel tape read by groundwater-management chief Wayne Bossert. Some officials estimate that the aquifer will remain an irrigation source for only another 20 to 30 years unless steps are taken to increase conservation.*

commercial hub of southwestern Kansas, boasting the state's largest livestock auction and supplying feed and materials for the state's growing beef industry.

FIFTY MILES west of Dodge, high-pitched whistles from men on horseback blended to almost a keening sound above the bellowing of the confused cattle. Black Angus, Charolais, and white-faced Herefords moved protesting through a horseshoe-shaped chute. They plunged over their heads into a pungent chemical bath and emerged complaining on the other side.

"They either slide in or dive in and get totally covered," Stan Fansher told me as we leaned against a fence. Providing this protection from ticks and other vermin is only part of a day's work outside of Garden City at Brookover Feed Yards, founded by Earl Brookover, who helped pioneer the feedlot business. After grazing on rangeland, cattle are grain-fattened in pens for the final four and a half months of their lives.

"A cowboy rides each pen every day," Fansher told me. "They go in to check for cripples or sick cattle. Or to see if a heifer's trying to have a calf."



Wearing a straw cowboy hat, Fansher led me through the noisy feed-mixing building, where computers dictate the mix of milo, wheat, corn, and other grains with vitamins and nutrients. In the veterinary building, workers gave immunization shots and neutered young bulls; their bellowing competed with a radio blaring songs of lonesome truckers and love gone wrong.

Brookover feeds close to 40,000 cattle, and each animal puts on about three pounds a day. "Mr. Brookover started all this 34 years ago when the closest packinghouses were in Kansas City, Oklahoma City, and Denver," Fansher said. "But as soon as you get an animal out of the pen, he starts shrinking. The farther you ship, the more chance of shrinking and bruising."

Nowadays it's only a ten-minute drive to the world's largest beef packinghouse—IBP, Inc., at Holcomb, Kansas. When I arrived, I was handed a white smock and a hard hat. "Ever toured a packing plant before?" one brawny worker asked me. When I told him no, he grinned and chuckled. "You're in for a real treat."

From the holding pens I walked up a long incline with

(Continued on page 370)

BOTH BY GEORGE OLSON

On the road again, *jogger Janet Hyde and her German shepherd, Maxie* ***(above)****, exercise in Mission Hills. One of the most affluent communities in the nation, it lies just across the state line from Kansas City, Missouri, the larger of the two cities that bear the name.*

But the Kansas side is booming, and many firms are jumping the state line, lured by Kansas' right-to-work law and the prospect of offices closer to home. Less than ten years ago cattle roamed the ten acres surrounding this farmhouse ***(left)*** *in Johnson County, fastest growing region in the metropolitan area. Now a new office park is taking its place.*

GEORGE OLSON (ABOVE AND BOTTOM LEFT)

Signs of humor, *some with a serious point, catch the eye along Kansas roads. Red reflectors and authentic shield lend an air of realism to a two-dimensional police car in Hedville. Skid marks attest its effectiveness on a stretch once noted for speeders.*

A full-size fiberglass Holstein announces the DeVore Ranch near Cassoday.

One resident of Midland leaves no doubt about his opinion of junk mail.

A warning, tacked up by a farmer near Dodge City, tickled his wife so much that she replaced it at least once.


Caution
Irritable
Farmwife
51

Baseball, weather, *and endless musings about farming are roundtable subjects at C & R Supply, a hardware store in Lebanon. The men head home at noon for dinner;*

GEORGE OLSON

women gather here in the afternoon. Coffee is a quarter, paid on the honor system. "We make more selling coffee than we do hardware," says clerk Ruth Obert.

Milford Gran, IBP's slaughter superintendent. On the other side of a restraining wall the wild-eyed cattle moved with us, herded from behind. At the top a worker placed a 14-inch cylinder against a steer's head and fired a two-inch retractable rod into its skull, a method considered quick and humane. The 1,200-pound animal dropped like a stone.

Beyond lay a clean, impressively efficient assembly line in reverse. I watched as workers—some of them Vietnamese—swiftly dismantled carcasses, boning a chuck roast in less than three minutes. By boxing its product, IBP targets its sales to regional tastes, even shipping the tendons to Japan, where they're sliced thin, skewered, and barbecued as a delicacy.

"People get into wild arguments about the best way to cut meat and what to call it," Don Jefferson said as he guided me through a cavernous refrigerated warehouse. "'Club steak' is the most abused term in the world. It's like a house wine; it can be anything."

MOST OF KANSAS CITY'S meat-processing plants have moved west, but the stockyards that straddle the Kansas-Missouri border still handle nearly half a million animals annually, largely cattle and hogs.

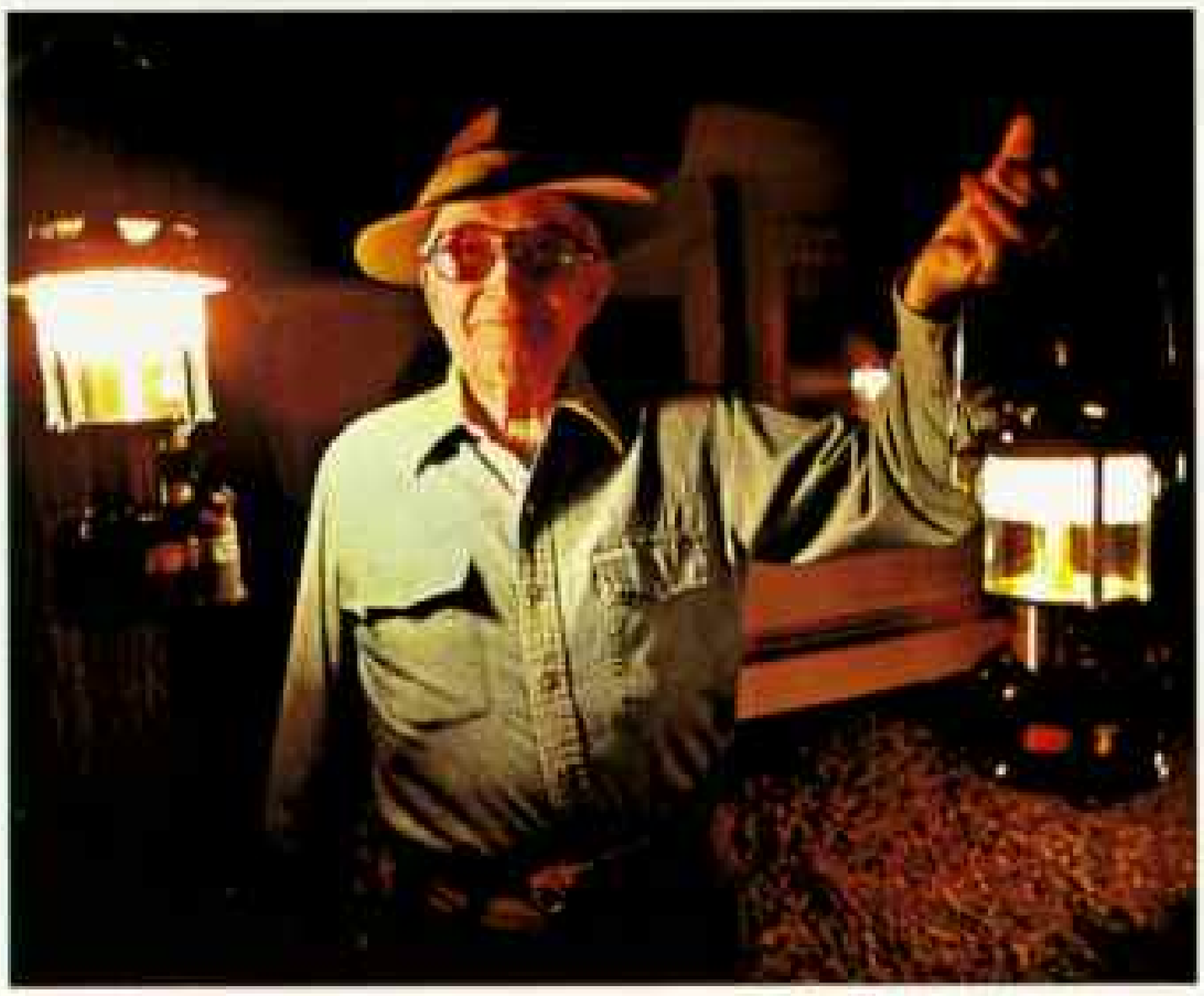
City with a hard hat, Kansas City, Kansas, also embraces towering grain elevators, miles of rail yards, and a gigantic General Motors assembly plant. At a new 750-million-dollar GM facility now under construction, robots will help produce a new line of front-wheel-drive autos.

But not everything is up to date in Kansas City, as I discovered on Strawberry Hill. Overlooking the Kansas River, this neighborhood of small, well-kept homes is dominated by the spires of churches serving the Croatian and German communities that helped build Kansas' namesake city.

"I was born on the hill, and this is still my home in many ways," artist Marijana Grisnik told me one bright February morning as we walked past her old church, St. John the Baptist. The chill air discouraged backyard kibitzing over stone walls, some dating from the 1890s. Though she no longer lives on the hill, Marijana helps preserve its heritage with her simple, unaffected paintings. Some

As big as his wit, *this giant portrait of Will Rogers, an Oklahoman, is the work of Lawrence muralist Stan Herd.*

Persuading a farmer friend near Dodge City to donate a 160-acre field, Herd first plowed the contours of the face, then had wheat and milo planted for shading. The finished picture is a favorite of airline pilots and passengers.



GEORGE OLSON

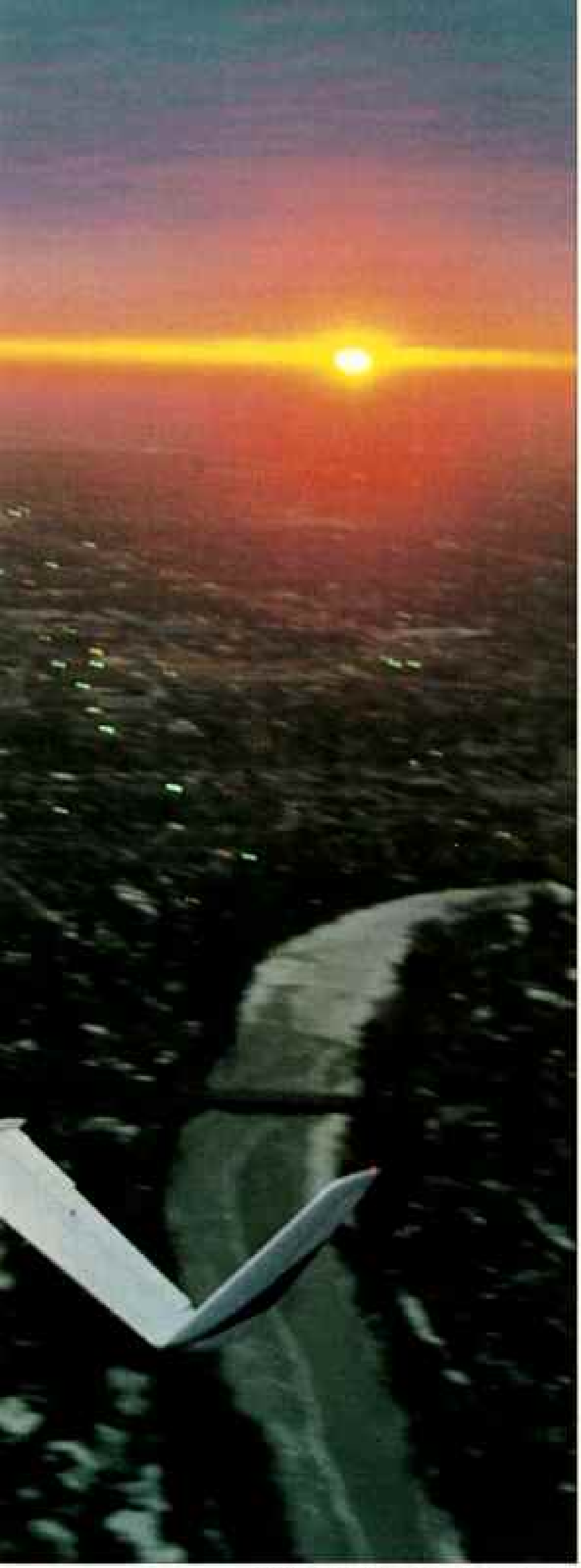
Entrepreneurs make it big *in the heartland. Lighting the wilderness, the Coleman lantern was developed in Wichita by the father of Sheldon Coleman (**top**), 83-year-old company head. Coleman has now diversified into a range of camping equipment, water skis, catamarans, and other outdoor gear.*

*A $200 advertisement in the Kansas City Star turned Henry and Richard Bloch from a small accounting firm into the world's largest tax-preparation company—H & R Bloch. Collectors of French Impressionists, Henry and Marion Bloch (**above**) are framed by a van Gogh, left, and a Gauguin in their Mission Hills home.*

*An airborne art gallery adorns the private jet of Wichitans George and Virginia Ablah (**right**). The real estate magnate and his wife own the largest Henry Moore sculpture collection in the world, numbering more than 100 pieces.*

Catering to Wichita's love of the arts, the Fourth National Bank hangs an Alexander Calder mobile in its atrium lobby. The financial climate of Kansas' largest city soars up or down on the health of its aircraft industry, which employs some 34,000.

Starship 1, *Beech Aircraft's bid to set tomorrow's standard for corporate aviation, sweeps over Wichita. The three-million-dollar aircraft, with small wings at the nose for stability and jetprop engines for fuel economy, will be available in 1987. Also headquarters for*



COTTON COULSON WITH LARRY D. KINNEY, MSS STAFF

Cessna, Learjet, and Boeing's military division, Wichita claims the title of Air Capital of the World.

term her style "naive." Marijana calls it "memory painting." Whatever the label, her works delight the eye with their Croatian flavor of life on the hill as it once was —women carrying bundles of grain on their heads, men playing pinochle, a traveling vendor called Harry the Huckster, and youngsters in bright Croatian dress stepping to the sounds of stringed tamburitzas.

The music and dancing still bind together this intensely proud neighborhood, but Strawberry Hill feels the growing pains of the metropolitan area. Interstate 70 took a hundred homes when it was carved along the riverside bluffs. Down the hill, developer R. G. Cotitta tries to reverse the decline of the downtown area.

Kansas City, Kansas, part of a metropolitan area of 1.5 million residents spread over ten counties in two states, has long been overshadowed by its bigger neighbor across the river, Kansas City, Missouri. Cotitta's Capital Development Corporation has embarked on the third phase of its Renaissance Center Project: the creation of prime office space by removal or renovation of old buildings along Minnesota Avenue.

"Urban renewal came in here and improved the streets, put in new lighting, created parking space, and developed a new city hall and convention center," Cotitta told me as we strolled by a storefront being gutted by workmen. Several of his buildings are already occupied and Cotitta is optimistic, declaring: "The reversal of the decline of downtown is well under way."

NO SUCH EFFORTS are needed just south of the city limits. There, where blue-collar Wyandotte County meets decidedly white-collar Johnson County, Greater Kansas City's boomtown, the challenge is to keep up with the breakneck growth. Along College Boulevard in Overland Park, six million square feet of prime office space has been developed over the past decade. Forty of the Fortune 500 corporations maintain offices in sleek office parks with names such as Corporate Woods and Executive Hills.

Boosters declare there's no end in sight to the dizzying growth of Johnson County.

"I hate to say it because we live here, but this is the finest residential area in the

country," Henry Bloch told me in his colonial-style mansion in Mission Hills.

Nearly 40 years ago Henry and brother Richard began doing tax returns as a routine service for clients of their accounting firm. Now H & R Block (the spelling was changed for simplicity) runs a tax-preparation chain with 8,000 outlets in 14 countries.

"People have a terrible impression of Kansas," Bloch said. "There's not much understanding of this area, especially in the East. Greater Kansas City is the perfect-size city. It's got major-league sports, the ballet, the symphony. Once people get transferred here, they don't want to leave."

WHEN I WAS a wire-service reporter in Kansas City, I, like Bloch, joined thousands who commuted daily from Kansas to Missouri. Though I've always felt a bit indignant that the largest city bearing the name of Kansas lies in another state, Bloch feels Kansas Citians identify with the metropolitan area as a whole: "The only divided loyalty I see is among the people who went to the University of Missouri or the University of Kansas."

Though the main campus lies 35 miles to the west, KU is very much a part of the Kansas City community. Spread over 50 acres, the KU Medical Center cares for 17,000 patients and 300,000 outpatients a year.

At the university's main campus in Lawrence, buff-colored buildings of limestone stand against green hills and trees, earning the school its reputation as one of the nation's most attractive. Here Dan Reeder of the alumni association warmed to his favorite subject:

"The William Allen White School of Journalism is among the best in the nation," he told me over lunch in the alumni-center building. "We're also excellent in architecture, chemistry, pharmacy, clinical psychology, child-development research, engineering, philosophy, and fine arts."

The school's art museum is known for its European paintings from the Renaissance through the Baroque period. The natural history museum houses an impressive panorama of North American plants and wildlife, from the tundra to Kansas' own shortgrass prairie and its buffalo, antelope, and coyotes. The Lawrence-based Kansas

Healer of minds, *Dr. Karl Menninger still lends a helping hand at age 92* ***(below)****. Here he attends a birthday party at a home for troubled youths, a special interest of the chairman of the famed Menninger Foundation of Topeka.*

Sixty years ago, Dr. C. F. Menninger and two sons, Karl and William, established the Menninger Clinic to treat the mentally ill in a total caring environment. Today facilities spread over 310 acres, dominated by the Tower Building ***(right)****, an administrative center resembling Philadelphia's Independence Hall.*

Grassroots Art Association celebrates the state's rich legacy of folk art at a museum just south of town.

Track-and-field athletes from throughout the nation gather in Lawrence each year for the Kansas Relays. But what really gets this college town's blood pumping is basketball—for good reason. It's an 87-year-old tradition. The game's inventor, James A. Naismith, called the father of basketball, coached here for nine years around the turn of the century. And one of his students, the legendary Forrest C. "Phog" Allen, became known as the father of basketball coaching by rolling up a 590 to 219 win-loss record during his 39 years at KU. As a young man umpiring baseball, Allen was called "Foghorn" or "Fog" for his deep, resonant voice. A sportswriter's whim later made it "Phog."

Founded in 1854, Manhattan, Kansas, was named for the New York borough.

Nowadays billboards at the edge of town good-humoredly welcome you to the "Little Apple." Manhattan cultivates its own international renown as a center for agricultural studies. In the laboratory of Kansas State University's Department of Plant Pathology I found geneticist Bikram Gill, a native of India, cupping a small flowerpot in his hand. It sprouted a tuft of thin green shoots not more than two inches high, offspring of a marriage of domestic wheat and wild grass.

"We grow 20,000 plants a year and keep a pedigree on each one," Gill told me. "Work has gone on for 30 years on a devastating disease called wheat-streak mosaic, which can wipe out a whole crop."

When German-Russian Mennonites migrated from the Ukraine and other regions in the late 19th century, they brought their finest grain seed. "It was a hard winter wheat that adapts well to harsh cold winters," Gill said. "It was the perfect wheat for this area. Our job is to improve it." By transferring chromosomes, Gill seeks to imbue one strain with the characteristics of another to produce plants that resist disease and insects while retaining high protein content and good harvesting and milling qualities.

At the nearby veterinary medicine building Dr. David Carnahan peered through a microscope. "This is a culture medium we introduced into a cow's uterus a week after she was bred. We then flushed it out, and now we're looking for embryos." Johnny Hook, a young rancher who owned the cow, sat beside him looking downcast. Carnahan turned from the microscope. "Sorry," he told Hook. "No luck today." Hook uses the university's embryo-transplant program to improve the cattle he runs on his nearby Flint Hills ranch.

The program builds superior herds by

mating top-quality bulls and cows, then implanting the embryo in an inferior female to bear the calf. The superior cow can be bred again within two months and the process repeated, even splitting the embryos and using two recipient females. Through this superovulation approach, a prize cow can produce as many as 30 offspring a year.

MY OWN ALMA MATER, Wichita State University, is intimately involved with the surrounding metropolitan area of more than 420,000. Aeronautical engineering professor Glen Zumwalt explained to me his work with Cessna to perfect an electro-impulse system to remove ice from aircraft wings, a NASA project by a consortium of companies. Across campus, I beheld the abstract wings of birds on a huge mosaic created by famed Joan Miró for the art museum.

Students and faculty members from the music school add class to the Wichita Symphony Orchestra's performances and verve to the city's highly regarded jazz festival. Wichitans are also justly proud of the Sedgwick County Zoo, where director Ronald L. Blakely has won awards for a program of breeding rare and endangered species.

Wichita calls itself the Air Capital of the World, and with 34,000 persons employed in aviation, few challenge the claim. The Boeing Military Airplane Company modernizes U. S. Air Force bombers and tankers

It's homecoming every July in Nicodemus, an all-black community founded in the 1870s by freed slaves. One of the town's 90 residents, when asked how many of her relatives attended last year's 107th gathering, replied, "I could say 50 and not miss it by much."

and builds component assemblies for jetliners. The name Learjet has for years been almost synonymous with corporate-jet travel, and Cessna is the largest producer of general-aviation aircraft in the world.

Beech Aircraft, another Wichita manufacturer, hopes to usher in a new age of corporate aircraft design with the Starship 1. This is a startlingly different-looking craft powered by twin jetprops mounted at the rear of wings that sweep away to vertical tip sails, and stabilized with two smaller variable-sweep wings just behind the nose.

I found advanced technology flourishing also at Wichita's Institute of Logopedics, which has aided more than 50,000 persons with communications disorders. There I sat while Bob Rosov, a biomedical engineer, strapped a thick sleeve around each of my arms. Wires led to a microphone through which Rosov recited the alphabet. As he spoke, his voice transmitted vibrations to my arm, giving me a clue to the potential of this device to help the deaf communicate.

Kansas' reputation as an innovator in medicine, however, rests largely in the mental health field, with the renowned Menninger Foundation. Sprawling over a wooded hill in northwest Topeka, Menninger's seems more a campus than a hospital. Patients are housed in modern, low-slung buildings of white-painted brick, whose brightly colored interiors reflect the optimistic atmosphere the staff works to promote.

The foundation's redbrick administrative headquarters is modeled after Philadelphia's Independence Hall. Inside, a silver-haired though youthful-looking man carries on a family legacy begun by C. F. Menninger and his sons William and Karl; the latter, at age 92, still sits as chairman.

"The three of them evolved what someone once called 'a combination of Freud and friendliness,'" foundation president Roy Menninger, William's son, told me.

"In the early part of the century my grandfather attended a conference at the Mayo Clinic and was quite taken by their idea of physicians practicing together. What happened here in Topeka was a mixture of an intensive intellectual interest in the unconscious combined with a sort of prairie-based, hospitable sense of how we deal with others—a relatively uncomplicated openness," he said. "This place has been perceived as a sort of court of last resort. Patients admitted here have had, on the average, three hospitalizations."

After World War II the Veterans Administration relied on Menninger's for the training of psychiatrists to treat psychological battle scars. The center continues to be a

major training institution for psychiatry in its various specialties.

In recent years Menninger's has emphasized prevention. Troubled teenagers live in family-like homes with trained counselors as house parents. The Will Menninger Center for Applied Behavioral Sciences offers alternatives to medication, such as biofeedback to reduce anxieties as part of seminars for executives on managing stress.

THE NAME TOPEKA was etched in civil rights history when the U. S. Supreme Court struck down school segregation in a case known as *Brown* v. *Board of Education of Topeka*. That landmark ruling came in 1954, a century after Topeka's founding by nine antislavery settlers. Inside the capitol building, I viewed a famous John Steuart Curry mural showing abolitionist John Brown towering above a Civil War battlefield clutching a Bible in one hand, a rifle in the other. With eyes wild and beard flowing, beneath a stormy sky, Brown represents a flash point in the long and often violent history of Kansas.

Less than half a century after Columbus reached the New World, the promise of fortune stirred a young Spaniard named Francisco Vásquez de Coronado. In 1540 he and 300 soldiers set forth from western Mexico in search of the Seven Cities of Cíbola, whose streets were said to be paved with gold. An Indian slave told them of riches far to the northeast in a land called Quivira.

Now called Kansas, the land was the domain of the Plains Indians, among them the Pawnee, Kansa, Osage, and Wichita. Coronado pushed on as far as a point now called Coronado Heights in the center of the state and found richness not in gold but in the land. "One finds plums like those of Castile," one of his men wrote, "grapes, nuts, mulberries, rye grass, oats, pennyroyal, wild marjoram, and flax in large quantities."

The Spanish claimed the land, but fierce resistance from Plains Indians discouraged them from establishing missions. France claimed the region in 1682, and the territory was acquired by the United States as part of the Louisiana Purchase in 1803. The next year the Lewis and Clark expedition camped north of present-day Atchison on the Missouri River.

Indian trails were soon being crossed by the pioneers. Arriving by boat, they disembarked where the Missouri River makes its great turn—now the site of Kansas City—then forged westward on the Oregon Trail.

Shunning electricity, *Sam Yoder powers his drill* (**left**) *with compressed air and a diesel motor. Aided by Lonnie Miller, he fastens spokes to a hub at his buggy shop in Yoder, one of many Old Order Amish and Mennonite communities in Kansas.*

Modern technology at Kansas State University in Manhattan helps Wade Kuhlmann and Susan Dolezal test a calf for stress (**right**). *After exercising for three minutes, the calf is measured for oxygen taken in and carbon dioxide expelled. The team hopes to relate findings to respiratory disease, a factor in weight loss of cattle during shipment. Such problems have caused many packinghouses to be built close to feed yards.*

By the 1820s the Santa Fe Trail was carrying manufactured goods to Santa Fe.

The Kansas-Nebraska Act of 1854 carved out two new territories for settlement, setting the stage for the Civil War by permitting the citizenry to vote on whether to allow slavery.

In 1854 President Franklin Pierce appointed a Pennsylvania attorney named Andrew Reeder as the first territorial governor of Kansas. He was, it happens, my uncle (with several "greats" before it). Though a Democrat, Reeder was repelled by the tactics of slavery proponents and promised fair elections.

The race for Kansas was on. Over the Missouri border streamed antislavery settlers from the North and proslavery factions from the South. Both sides charged vote fraud, and it was impossible to establish a valid constitution or permanent capital. Pierce removed Reeder from office.

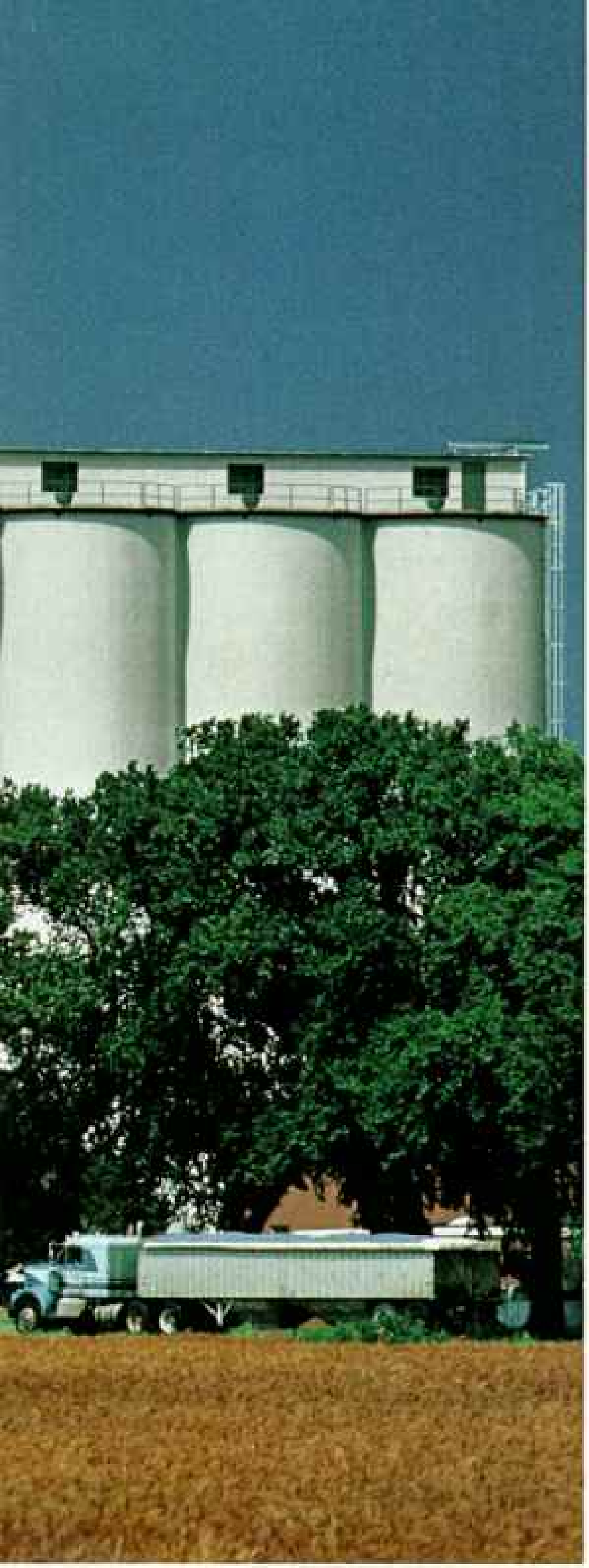
As an anxious nation watched, the Missouri border was crisscrossed by marauding raiders—Border Ruffians from Missouri, and guerrillas from Kansas who called themselves Jayhawkers. Proslavery forces sacked the town of Lawrence, a stronghold of abolitionism. In retaliation a group led by the fanatical John Brown murdered five southern settlers. These were the years of Bleeding Kansas.

One evening in 1856, the deposed Reeder got word that men were gunning for him. He rose from a chess game in Lawrence, made his way to Kansas City, disguised himself as an Irish lumberjack, and returned to his family in Pennsylvania. Legend has it that the board was left untouched until Reeder returned years later and completed the game.

THE ADMISSION OF KANSAS to the Union in 1861 as a free state did nothing to quell the violence. No band of guerrillas was as feared as the Confederate William C. Quantrill and his raiders. On August 21, 1863, Quantrill and about 300 men attacked Lawrence, leaving some 150 of its citizens dead and putting its buildings to the torch.

War's end brought an age of settlement, railroads, and cattle drives from Texas that fostered the boisterous cow towns of Kansas. The last Indian raid occurred in 1878. Today, sadly, only a few Kansa Indians, the "people of the south wind," remain in the state that bears their name. With their ancestral land in Kansas long taken, their tribal holdings lie, ironically, in Oklahoma.

Cathedrals of commerce and faith *rise above the plains near Danville, a town of 72 residents in the heart of wheat country. The 81-year-old Immaculate Conception Church counts 195 parishioners, many from surrounding farms that at harvesttime strive to fill the grain elevator with 1.6 million bushels. Such are*



the hallmarks of Kansas—"no mere geographical expression," as historian Carl Becker wrote, "but a 'state of mind,' a religion, and a philosophy in one."

I FELT more of my roots in Kansas just upriver from Kansas City, at the entrance to Fort Leavenworth, established in 1827 to protect the Santa Fe Trail. A sign tells how Governor Reeder, my distant uncle, set up his office here upon his arrival in 1854. Nearby I walked through the rolling green hills of the national cemetery, resting-place for many Indian fighters.

Leavenworth's Command and General Staff College educates promising officers from the armed services of the United States and some 50 other lands. Nearby stands the giant, silver-domed federal penitentiary.

To the west at Fort Riley, also established to guard travelers on the Santa Fe Trail, I visited the first territorial capitol, where Reeder presided. And on a muddy spring morning I rode an armored personnel carrier as it fired live ammunition in a practice maneuver. Since 1955 this has been home for the First Infantry Division, which trained here for combat in Vietnam. During World War II the celebrated unit—known as the Big Red One—became renowned for its valor in North Africa, Sicily, and on the beaches of Normandy.

As you follow the Santa Fe Trail to the south and west of Fort Riley, no cavalrymen thunder out to safeguard your passage. Historical markers are now the only sentinels. In the Cimarron National Grassland, where the trail's southern branch leaves Kansas, ranger Don Mecklenburg and I stood on a bluff overlooking the Cimarron River.

"Sometimes the trail was several wagons wide," he said in the quiet summer heat. "If you've got a real good imagination, you can still see where the ruts are."

My own imagination takes me back to a place up the trail near a landmark called Pawnee Rock, a place where my ancestors homesteaded, where my father was born in a house built with sod. Now it's only a furrowed field. But I think of the first settlers there, at night after campfire and conversation had died, beholding that brilliant prairie sky, perhaps finding comfort in a familiar constellation.

Ad Astra Per Aspera, reads the state motto: To the Stars Through Difficulties. The 34th star in the nation's flag was indeed born of difficulties, but I think that the spirit of Kansas shines the brighter for it. □

REGION IN REBELLION

ERITREA

PHOTOGRAPHS AND TEXT BY
ANTHONY SUAU
BLACK STAR

WHILE FAMINE in Ethiopia has captured worldwide attention, it has made even more obscure a long-fought but little-noticed war for independence in that country's northernmost province. After a visit to Ethiopia in 1983, I was invited by the Eritrean People's Liberation Front to come see their side of the story.

In December 1984, accompanied by four EPLF officers, I spent all night crossing the Sudanese desert by Land-Rover and, at sunrise, passed into EPLF-controlled territory. The line between rebel and government forces is a 300-kilometer (186-mile) trench, fortified with rocks, stretching through western Eritrea. Dug into the ground are sleeping, storage, and observation rooms. EPLF fighters (***right***), a third of whom are women, live in groups of 50 to 100, about an hour's walk apart. The informal uniform is rubber sandals, shorts, an earth-colored shirt, and a Kalashnikov automatic rifle.

Water and food arrive after a trip that may take two days on foot over some of Africa's roughest, most isolated terrain. Cans are used as drinking glasses until they rust away. The principal foods are lentils, goat, and a pancake bread, *injera*. Recreation is drinking *swa*, a beer made from fermented injera, and playing *dama*, a game resembling checkers.

Most days an EPLF fighter fires a few shots or plays a propaganda tape into loudspeakers. Ethiopian troops in their trenches answer with hundreds of rounds. The Eritreans crouch down, chuckling, and then settle back into silent waiting.

FINDING THEIR WAY by flashlight, EPLF fighters often use donkey caravans to carry weapons and other supplies captured from the Ethiopian Army. The Ethiopian MIGs that enjoy uncontested control over Eritrea's skies

National Geographic, September 1985

guarantee that little in Eritrea moves during daylight hours. Because this is a drought area, the caravans generate clouds of dust, and the fighters often sink up to their knees in drifts of loose dirt. They keep alert for antelope to shoot for dinner.

GEOGRAPHY DEFINES the people of Eritrea. At about 120,000 square kilometers—roughly the size of Mississippi—the region is dominated by a south-central highland with an average elevation of 2,100 meters, rising to a high point of 3,000 meters (10,000 feet). To the south are extinct volcanoes and fields of broken lava. To the west are plains, crossed by rivers with fertile lowlands. In the east, dropping sharply to the Red Sea, is the coastal plain, a narrow strip of barren scrubland and desert.

The famine that has hit Eritrea and much of sub-Saharan Africa has been caused by drought and erosion. Eritrean lands that once yielded food—areas aptly described as jungle by Edgar Rice Burroughs in a Tarzan novel—are now seas of dust.

In the highlands I met Ethiopian Orthodox Christians, members of a branch that split from mainstream Christianity in the sixth century A.D. and is closely related to Coptic Christianity. In the lowlands are primarily nomadic and semi-nomadic Muslims. Eritrea's four million people are divided about evenly between the two religions; a small percentage are scattered tribes of animists who believe that natural phenomena, such as the wind, have spirits.

Eritrea's recorded history dates from the second millennium B.C., many experts believe, when the Egyptian pharaohs conducted trade with Red Sea coastal chiefs. The region saw invasions by Egyptians and Turks and in 1890 became an Italian colony. The name Eritrea, given by the Italians, is derived from the Greek word for "red."

Italy lost the colony to a British invasion force in 1941. After World War II a United Nations resolution made Eritrea an autonomous, self-governing region of Ethiopia—apparently against the wishes of most of Eritrea's population. In 1962 Ethiopian Emperor Haile Selassie formally annexed Eritrea, discarding its flag and forcing the adoption of the Ethiopian language, Amharic. The previous year Eritreans had begun an armed revolt.

EPLF rebels are mostly Marxist, and in the first two decades of their struggle received outside aid mainly from Arab allies of the Soviet Union. After military officers overthrew Haile Selassie in 1974 and imposed a Marxist government on Ethiopia's 33 million people, the U.S.S.R. began to send billions of dollars' worth of arms to the new government, which now fields one of the largest armed forces on the African Continent. As many as 150,000 troops are committed in the war to contain independence movements in Eritrea and the neighboring province of Tigray.

The EPLF has perhaps 20,000 fighters. They say they now receive no direct arms aid but use captured arms. Throughout Eritrea I saw only enthusiastic support for EPLF fighters, many younger than the war itself; from birth to combat they have known nothing but struggle against Ethiopia.

Rain will come, but most observers agree that the cycle of famine will not be broken until combat ends. Ethiopia, for example, spends half of its national budget on its armed forces.

For now, the war is stalemated. The EPLF claims to control 85 percent of Eritrea and mounts guerrilla operations in much of the remainder. Ethiopia holds a largely coastal zone that includes the Eritrean capital, Asmera, population 425,000, and all other large cities. Since 1978 Ethiopia has mounted seven major assaults on EPLF territory. Each has failed.

An estimated 150,000 civilians and combatants have been killed. War also directly threatens the 750,000 Eritreans facing starvation. The EPLF charges that Ethiopian policy is to starve Eritrea into submission by denying aid to rebel-controlled areas. Ethiopia, in turn, charges that rebels disrupt movement of food and medical supplies into parts of Eritrea controlled by the government. In this complex war of Marxist killing Marxist, each charge seems to carry some truth. A senior United States government official calls it "one of the greatest tragedies of our time."

War and drought have changed Eritrea. In Teseney, 90-year-old Letemichael Medhane tells me of her youth: "When we came, we found giraffes, elephants, monkeys, lions, and dense forest." She and fellow lowlanders cut the forest, built irrigation

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Anthony Suau is a Pulitzer Prize-winning photojournalist, formerly with the *Denver Post*. He lives in New York City.

ditches, and created lush cotton fields. The farms were disrupted by fighting in the 1970s and destroyed by drought in the '80s.

Orotta, about 12 hours by truck from Port Sudan, is the most sophisticated part of what the EPLF calls liberated Eritrea. Motors pump water through irrigation ditches. A radio station broadcasts. Medicines and sandals are manufactured. An orphans' camp cares for 600 children. A network of schools holds daily classes.

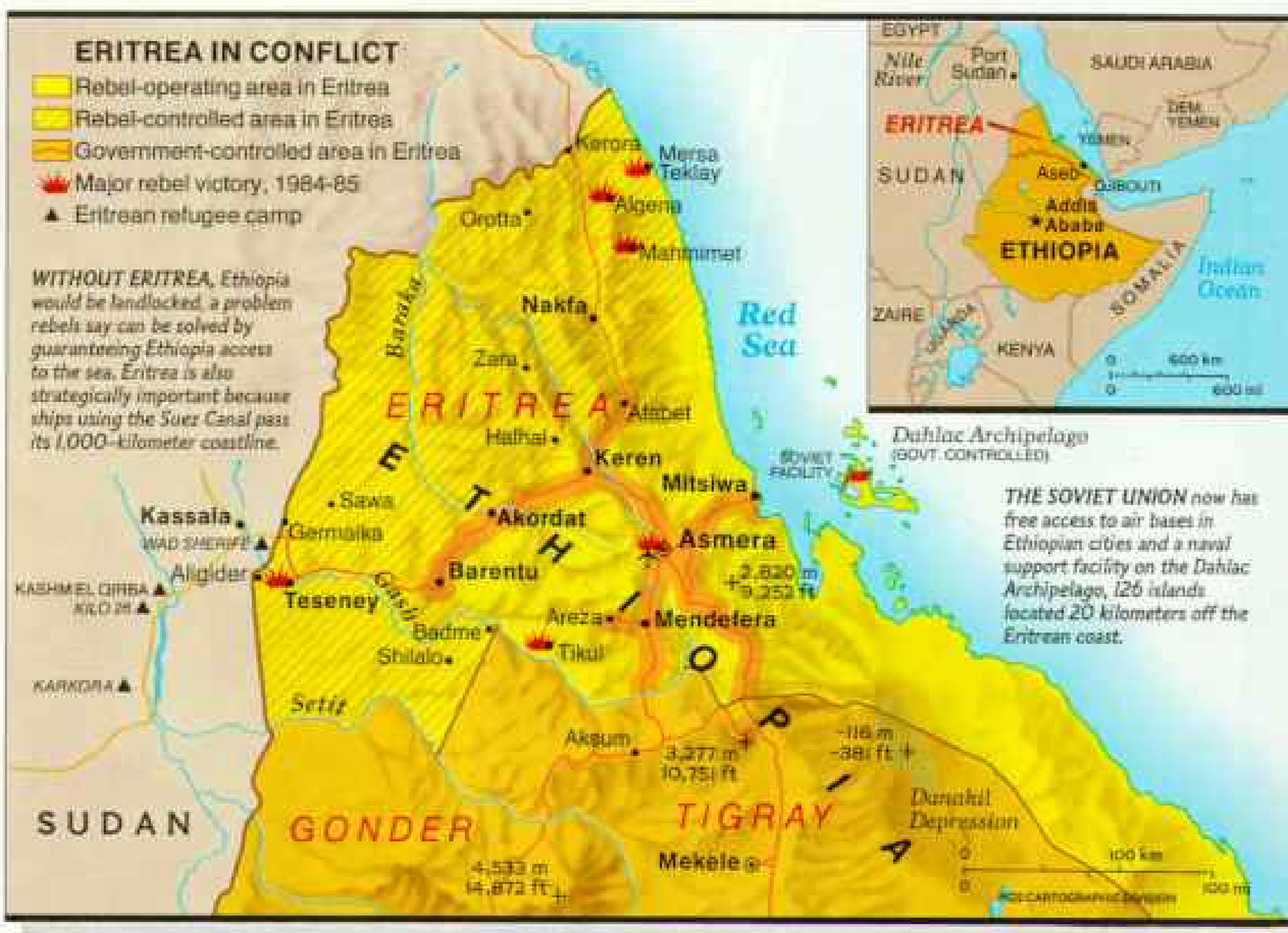
Amid this sophistication, life is hard. The orphans' camp is built into a hillside to hide it from bombs; children run into their underground dormitories if they hear an airplane. Fresh fruit, vegetables, and meat are limited. Toys are mostly sticks and rocks.

To make detection by MIGs more difficult, buildings in Orotta are scattered over perhaps ten square kilometers. The camouflage is so effective that you can be next to a cluster of dead branches and not know they conceal an automotive repair shop. "Just roll your flat tire into the bushes, and a new one rolls back," one nurse tells me.

At night, soldiers are everywhere. Burlap sacks and green blankets are thrown off trucks, which begin to convoy troops and supplies throughout Eritrea. At the 1,200-bed central hospital, stretchers are carried into the modern operating theaters; there is also a dentist's office that looks lifted right out of the United States.

Eritrean doctors, most of whom were trained in Europe or the United States, see from 50 to 70 patients a day. "One of the problems," Dr. Assefaw Tekeste tells me, "is that the fighters tolerate pain to an extraordinary degree, and many times we don't know if they're in pain or not."

Wounds caused by MIG attacks on civilians are commonplace. Tears of pain show as 24-year-old Tzige Woldu, mother of three, tells me what happened to her village in October 1984: "It was market day. The planes came at noon and began dropping bombs. There were about 500 people in the market; 42 were killed and many more injured. I saw that my leg was bleeding. Later, it was amputated because of infection."

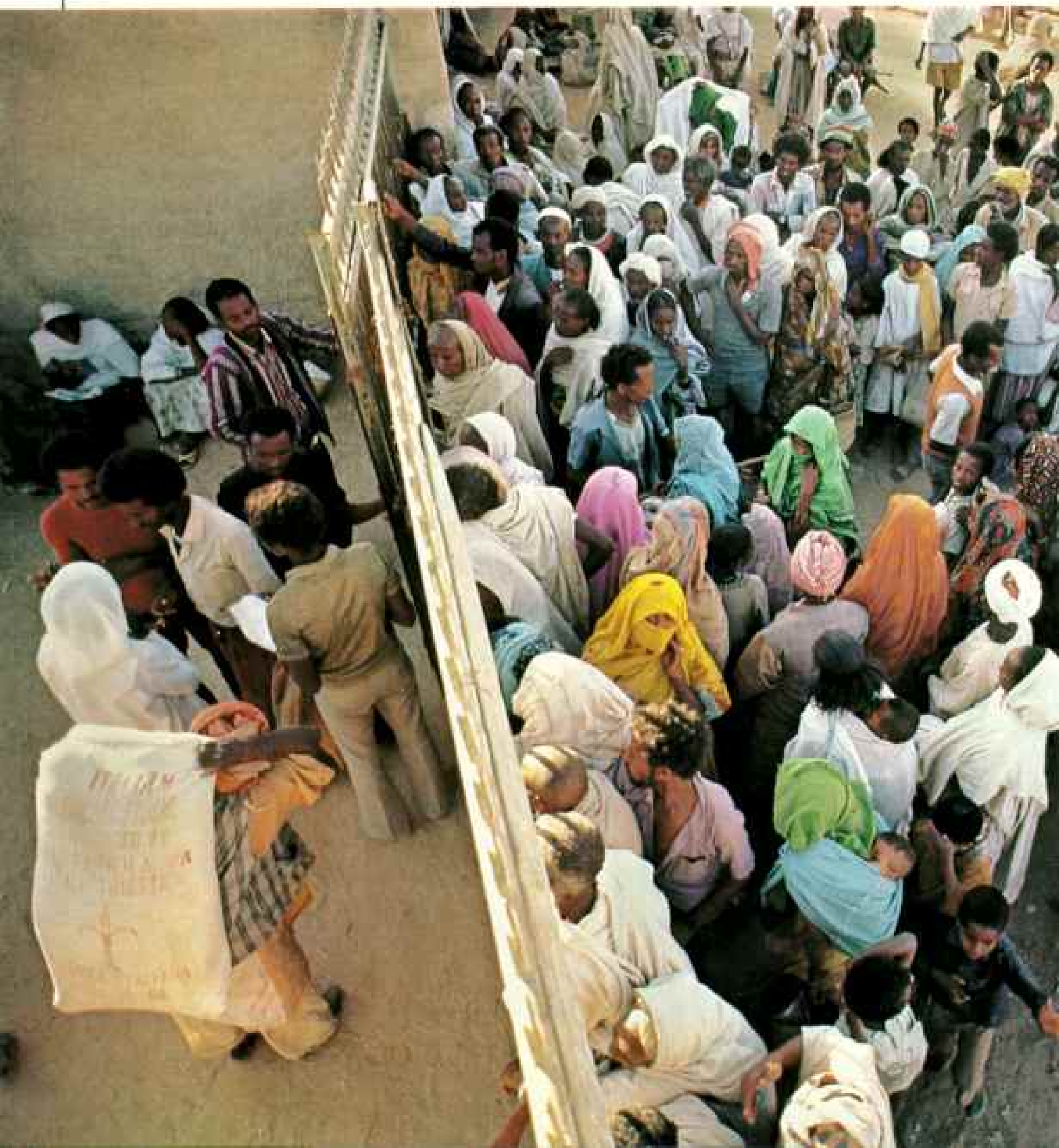


The cities: an uneasy calm

I COULD NOT GET THERE from here. To reach Ethiopian-controlled Eritrea, I rode back to Sudan, flew to Addis Ababa, and then reentered Eritrea along roads guarded by tense government troops. People look the same as in EPLF areas, but the countryside is more intensively farmed.

Keren, a city of 80,000 only 13 kilometers from the trenches, has two identities. One offers modern hotels, Italian architecture, and stylish European clothing. The other—with heavily armed Ethiopian soldiers much in evidence—smells unwashed and is filled with crowds outside such relief centers as this Roman Catholic mission (***below***).

Those who sign up in advance are allowed through the gates, at left, to receive food. They must then push through the hungry people, who try to force their way in every time the gate



opens. Mission guards scream and threaten them with whiplike sticks.

From relief officials I learned that most of those dying in this drought are children under five years old. Even the Ethiopian-controlled cities, which are easiest for outside relief to reach, have hungry children. One American relief official tells me that "fifty women sometimes surround me with their children, begging for food and pushing their children up in my face."

Most food destined for Ethiopia—as much as 100,000 tons each month—has arrived at the Ethiopian-controlled port cities of Aseb and Mitsiwa (***below right***). Three types of ships seem ever present: Ethiopian military vessels, freighters bringing food from the United States and other Western countries, and ships with arms from the Soviet Union. Military equipment seems to get priority.

For me, the situation in Eritrea is epitomized by a young Ethiopian soldier I see walking proudly down the street. In his arms are two gifts: food from the United States and an automatic rifle from the Soviet Union.

A ROUGH HAND shakes me awake. It is midnight, and I am back with the EPLF. A voice says, "If you want to see the battle, come now." I walk with a group of fighters. Several hours before dawn we enter a village occupied only by the decomposing bodies of Ethiopian soldiers. Two kilometers ahead is Tikul, a typical Eritrean village, with scattered huts made of straw and mud—and an Ethiopian garrison.

Ninety minutes before dawn, the EPLF penetrates government lines. Dancing tracers fill the darkness as Ethiopian troops seek refuge in a hillside church. At 9 a.m. the MIGs come. Tikul is bombed for more than seven hours (***above right***).

The Ethiopians are following what I'm told is their typical strategy: flattening any town the Eritreans capture.

Although such tactics anger EPLF fighters, they do not in my presence mistreat enemy soldiers captured at Tikul (***right***). Some are Eritreans drafted into the Ethiopian Army against their will. I speak to about half a dozen POWs, none of whom cares about politics. "I would like to see my family," one tells me.

Despite modern weapons, soldiers in face-to-face combat remain this war's basic ingredient. One who might survive undergoes brain surgery (***above left***) at the remarkably modern underground Eritrean hospital at Orotta.

"I HEARD THINGS from the sky, but I did not know they were throwing things at us," 12-year-old Halima Ebrahim tells me from her bed in the EPLF field hospital in Zara. During a MIG attack on her village of Jamrat, Halima was struck by burning napalm that hit her at waist level and ran down her hand and thigh.

Beauty scars on Halima's face

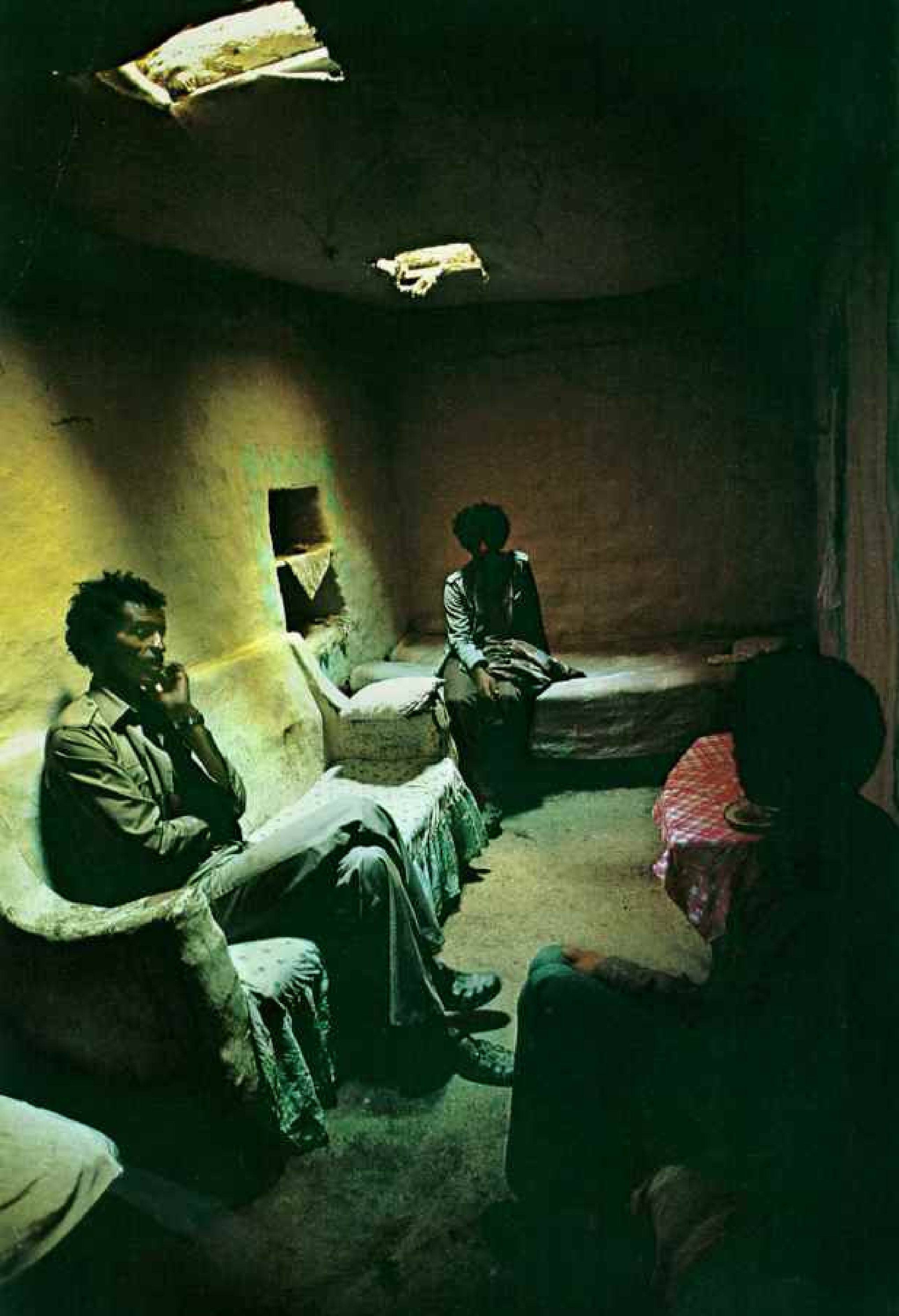
identifying her tribe are inflicted in accordance with her people's long-standing custom. Her mother wears the colorful clothes of the lowland nomads.

Blood seeps through the child's bandages, which doctors change every morning. Her mother offers comfort for pain that medicines cannot reach. Halima will live, probably with the fingers of one hand fused together.

MOST EMOTIONAL symbol of the independence movement, the village of Nakfa (***above***) is defended—and held—despite constant artillery attack and air bombardment. Before 1977, when the EPLF captured Nakfa, it was a farm community of more than 6,000 people.

Few buildings except the mosque remain intact. No one lives above ground.

About 500 people, mostly fighters, live in underground homes whose entrances can be seen only as the dark holes at left. On cloudy days and after sundown residents climb out to socialize, get water, and cook over open fires. Amid abandoned fields are small gardens of cabbages, onions, chili peppers, eggplants, lettuce, carrots, maize, grapefruit, pumpkins, and papayas.



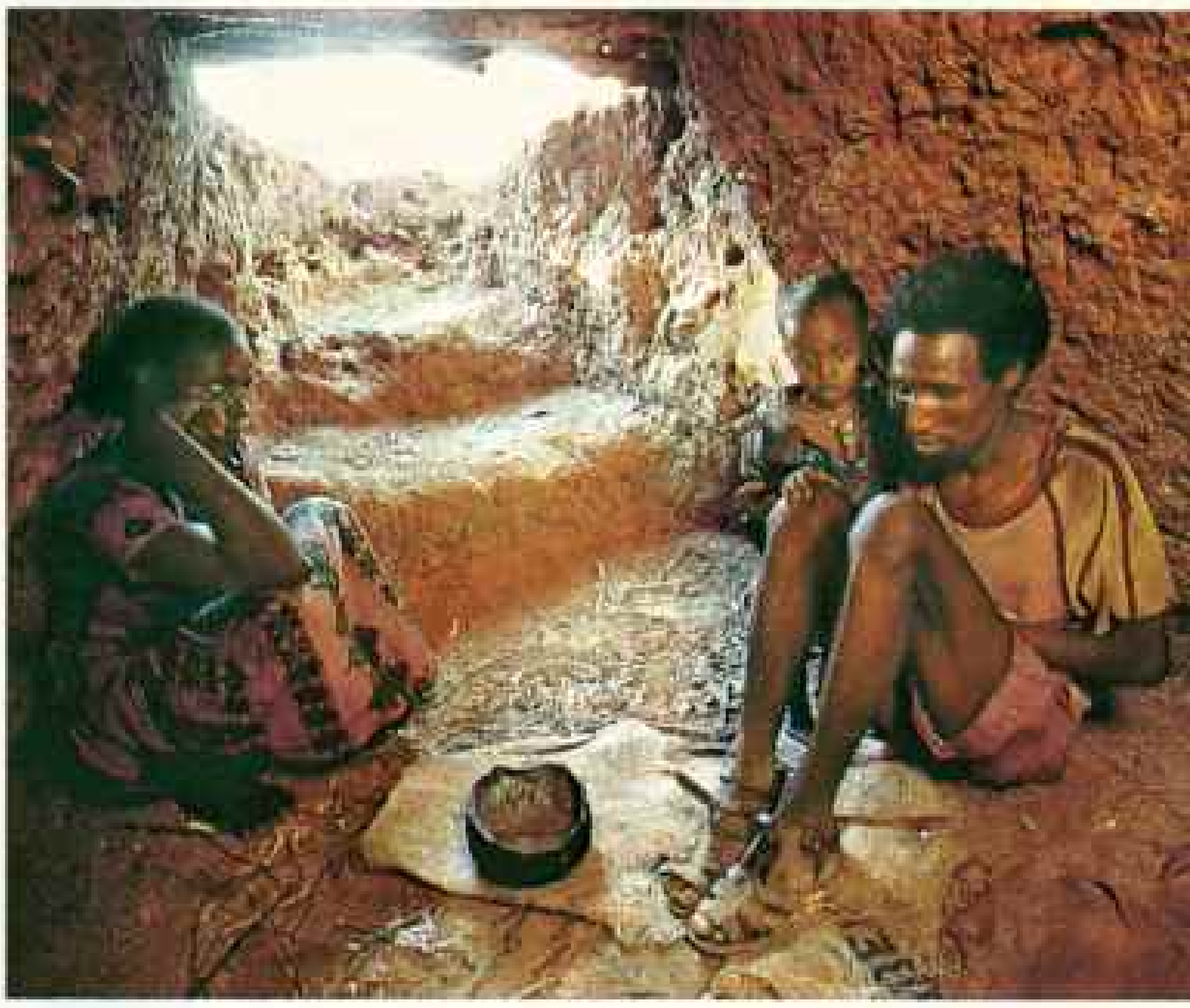
THIS IS LIFE in Nakfa. Homes (*left*) are dug into the ground and covered with rocks, dirt, and tree trunks for additional protection. Walls are painted white, and furniture is carved out of the earth. Light enters through holes in the ceiling. Careful craftsmanship (*right*) indicates that the Eritreans intend to be here—and under siege—a long time.

The usual drink is tea, but by tradition special occasions call for coffee. It's not unusual to drink six cups in one sitting.

Another tradition is more recent: If you go outside during the day to tend the garden, you must keep one ear cocked. A MIG—flying so low that you can look into the pilot's face—swoops by to spot its target; then it returns to drop napalm or bombs. After the first pass, you have a few minutes to seek cover. Serious injury or death is the price of delay.

When government planes napalmed the village of Badme, nine people were killed and 139 homes destroyed. Most survivors fled. Guoy Teferi, Girmay Abraha, and their two-year-old daughter, Azmera Girmay (*right*), stayed. They live in a hole, emerging only at night to gather edible leaves.

Azmera rarely has another child to play with. Although her parents are thankful for their hole, their strongest emotion is fear. They look up at me and ask, "How can you stand outside in the daylight like that?"



AT GRIPS with the nearly inevitable, Amna Mohammed (***right***) and her two young grandsons traveled three days by camel to the military field hospital in Sawa in search of food. Along the way the boys' mother died.

The humanitarian Eritrean Relief Association regularly provides food and medical supplies to dozens of refugee camps and hundreds of villages, yet claims to reach only a fifth of the 1.5 million people threatened by famine. "Many humanitarian organizations think the Eritrean people affected by drought are getting food via Ethiopia. This is not true," ERA field coordinator Askalu Menkorios tells me. Her explanation: Ethiopia tries to prevent outside aid from reaching people in EPLF-controlled Eritrea. Thus, food and medicine must enter the way I did: from Sudan, crossing the border without official permission and moving only at night to avoid Ethiopian planes.

Once in Eritrea, distribution is another major problem. MIGs make daytime travel dangerous all along the 2,500 kilometers of unpaved roads.

The young boys have lost their hair, a sign of starvation. They are too weak to brush flies out of their eyes. When not asleep, they cry in a rhythmic humming. They do not notice when their grandmother dies, days after their arrival.

Fellow Muslim women bathe the old woman for burial (***below, far right***), while the doctor and his assistants dig her grave (***right***). They use pickaxes, the only way to penetrate the sunbaked soil.

As a Muslim holy man blesses the departed, I stand alone, unsuccessfully searching for an answer to such horror.

After another three days the older boy dies. I have left the hospital by then, but later I meet other visitors who tell me, "The younger boy lived. The doctor took extraordinary care of him. The doctor swore, 'This one, death won't get.'"

But death takes many. It is here in the countryside, far from the refugee camps, that the greatest number of people die from starvation.

BERATING a "ship of the desert," a camel caravanner (*left*) for the Eritrean Relief Association makes his arduous way to the Metite Camp near Nakfa from a storehouse at Wina, two hours distant. The relief association, whose grain normally passes into Eritrea from Sudan, often uses camels for distribution of foodstuffs to famine-stricken camps and villages. Each camel can carry more than a quarter of a ton 50 kilometers a day for four days.

Other distribution is by merchants for whom bribes ease passage through combat lines. Grain given as a gift to the Ethiopian government is sold to merchants (**above**), who tell me they often purchase it from Ethiopian Army officers. Much of it ends up in the principal EPLF-controlled merchant town of Germaika, near the Sudanese border.

BEYOND the battlefields, the fight for education continues (***below***). In most EPLF-controlled towns children go to school for at least three hours every morning, five days a week. Subjects include history, mathematics, and science, but priority goes to reading and writing. English is stressed.

To promote literacy, the EPLF has also mounted an adult-education program. Classes for fighters are held at the trenches; in towns other adults often attend classes.

Many of the teachers I see are men and women who have lost arms or legs; the able-bodied instructors carry weapons in class. This may be to indoctrinate the students. "If our struggle is not successful in my life," one man says, "my daughter will continue. She is 11 years old."

Children become adults quickly. Only 15 percent of those in school are more than 12 years old, and most young refugees have no school. Their education deals exclusively with the art of survival. One child shows me around her refugee camp. "We don't eat today," she explains. "We ate yesterday."

Adults here know that the children suffer most. In Aligider, Ethiopian Orthodox priest Andemichael Tesfamichael enjoys a quiet conversation with five-year-old Adhanom Kiflom (***right***). Suddenly Adhanom smiles. The man reaches for him. In the gentleness of the priest's touch I can see the content of his prayers: May hunger never rob this child of laughter, may he inherit a world whose children know war no more. □

JASON'S VOYAGE

IN SEARCH OF THE GOLDEN FLEECE

JOHN EGAN

Battling currents treacherous even for tankers, modern-day Argonauts pass Istanbul as they strain to row up the Bosporus. Journeying across the Aegean to the Black Sea, adventurer Tim Severin and crew put flesh on the legendary quest of Jason and the Argonauts.

By TIM SEVERIN

Photographs by
JOHN EGAN and
SETH MORTIMER

IT WAS King Pelias who sent them out. He had heard an oracle which warned him of a dreadful fate—death through the machinations of the man whom he should see coming from the town with one foot bare.

The prophecy was soon confirmed. Jason, fording the Anaurus in a winter spate, lost one of his sandals. . . . And no sooner did the king see him than he . . . decided to send him on a perilous adventure overseas. He hoped that things might so fall out, either at sea or in outlandish parts, that Jason would never see his home again. —APOLLONIUS RHODIUS, ARGONAUTICA

THUS BEGINS the first nautical saga in Western literature—Jason and his Argonauts in search of the Golden Fleece. It is a superb tale: A galley manned by Greek heroes sets out for the far kingdom of Colchis, where hangs a fleece of gold in a sacred grove guarded by an immense and deadly serpent. If Prince Jason can bring the fleece home, he will win back the throne from his uncle, the usurper Pelias.

In that 3,000-year-old epic Jason and his crew meet all manner of adventures. A barbarian chieftain challenges them to a boxing match whose loser will be killed; they seek directions from a blind prophet tormented by Harpies; clashing rocks nearly smash *Argo*, their vessel. When they reach Colchis, the king's daughter, Medea, falls in love with Jason and betrays her family to help him steal the Golden Fleece. Jason returns to Greece in triumph to claim his throne.

Little wonder this story echoed down the centuries. It was a tale "on all men's lips," according to Homer; Aeschylus and Sophocles based plays on it. And in the third century B.C., Apollonius Rhodius, head of the great library at Alexandria, was "moved by the god of song" to write his *Argonautica*.

In May 1984 I set out to commemorate those heroes. But where Apollonius had tracked them in verse, my companions and I wanted to follow in fact. We rowed a replica of Jason's galley to seek our own Golden Fleece—nuggets of reality behind the story. The *Argonautica* served as constant guide.

Our boat took three years to research and build. Naval architect Colin Mudie patterned it on ancient Aegean vessels. Students at Southampton College of Higher Education tank-tested her hull, and Tom Vosmer crafted an exquisite model. Greek shipwright Vasilis Delimitros built *Argo*, 54 feet long with a nine-foot, four-inch beam, using the same Aleppo pine and techniques as the ancients. Mortise-and-tenon joints locked the planks in place of nails. On a bright April day a priest intoned a blessing,

workers pulled the chocks clear, and gaily painted *Argo* slid into the water.

"My God, she's beautiful," blurted Tom. We knew we had, as Apollonius had said, "the finest of all ships that ever braved the sea with oars."

Jason recruited Lynceus, keenest-eyed man in Greece, as lookout; Tiphys, finest helmsman; Hercules, strongest of men; Orpheus, whose song charmed man and beast.

My crew was superlative too. At its core was Faroe Islander Trondur Patursson, a partner in adventure since the *Brendan* voyage across the North Atlantic in a skin boat; ship's doctor Nick Hollis, purser Tim Readman, and strapping master-at-arms Peter Dobbs from our voyage in the wake of Sindbad;* ship's carpenter and second in command Peter Wheeler, rowing master Mark Richards, and seven new British and Irish shipmates. Greek, Turkish, and Georgian volunteers gave a boost along the way.

Both *Argos* set out from Volos in northern Greece, "a land ringed by lofty mountains, rich in sheep and pasture," as Jason describes it. Volos was once Iolcus, richest town in Thessaly. Puzzling ruins were found just west of the town, with no traces of destruction by fire, earthquake, or attack.

"That's odd for a Mycenaean town," the curator of Volos's archaeological museum said as she showed me the main street, palace remains, and characteristic royal tomb. "Townspeople seem to have occupied it less than a century, then simply packed up and left." How to explain this?

When Jason's father was dethroned, perhaps he set up this town. And when Jason brought back the fleece, "dazzling as the lightning of Zeus," the people joyfully returned to Iolcus with him. Evacuation and voyage dates agree—roughly 1280 B.C.

Jason departed amid the wailing of women mourning the Argonauts as heroes already dead, sent on a desperate venture by a cruel king. We left on a different note.

"*Kalo taxidi!*—Good journey!" chanted schoolchildren. I poured a libation to Poseidon. The mayor of Volos threw an olive branch into the sea, and racing shells of a rowing club skimmed around like water beetles as my Argonauts took up the beat.

"Their blades were swallowed by the

*The author's test of whether Irish monks could have reached North America nearly a thousand years before Columbus appeared in the December 1977 NATIONAL GEOGRAPHIC. He described the Sindbad voyage from Muscat to Canton in the replica of an eighth-century Arab merchant vessel in the July 1982 issue. His book *The Jason Voyage* will be published next spring by Simon & Schuster, Inc.

***First great sea voyager** in Western literature, Jason sailed from Greece to Colchis, in today's Soviet Georgia, with a heroic crew—including Hercules and Orpheus—to capture the Golden Fleece. If Jason could accomplish this seemingly impossible mission, his evil uncle, King Pelias, promised him the crown. On a fifth-century B.C. Greek vase (**right**) the goddess Athena protects Jason as he reaches for the pelt. A crew member stands beside their boat, Argo. The modern Argo (**left**) arrived off the Greek island of Limnos to the songs of children on fishing boats.*

JOHN EGAN (LEFT); METROPOLITAN MUSEUM OF ART

waves," wrote Apollonius, "and on either side dark salt water broke into foam, seething angrily in answer to the strong men's strokes." For us, it was not quite so dashing.

We soon found out what it is like to row seven tons of laden Bronze Age galley on a three-month voyage of 1,500 nautical miles. Volunteers came and left as holiday time allowed, so crew size varied. Generally we had 15 or 16 rowers, so ten rowed at a time, five to a side, while the others rested. Every five minutes one pair of oarsmen shipped blades and were replaced by two reservists. Thus we nibbled away the sea miles hour after hour at about three knots.

Even a modest head wind stopped us. We'd anchor in a cove until a favorable breeze sent small-sailed *Argo* skimming at five to six knots, twin steering oars controlling her as sweetly as a racing dinghy.

BRONZE AGE SAILORS navigated by eye, from headland to headland, making their landfall at day's end when the "ploughman, filled with thoughts of supper, reaches home at last and . . . looks at his worn hands with a curse for the belly that commands such toil."

When *Argo* came in sight of Mount Olympus, we struck out east for the Khalkidhiki Peninsula, keeping Olympus's snowy crown behind us. But 15 miles from Cape Poseidon the wind fell, and we had to spend our first night at sea—an ordeal since each man had just half a thwart to sleep on, a plank eight and a half inches wide and 48 inches long.

Mount Athos was our next landmark, as for Jason, and after that the isle of Limnos.

Just before Jason reached Limnos, the Limnian women had killed their men for infidelity with slave girls. Realizing they had condemned their race to extinction, their beautiful Queen Hypsipyle welcomed the Argonauts ashore. Indeed the quest for the Golden Fleece almost ended there, for they found life so agreeable with the Limnian ladies that they were loath to leave.

At Limnos our Greek volunteers turned back, and our depleted crew labored eastward. Next day a Turkish fishing boat came over to rescue us. The skipper thought us shipwreck survivors rowing a lifeboat.

"Just as the sun was setting they reached the foreland of the Chersonese," continues

"YOUR COURAGE *fills me with fresh confidence," said Jason to the Argonauts, who, guided by a dove, were the first to pass safely through the Symplegades, or Clashing Rocks—boulders that collided to crush ships entering the Black Sea.*

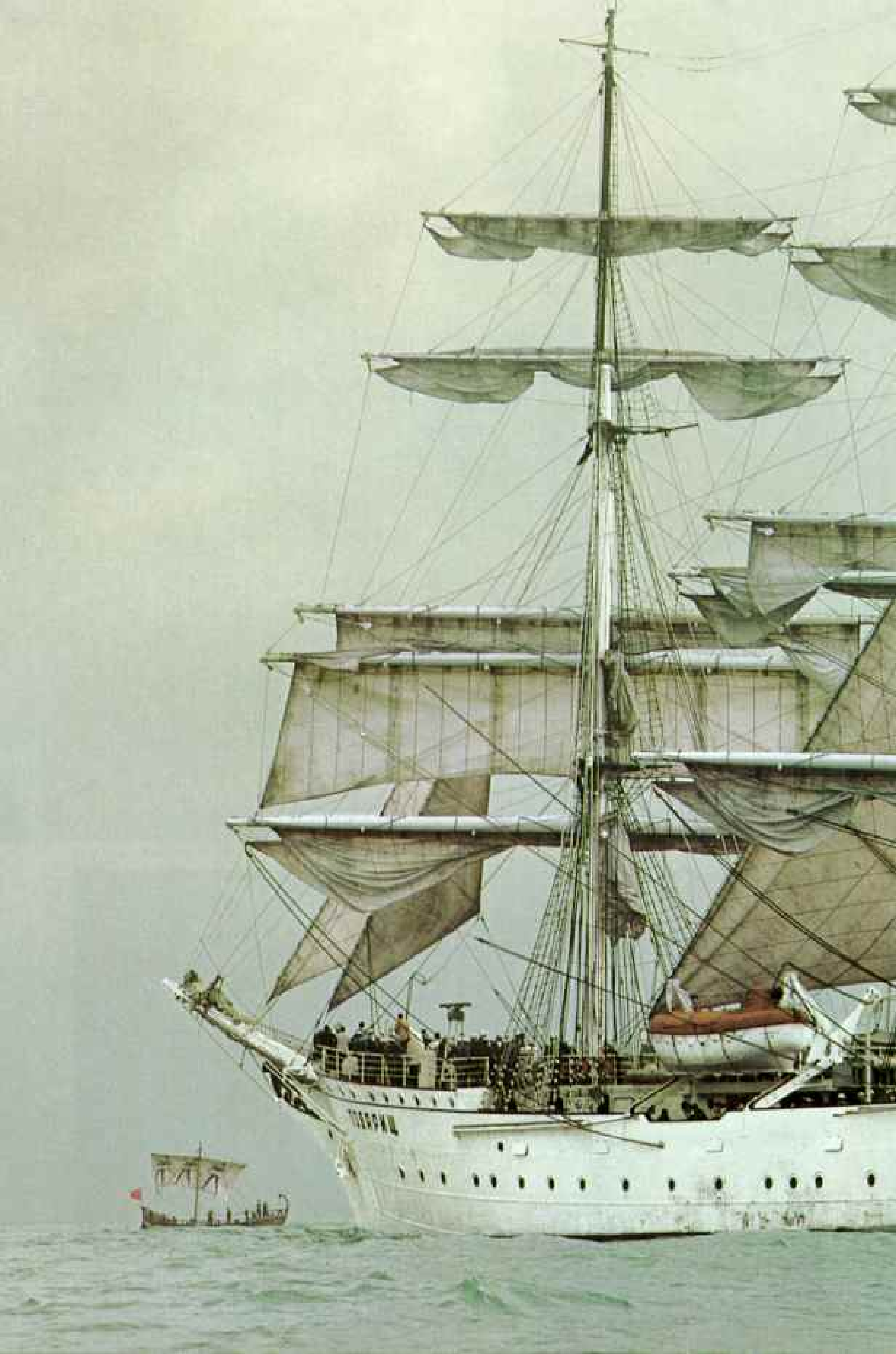
Greeks colonized the Black Sea in the seventh century B.C. But could their ships have reached it earlier? Severin believes it possible. Launched in May 1984, his Argo made the 1,500-nautical-mile journey in three months.

PAINTING BY JAMES M. GURNEY


ROMANIA
U.S.S.R.
YUGOSLAVIA
Danube
Black Sea
CAUCASUS MTS
Mestia
BULGARIA
AUTHOR'S ROUTE
Poti
Vani
COLCHIS
ALBANIA
Thessaloniki
SYMPLEGADES
BOSPORUS
Sinop
JASON'S CAPE
GIRESUN ISLAND
Hopa
KHALKIDHIKI PENINSULA
Rumelifeneri
Istanbul
(CONSTANTINOPLE)
Ereğli
Samsun
Ordu
Trabzon
CAPE KASSANDRAS
(CAPE POSEIDONI)
MT. OLYMPUS
THESSALY
MOUNT ATHOS
LIMNOS
Çanakkale
TROY
Sea of Marmara
Ankara
Volos
(DOLICHE)
DARDANELLES (HELLESPONT)
TURKEY
GREECE
Aegean Sea
İzmir
ANATOLIA
Athens
Dicle (Tigris)
SYRIA
CRETE
RHODES
CYPRUS
Archaeological site
Historical names shown thus: TROY
200 km
200 mi
NGS CARTOGRAPHIC DIVISION
Mediterranean Sea

*"**They rowed . . . in a spirit of rivalry,** each trying to outlast the others at the oars." Such descriptions of the saga, as recounted by the third-century B.C. scholar Apollonius Rhodius, inspired Severin's crew as they pressed through the Black Sea (**above**). Oarsmen numbered from 13 to 22, as volunteers from Greece, Turkey, and the Soviet Union came aboard. After the daily five-to-six hours of rowing that propelled the 54-foot-long Argo at about three knots, Oxford-trained rowing master Mark Richards (**right,** at left) and cook Peter Moran succumb to exhaustion as the sail takes over. Classical accounts tell of Hercules breaking an oar with his rowing strength. This Argo, patterned on Bronze Age Greek vessels, suffered broken steering oars from turbulent seas. Ship's carpenter Peter Wheeler, second in command, mends the damage (**left**).*

SETH MORTIMER (ABOVE) & JOHN ESAM



Apollonius. "There they met a strong wind from the south [and] set their sail to it. . . . Before dawn, *Argo* by dint of sail and oar was through the darkly swirling Hellespont," beyond danger from nearby Troy, whose king sought to bar Greek ships.

At Çanakkale in the narrows of that strait we picked up our first Turkish volunteers: Ersin Yirmibeşoğlu, who captains a 150,000-ton tanker; Kaan Akça, at 16 our youngest crew member, son of an Istanbul family that had befriended me when I traced Marco Polo's route in 1961; and two archaeology students.

Here we first tasted the hospitality which was to envelop us during our long passage along the Turkish coast. Exotically costumed dancers entertained us. Here too we learned how delightfully the *hamam*, or Turkish bath, rids one of the aches of a hard day's rowing. And we raised many a blister toiling across the Sea of Marmara before we spied the minarets of Istanbul and "the misty entrance to the Bosporus."

THE BOSPORUS proved our greatest trial. Some scholars claim that the strait's fierce currents would have kept Mycenaean ships from the Black Sea. Water that pours into the Black Sea from the Danube, Don, and Dnieper drains through the Bosporus. Its unpredictable current can catch ships in eddies and whirl them around like toys. Sometimes bows smash house balconies along the banks.

Against this current we could pit the strength of only 20 men, our Argonauts reinforced by nine volunteers from two Istanbul rowing clubs. In short bursts athletes could propel *Argo* at six knots in a dead calm. Even that didn't seem much against Bosporus currents of up to seven knots with a strong head wind.

At 9 a.m. on June 12 a head wind kicked up a nasty chop as we eased *Argo* out into the strait, rowing gently so our Turkish friends could get the feel of the 14-foot oars. With Topkapi Palace and the mosques of Istanbul ahead, we passed a burned-out tanker that had lost control in the current, collided with another ship, and exploded in a fireball. Ferries buzzed in and out, a hazard Jason never had to face.

"Hadi Allah! Hup! Hup!" roared the Turkish rowing squad as *Argo* emerged from behind a breakwater into the full force of the strait. "Come on! Pull harder!" came yells in Turkish as the crew piled on effort.

I set *Argo*'s course to slant across to the opposite bank. But for every yard we made sideways, wind and current swept us two yards back toward the Sea of Marmara. Whitecaps troughed the water's surface.

Could we keep from being swept downstream? My doubts rose. Then I spied the countercurrent. On one side the main current churned south. Five feet away, the water calmly moved in the opposite direction.

A few strokes later *Argo* crossed the divide. A great hand pulling back on the keel relaxed its grip. The oarsmen eased their stroke; *Argo* steadied her roll.

We pulled northward, keeping so close to the European bank that scarcely a yard separated oar tips from seawall. Workmen suspended on bosun's chairs, chipping rust from moored ships, shouted encouragement. We passed under the Bosporus Bridge, which joins Europe and Asia.

Just south of the suburb of Bebek, the Bosporus curves and narrows to half a mile wide. Here Mehmed II, Ottoman conqueror of Constantinople, built a fortress, Rumelihisarı, to control the passage. Round the point water shot like a millrace. "Thirty meters to go. . . . Twenty. . . . Build up speed!" I shouted. "Ten meters. . . ."

Bang! The current hit *Argo*, swung her bow. I feared we would spin around.

Blades bit the water, the crew grunting with effort. *Argo* hung, poised like a salmon fighting rapids. Ever so slowly we gained ground. The chart showed a counter eddy along the other bank. But 700 yards against

Entering Soviet waters *in the Black Sea, Argo is greeted by the Tovarishch, a Soviet merchant marine training ship. The square-rigged vessel crossed the Atlantic in 1976 to parade with other tall ships for the United States Bicentennial. To Argo it delivered a team of Georgian rowers—one so energetic that, like Hercules, he damaged his oar.* JOHN SEAN

the current meant at least four times that through the water. Wind held the galley's bows as in a vise.

"Come on! You're losing her!" I yelled. "We'll be pushed back to where we first crossed over!" Apollonius's words rang true: "Yet for every foot that *Argo* made she lost two, though the oars bent like curved bows as the men put out their strength."

Despite our five to six knots, we barely advanced. Just before the men broke, she slid across a dividing line into the far eddy. The crew slumped over their oars.

ONCE MORE that day we had to recross the channel. Once more the crew strained across the current, shot through with eddies and overfalls. As we reached our anchorage at Bebek, a third of the way up the Bosporus, you could sense the achievement. My Argonauts burst into applause for our Turkish volunteers.

After a 24-hour break we pushed *Argo* up to the Black Sea, a nine-hour slog, anchoring every two hours to rest. Finally she lay safely in the fishing harbor at Rumelifeneri, not 200 yards from the formation ancients called the Symplegades, or Clashing Rocks.

"Not being fixed to the bottom of the sea," explains Apollonius, "they frequently collide, flinging up the water in a seething mass which falls on the rocky flanks of the straits with a resounding roar." If a ship tried to pass, the rocks shattered it.

Cunningly, Jason released a dove as decoy. The rocks closed, nipping off its tail feathers. Then the Argonauts rowed with all their might; the rocks were parting again. "Sheer destruction hung above their heads."

But a wave rushed down. "And when

SETH MORTIMER

Joyous last effort *frees* Argo *from a sandbar in the Rioni River, the Phasis to ancient Greeks. In this marshy delta Jason plotted his strategy for obtaining the fleece. These Argonauts hoisted champagne and were then towed to Vani.*

Argo had shot end-on like a rolling pin through the hollow lap of this terrific sea, she found herself held back by the swirling tide just in the place where the rocks met. To right and left they shook and rumbled; but *Argo* could not budge."

Then *Argo* shot through. Only a fragment of stern ornament got clipped. Thenceforth, said Apollonius, the rocks were "rooted forever in one spot close to one another."

You can see a cleft that makes the rocks seem apart. And on the summit stand vestiges of a shrine where ancients sacrificed to the gods before braving the Black Sea.

Greeks dreaded the Black Sea—the "inhospitable sea." This fear still finds expression in the Turkish proverb that it has only four safe harbors: Samsun, Trabzon, July, and August. We benefited from the first three as we coasted east the next four weeks.

Giresun Island we easily identified as the place where Jason's men put to flight birds that "in their thousands rose and . . . discharged a heavy shower of feathery darts at the ship as they beat a hasty retreat over the sea toward the mainland hills." The island is home to cormorants and gulls that fish where the River Aksu joins the sea.

Apollonius mentions a "black rock" on the island where the Argonauts offered a sacrifice. Today people come to a large black boulder on the beach to ask for financial success, the birth of a boy, or a happy marriage. In its clefts we found pairs of pebbles, like birds' eggs, placed there by hopeful lovers. We found similar folk traditions enduring at many another Argonaut site in Turkey: a wishing hill, a magic spring or well, an ancient altar such as may have stood on the headland named Jason's Cape.

In mid-July we reached Hopa, last port on Turkish soil.

AND NOW *the last recess of the Black Sea opened up and they caught sight of the high crags of Caucasus, where Prometheus stood chained by every limb to the hard rock with fetters of bronze, and fed an eagle on his liver. . . .*

Night fell, and presently . . . they reached the broad estuary of Phasis, where the Black Sea ends. . . . On their left hand they had the lofty Caucasus and the city of Aea, on their right the plain of Ares and the god's sacred grove, where the snake kept watch and ward over the fleece, spread on the leafy branches of an oak. —APOLLONIUS

TODAY THAT RIVER, now the Rioni, lies in Soviet Georgia. As *Argo* crossed into Soviet waters, I heard a voice calling us on the radio. "*Argo! Argo!* This is *Tovarishch.* Do you hear me?" Soon, over the horizon appeared the masts of a square-rigger, her spars lined with cadets.

Visitors shuttled back and forth. Among

the first was Yuri Senkevitch, ship's doctor on Thor Heyerdahl's *Ra* and *Tigris* expeditions. Yuri had played a key role in arranging *Argo*'s visit to Georgia. On board a squad of Georgian oarsmen stood by to help us, impressive in their dark blue track suits. Their leader awed the Argonauts when he rowed so hard he snapped the tholepin of his oar—just as Hercules, "ploughing furrows in the choppy sea, broke his oar in half and fell sideways off the bench. . . ."

We rowed upstream into the Rioni delta until we grounded on a sandbar opposite the river's first Bronze Age site. With whoops of delight the Argonauts threw down their oars. Signal rockets and Georgian champagne celebrated journey's end. Amid pandemonium, the crew, one by one, was tossed into the swift-flowing waters.

We accepted a tow upstream. Children ran along the banks. Parents clustered at ferry points and on bridges. In Vani an open-air gala of choral songs and folk dancing welcomed us to Georgia.

I had had no inkling Jason's story was so popular here. The *Argonautica* is studied at universities. A cigarette brand is called Golden Fleece. Schoolchildren learn that the love-smitten princess Medea, skilled in magic, drugged the monstrous serpent so

To prove his right *to the Golden Fleece, Jason was challenged by King Aeetes of Colchis to yoke a pair of bronze-hooved, fire-breathing bulls, plant serpent's teeth, then slay the army that arose. Aided by the magic of the king's daughter, Medea, Jason accomplished the task (***bottom***). Bronze Age sites along the Rioni have yielded evidence of a bull cult. A strong ram cult flourished nearby. A bronze ram's head totem (***below,*** upper) dates from the 18th century B.C. In the fourth century B.C., goldsmiths molded the region's treasure into ram's head bracelets (***below,*** center).*

RAM'S HEAD TOTEM AND BRACELETS FROM GEORGIAN STATE MUSEUM, BY SETH HORTINER; JOHN ELIAS (ABOVE LEFT); SKETCH BY JAMES M. BURKEY

Gilding the fleece, *a retired prospector in northern Georgia (***above***) demonstrates how a pegged sheepskin was once used to extract gold particles from rivers rushing through the Caucasus Mountains. Abandoned in the 1930s, the practice was described as early as the first century B.C. by the Greek geographer Strabo, who cited it as the basis of the myth of Jason and the Golden Fleece.*

JOHN LEAR

A hero's welcome *met Severin and his Argonauts in Vani. Presented with traditional dress and a silver dagger, he played Jason to Medea, actress Nino Katsitadze, while a choir serenaded. Medea, who fled Colchis with Jason and the fleece, is a blood-stained figure in Greek legend. When Jason later betrayed her to marry another woman, she killed their sons and his bride. But Georgians—who treasure the Golden Fleece myth as part of their heritage—hold her as a beloved princess, self-exiled to help the man she loved.*

Jason could remove the fleece, shimmering in fiery splendor—the prize for which the Argonauts had "dared greatly and suffered misery on the cruel sea." Pursued by her wrathful father's ships, she fled with Jason to his home in Greece.

The richness in gold of later Greek colonies here gave credence to the legend of the Golden Fleece, an archaeologist explained. After a heavy rain, golden objects have been picked up from the ground at ancient Vani, gold probably from the mountainous Svanetia region of northern Georgia.

There three gold gatherers demonstrated the age-old method, reported by the Greek geographer Strabo. Sheepskins pegged out on boards were sunk in streambeds to trap gold particles in the wool (previous pages).

In Mestia, Svanetia's chief town, I saw hundreds of objects an archaeological team had recovered from ancient burials. Ram figurines, cast in bronze, caught my eye. In western Georgia a ram cult endured from the middle Bronze Age until our own era.

Legend relates that a Mycenaean royal child escaped death in Greece by flying away on the back of a golden ram. Reaching Colchis, Prince Phrixus sacrificed the ram and gave its golden fleece to Colchis's King Aeetes, who hung it on an oak tree in a sacred grove.

Mycenaeans at Iolcus knew of the Caucasus ram cult and regarded its people as relatives. Scholars show similarities in early Greek and Georgian myths—not only Jason but Prometheus, punished by Zeus for giving fire to man.

The most thrilling corroboration came on our last day. Atop a mound near the mouth of the Rioni, I looked down on the base of a small building surrounded by a stockade and moat. A temple or religious site, archaeologists suggest, from cult objects—stylized bull's horns—found here.

No ram cult. Then I remembered. Before he could win the Golden Fleece, Jason had been put to an ordeal by King Aeetes. He had to yoke a pair of fire-breathing bulls and plow a field. A bull cult? Perhaps.

But what about the serpent that guarded the Golden Fleece? This site and others had yielded tiles and clay artifacts scratched with snake symbols. Snakes were protector figures in Georgian homes.

I felt the last piece of the puzzle had fallen into place. Georgia's history has gold collecting with sheepskins, a ram cult, even a folktale of a mountain cave where a golden ram is tethered beside a golden treasure by a golden chain. Coastal archaeology shows bull worship and a stockaded temple—possibly the sacred grove from which Jason stole the fleece protected by a snake.

No one has firmly identified the site of Aea, capital of King Aeetes, and sites await excavation in the Rioni delta. But every element of Jason's tale is there. And our *Argo* showed that the voyage could be made. □

NATIONAL GEOGRAPHIC SOCIETY

WASHINGTON, D. C.

Organized "for the increase and diffusion of geographic knowledge"

GILBERT HOVEY GROSVENOR

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

THE NATIONAL GEOGRAPHIC SOCIETY is chartered in Washington, D.C., in accordance with the laws of the United States, as a nonprofit scientific and educational organization. Since 1890 the Society has supported more than 2,700 explorations and research projects, adding immeasurably to man's knowledge of earth, sea, and sky.

Profound truth: One thing does lead to another.

Here's how it works at 3M...

How a dirty made living

When 3M first developed fluorochemicals, they did everything we expected... and a bit more. The bonus came when some spilled onto a tennis shoe and tests showed that part of the shoe just *couldn't* be easily soiled. It was the birth of "Scotchgard" Protector...the world's finest soil and stain repellent for carpet and fabrics.

It was another case of 3M people stretching their minds. Sharing technologies, probing, exploring. To make small ideas big ones: to make big ideas better.

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It's an environment we encourage at 3M. To promote innovation. To make our people eager and able to respond to your needs. And it works wonders.

Let us demonstrate. Tell us of a problem that you have. And then watch how quickly we respond. Because 3M hears you.

Call Terry Baker at 800-328-3234. In Minnesota call 612-736-6772.

A legacy in fact, a legacy in spirit

A GOOD FRIEND we never knew: That was Mary Pickering (**right**), a Society member from southern California. From what her friends have told us, she lived a life full of work, joy, and caring for others. Having studied psychology and education, she began her career in 1945 as a secretary and writer of radio scripts for a church's broadcasts, often on the theme of encouraging down-and-outers who didn't have much hope left. She also found time to direct the children's choir of the church.

Mary Pickering became a public-school teacher. Then, motivated it seems by her continuing concern for life's down-and-outers, she became involved in probation work, but was eventually drawn back to children, teaching, and music. She insisted on proper behavior from her students and earned their affection and respect.

She was, her friends report, cheerful and optimistic. A free spirit, she loved to travel the Southwest, venturing off on the spur of the moment for some new exploration of Arizona, New Mexico, or Texas.

She loved the outdoors and animals, and she was fascinated by Indian culture and art, often stopping at reservations to learn more. Her urge to follow new byways was such that her friends gave up expecting her to arrive on schedule.

Except for her death in 1984, we might never have known about this remarkable woman. We were unexpectedly honored to learn that Mary Pickering had made a generous bequest to the Society in her will.

Without close family, she remembered her friends and nonprofit organizations. These included groups dedicated to conservation, to education, to supporting medical care and destitute children in foreign countries, and to humane treatment of animals.

While the Society is more accustomed to making grants to scientists and scholars than to receiving bequests, there is a way in which Mary Pickering's generosity applies particularly to one aspect of our future.

I have increasingly come to realize that the Society's mission cannot be wholly fulfilled unless we do our best to support geographic education, both at the advanced scholarly and at the elementary and secondary school levels. This summer, for example, we began a pilot project in geographic education at a junior high school in the District of Columbia. We hope this will lead to a citywide program and then expand farther.

PHOTO BY BETH WILDER

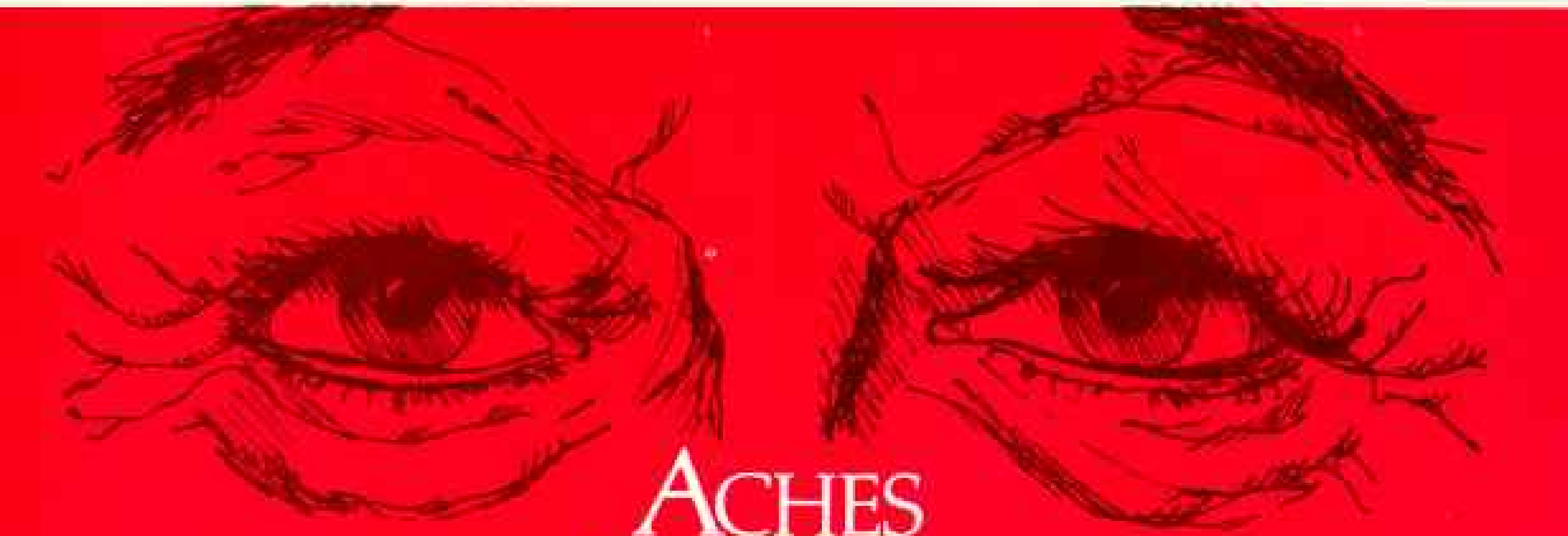
We want to do more, and we will need partners for education. To that end the Society's trustees have adopted a policy that will allow us to utilize foundation and corporation grants for clearly defined programs. These will be research and education related, and their funding will not be applied to the Society's normal operating budget.

When I think of those junior high students learning more about their world, I think about a teacher whose spirit is in that classroom. Thank you, Mary Pickering.

Gilbert M. Grosvenor

PRESIDENT, NATIONAL GEOGRAPHIC SOCIETY

The makers of TYLENOL want you to know more about...



Aches And Pains When You're Getting Older.

Two things are true about you now that you're no longer so young. You know more . . . and you hurt more. It helps to understand the hurt and to know what to do about it.

Why more aches and pains now?

The passing years take their toll. Little weaknesses—concealed by the resilience of youth—began to surface. Muscles won't stretch as easily or as far. Joints become stiff and less flexible.

What causes pain?

Pain can result from damage to the connective tissue, irritation in the joints, pressure on nerve endings, muscle spasms, or plain fatigue. Deterioration of your moving parts can cause trouble. Result: stiffness and pain.

The main weight-bearing joints are the ones most affected—hips, knees, feet, spine. Funny, but ankles are rarely guilty of causing much pain, even though they carry their share of the load.

When you walk, three times your body weight is thrust upon your knees and hip joints. More if you run. As time goes by, these joints weaken. So . . . keep your weight down!

Take a little more care.

Remember, muscles tend to deteriorate with age. Be more careful. Don't exercise without warming up. If you're tired, don't play that extra set of tennis. Keep in mind what not to do and you'll save yourself a lot of discomfort.

The wisest way to deal with aches and pains is to see your doctor. He might recommend heat treatment or massage. Or exercise programs that extend the joints and strengthen flabby muscles.

What pain reliever should you take?

Nonprescription pain relievers can play an important role in making you feel better. For example, TYLENOL® does an excellent job of relieving aches and pains. But, unlike aspirin or any other type of pain reliever, it won't upset your stomach.

Doctors know about these side effects.

Medical studies have shown that any kind of aspirin—even buffered aspirin—and the ibuprofen brands can irritate the stomach. Your doctor might recommend TYLENOL so that you can avoid problems while getting the relief you want. In fact, TYLENOL is the pain reliever hospitals use most.

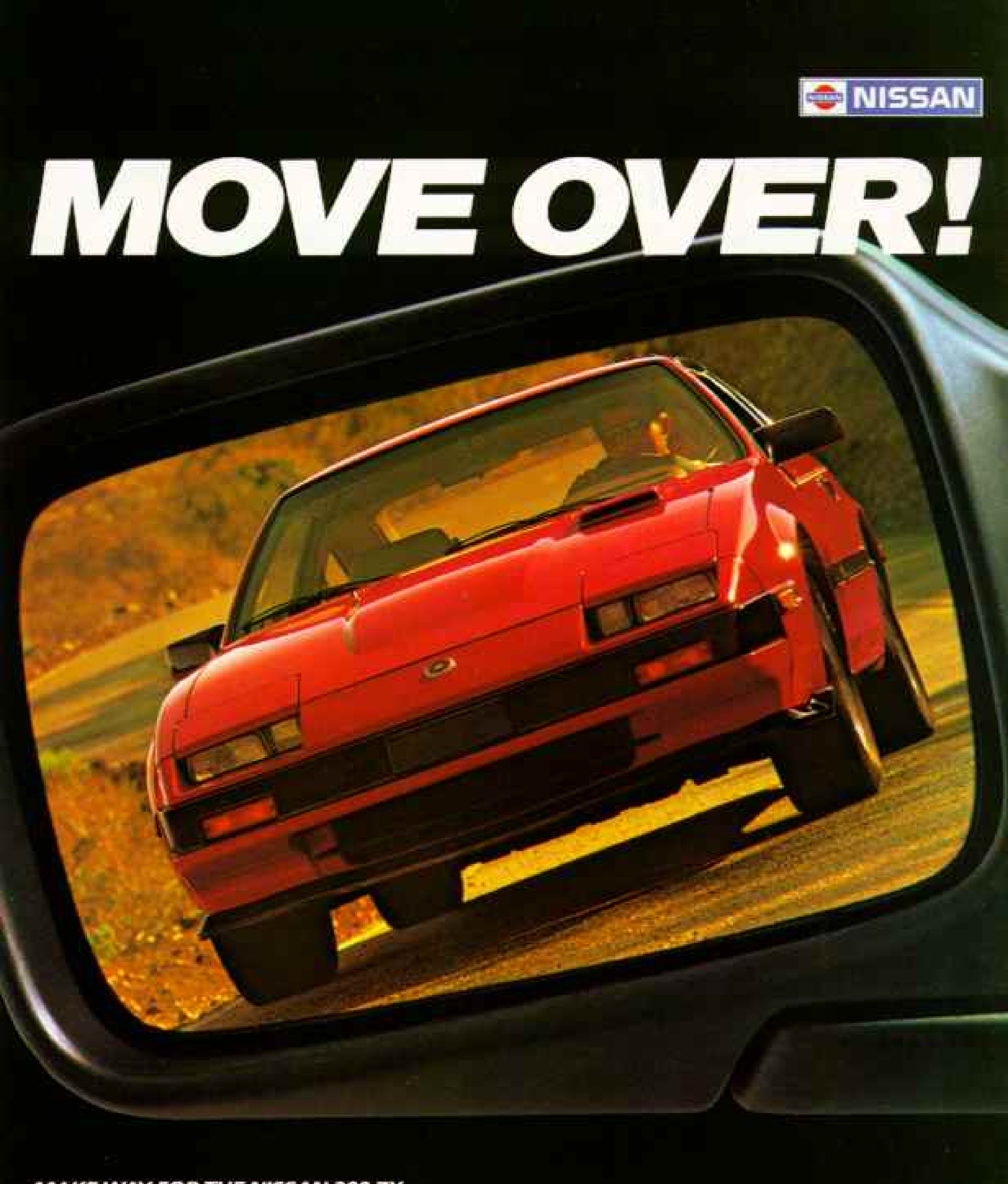
See your doctor.

The people at TYLENOL have been working with the medical profession for many years to make things better for you. Our experience and your own doctor's knowledge of you can combine to help you deal effectively with your aches and pains. So see your doctor and talk things over.

The most trusted name in pain relief.

NISSAN

MOVE OVER!



MAKE WAY FOR THE NISSAN 300 ZX.

FUEL-INJECTED • TURBO-CHARGED • V-6 • 200 HORSEPOWER • 3-WAY ADJUSTABLE SHOCKS.

AWESOME!

BELT YOURSELF

THE NAME IS

NISSAN

FREE! A Delightfully Beautiful Christmas Ornament for joining.

The Christmas Ornament Collectors Club

Founded to give you the opportunity to acquire in a convenient and affordable way, Christmas ornaments not readily available in stores.

Peppermint Fairy
Delightful peppermint fairy – hand-tailored costume . . . crafted of fine imported porcelain . . . hand-painted face. $9.50.

Hand-made Glass Bell
Rare, individually-crafted. $8.00.

Calico Goose
Beautiful example of American handcrafts. $9.00.

Villeroy & Boch Ornament
Fine porcelain from Villeroy & Boch featuring their popular "Nail Christmas Scene." $7.75.

Ornaments above – typical of those selected for club members – are shown smaller than actual size.

It's no wonder that Christmas ornaments are a treasured part of your family's Christmas tradition. Colorful and magical, they add warmth and wonderment to your Christmas tree each year. Memories of holidays past come alive as you and your family trim the tree with the ornaments you've collected over the years.

Unfortunately, however, in this age of mass production, distinctive ornaments of high quality are becoming very hard to find.

A Beautiful Ornament Sent To You Each Month

Now, through membership in The Christmas Ornament Collectors Club, you can build a collection of heirloom quality ornaments; a collection which would be practically impossible to assemble on your own. Indeed, many of the monthly selections are created *exclusively* for the Club.

Each month, you will receive a splendid ornament. For you and your family, it will be as if Christmas arrives every month with each delivery.

Each ornament will be painstakingly crafted from the finest materials. Many will be hand-decorated. Some will be crystal, some porcelain, others pewter and still others wood. Moreover, as a member you will have the opportunity to acquire at a very attractive price a handsome collector chest to store your ornaments.

No Risk or Obligation

If you are not delighted with any month's ornament selection, you may simply return it within thirty days for a full refund. You may cancel your membership at any time.

Modest Cost

One of the nice things about collecting these ornaments is that besides being beautiful they don't cost a lot. The Club's regular monthly ornament selections cost from $5 to $10 each.

Now is the Best Time to Join!

To become a member of The Christmas Ornament Collectors Club, send in your application today. There's no membership fee and you need send no money now. Act today and receive your first ornament in time for this Christmas.

FREE!
A colorfully hand-painted wood soldier is yours free as a member – it's our special welcoming gift for joining.

Wood Soldier shown actual size.

MEMBERSHIP APPLICATION
090

The Christmas Ornament Collectors Club

The Christmas Ornament
Collectors Club
14 Finance Drive
Danbury, Conn. 06810

Please return by November 30, 1985.

Please enroll me in The Christmas Ornament Collectors Club. Each month I will receive a different ornament, crafted from the finest materials. I need send no money now. I will pay for each new ornament as billed on a monthly basis. The ornaments will cost from $5 to $10. Any ornament I am not satisfied with may be returned within thirty days for replacement or refund and this membership can be canceled by either party at any time. Upon acceptance as a new member, I will receive a hand-painted wood soldier ornament as a free gift.

Name _____
PLEASE PRINT CLEARLY

Address _____

City _____

State/Zip _____

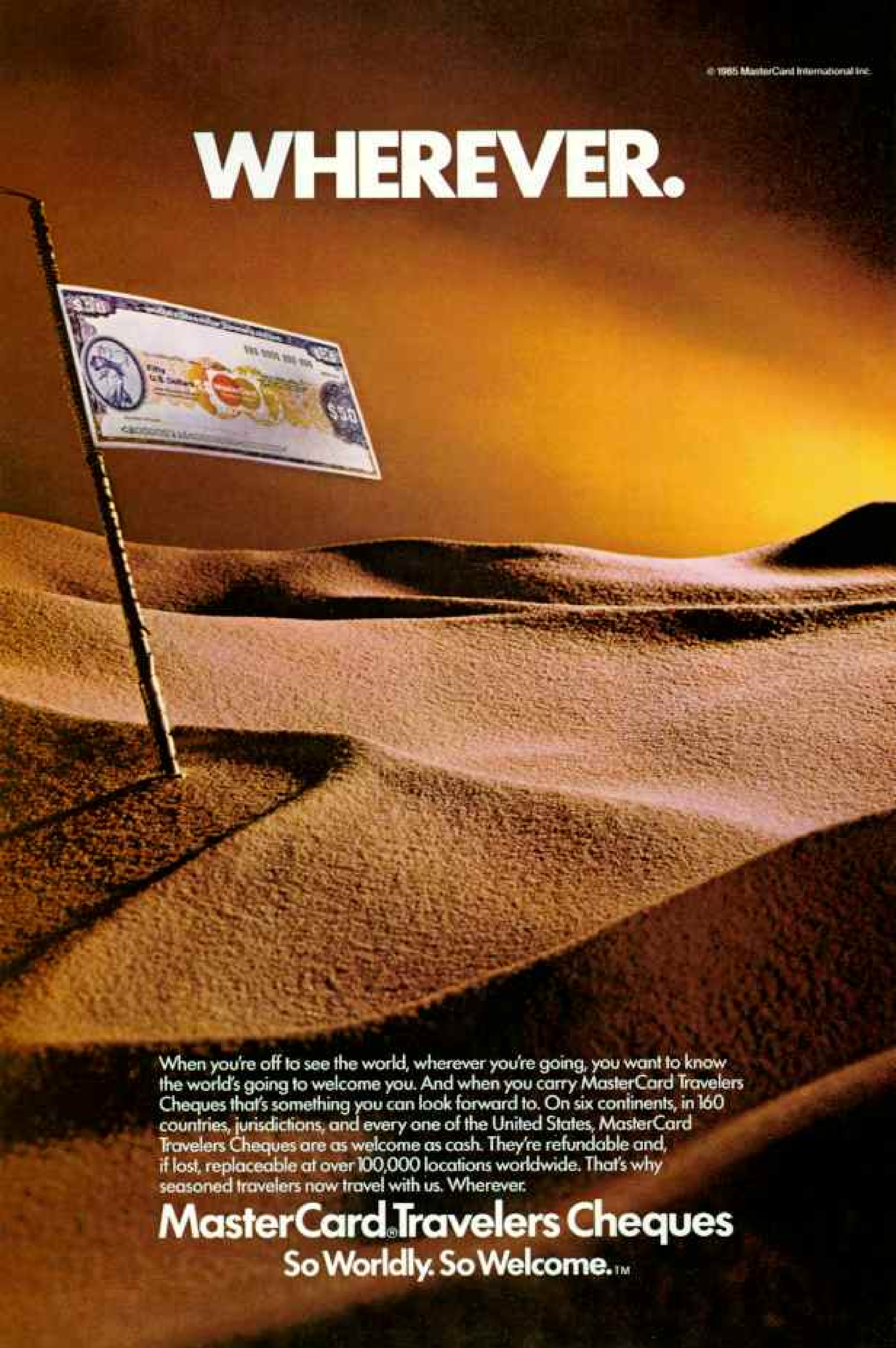
Check here if you want each ornament charged to your: ☐ VISA ☐ MasterCard

_____
Credit Card No. Exp. Date

Signature _____

Allow 8 to 12 weeks for initial shipment.

WHEREVER.



When you're off to see the world, wherever you're going, you want to know the world's going to welcome you. And when you carry MasterCard Travelers Cheques that's something you can look forward to. On six continents, in 160 countries, jurisdictions, and every one of the United States, MasterCard Travelers Cheques are as welcome as cash. They're refundable and, if lost, replaceable at over 100,000 locations worldwide. That's why seasoned travelers now travel with us. Wherever.

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Members Forum

The Nile

Thank you, Robert Caputo, for taking me on the journey of my dreams, "Up the Nile" (May 1985). I went every step of the way, following the accompanying map! Where are we going next?

Mrs. Gloria Morris
Wheeling, West Virginia

The Boers believed they had found the source of the Nile during the Great Trek north from the Cape Colony in the 1840s and named the stream they had found Nylstroom—Afrikaans for "Nile stream," a name that still graces a Transvaal river and town.

Geoffrey H. Sperber
Edmonton, Alberta

Farouk El-Baz mentions the charges by critics of the dam that it has "caused a rise in groundwater levels in the Nile Valley down to Cairo." There is nothing adverse about rising groundwater levels in arid agricultural lands.

Pedro L. Vivas, Jr.
Ponce, Puerto Rico

The High Dam has made water so readily and amply available on a year-round basis that it is overused by farmers, causing both waterlogging of the soil and rising salt levels.

The Atom

In the May 1985 article "Worlds Within the Atom" are no fewer than four statements as if the big bang theory were a fact. Is it not just a theory? It does little for my self-image to read that my ultimate beginning came about as the result of a cosmic belch.

Stanley A. Tucker
Carbondale, Illinois

The big bang is the current theory of the beginning of the universe, accepted by most scientists.

For years I have tried to follow developments in particle physics. It is high time, I often thought, for a down-to-earth summary of this labyrinthine topic. And here it is: straightforward and visually rich.

Maria Bajnoczy
Toronto, Ontario

On page 652 the statement is made, "Atoms are end products, born to a 10,000-year-old universe and far removed from big-bang conditions." Can additional information be provided on the theory behind and evidence for a 10,000-year-old atom?

James G. Helgeson
Spokane, Washington

The statement does not say an atom is 10,000 years old, but that atoms did not exist until the universe was 10,000 years old. Prior to that time the high temperature in the universe made electrons too energetic to be bound into atoms.

Temperatures "as high as 7,000 trillion degrees Celsius" and in the laboratory! Is John Boslough reflecting reality?

S. Gaunt
The Hague, Netherlands

When subatomic particles collide within the accelerator, temperatures as high as 7,000 trillion degrees Celsius are produced, but only in microscopic areas for the tiniest fraction of a second.

Bob Marshall

Taking a hike with Bob Marshall (May 1985) seemed equal to hitching a ride with a truck on an interstate highway. Although I respect his indomitable spirit and endurance, I feel that perhaps he was carrying his New York City roots with him or the rush-rush-rush syndrome versus the slow-and-let's-see attitude of mountainfolk.

Eric Garrison
Wappingers Falls, New York

Having experienced the backcountry of "the Bob" firsthand, I can only say that the inner peace it gives to one's state of mind far outweighs any limited benefit that oil and gas may provide.

David L. Smith
Great Falls, Montana

Moguls

In your article (April 1985) you mention Jahangir and his wife Nur Jahan. Jahangir said all he needed was some wine and food; he had Nur Jahan to rule the kingdom. And rule it she did! Twice she put down revolts, she appeared on coins, appointed many of the high posts of the government, plus she carried on the daily administration of the kingdom.

Amy Hutzel
Cincinnati, Ohio

Written history can be deadly dull and dry, but not this time. I read much of it to my young granddaughter, who was as fascinated as I.

Loretta T. Scheffer
Fort Walton Beach, Florida

Austria

Tirolean hats off to Mr. Putman and Mr. Woolfitt for "Those Eternal Austrians" (April 1985). My favorite country never looked better. So glad you featured a story on a country where constant scenery and warmhearted citizens make every visitor want to return again and again.

Daniel Steppan
Chicago, Illinois

I share old Bismarck's view that Austria and Germany are better off separated and history

cannot be turned back 1,000 years. It seems good that the enthusiasm I saw from many Austrians for Hitler's *Anschluss* was little mentioned in your article.

H. C. Gloss
Nice, France

You state that King Richard the Lionhearted was imprisoned in Dürnstein Castle near the Danube. The natives of Annweiler claim it was in Trifels Castle.

Neil Andersen
APO New York

Richard I was captured in December 1192 by Austria's Duke Leopold V and held in Dürnstein for three months. He was then transferred to Trifels, where he remained for about a year.

Alps Map

In your map "The Alps," I noticed a mistake: "Romansh, an official Swiss language. . . ." German, French, Italian, and Romansh are Swiss national languages, but only German, French, and Italian are official languages.

Anton Andereggen
Portland, Oregon

NR-1

I am an outer-space-program follower, but I'll become an inner-space follower, too, if more articles on the NR-1 are written.

June E. Cooley
San Jose, California

I would like to know why the NR-1 submarine described in the April 1985 issue has wheels. Does it drive along the bottom like a car?

Ann B. Patterson
Garland, Texas

On a smooth ocean floor the submarine uses less power rolling on wheels than hovering.

Isle Royale

Your article (April 1985) states that in 1949 "came a predator—the wolf." What happened to all the wolves that inhabited the island in 1931? My husband, a friend, and I spent 17 days on Isle Royale spotting ospreys, watching and listening to the loons, and being serenaded by wolves almost every evening.

Mrs. George E. Cann
Saginaw, Michigan

The "wolves" were probably coyotes, commonly termed "brush wolves," that disappeared after the true timber wolf arrived in the late 1940s.

You brought back memories from 1938, when 40 Boy Scouts from Grand Haven, Michigan, experienced the wonders of unspoiled plant and animal life on Isle Royale. Our greatest challenge arose because our chartered boat was 72 hours late in picking us up. One has not lived until he is

faced with feeding 40 teenagers for three days *after* you have broken camp.

Tom Colten
Baton Rouge, Louisiana

Hazardous Waste

While reading your article on hazardous waste (March 1985), the chemical 2,4,5-T (Agent Orange) rang a bell. Had I not seen those numbers somewhere before? Checking my over-the-counter homeowner garden chemicals, I found those questionable numbers on a can of herbicide. Knowing that 2,4,5-T is off the market, I can't help but wonder how much is still out there in someone's garage waiting to be sprayed on us.

Fraser H. Kershaw
State College, Pennsylvania

Your herbicide is probably Silvex, a cousin of 2,4,5-T; both contain dioxin. Since some 90 percent of all homeowners use pesticides, there are probably many old containers on garage shelves. Local EPA offices should know of disposal sites.

Susquehanna

Your March 1985 article stated that "at least 250,000 deer a year are taken." The April 1985 Pennsylvania Game News gives the official 1984 harvest as 140,180.

Mark R. Montgomery
Fairchance, Pennsylvania

The Pennsylvania Game Commission suggested that we double the official reported number to get a realistic total, since hunters report only about half the deer actually killed.

Explorer

We want to thank you for making such fine television viewing available; it is a pleasure to watch high-quality, varied, and interesting programs.

Mr. and Mrs. Ronald W. Sandefer
Paducah, Kentucky

I am happy to hear about your EXPLORER program, as it will bring truly worthwhile TV to more people. However, I am pained that I am not to be one of them. We do not have cable TV, and Nickelodeon is not even offered in San Antonio.

Sandra Barnes
Boerne, Texas

Only cable, which is available to three-fourths of our U. S. members, offers the opportunity to present a three-hour weekly video magazine. We are investigating ways, such as videocassettes, to make EXPLORER available to those who do not get cable. And we are committed to continuing our Television Specials on Public Broadcasting.

Letters should be addressed to **Members Forum,** *National Geographic Magazine, Box 37448, Washington, D. C. 20013, and should include sender's address and telephone number. Not all letters can be used. Those that are will often be edited and excerpted.*

Photographed by Günter Ziesler. ***Black Caiman:*** *Genus: Melanosuchus Species: niger* ***Adult size:*** *Known to exceed 6m in length, but large specimens are now rare* ***Adult weight:*** *Approx 322kg for 4.5m* ***Habitat:*** *Inhabits quiet river backwaters, lagoons, and flooded forests or grasslands in the Amazon basin* ***Surviving number:*** *Largest known population, in French Guiana, is estimated at around 1,000*

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

The enormous size of the black caiman and the extraordinary quality of its hide have made this reptile a favorite target of hide-hunters since the 1930's. Once widespread throughout the Amazonian region, millions of black caimans were killed for their hides in just a few decades. Such exploitation, along with the hunting that continues today, has resulted in the severe decimation of this once abundant species.

Nothing could bring the black caiman back should it vanish completely. And while photography can record it for posterity, more importantly photography can help save it and the rest of wildlife.

Stringent protection measures are required to keep the remnant black caiman populations flourishing in their last remaining haunts. Photography can help promote a better understanding of the ecological importance of this species in the Amazonian rivers, while alerting people to the urgent need to ensure the survival of this largest of New World crocodilians.

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

Canon

Images for all time

Why every kid should ha

Today, there are more Apples in schools than any other computer.

Unfortunately, there are still more kids in schools than Apples.

So innocent youngsters (like your own) may have to fend off packs of bully nerds to get some time on a computer.

Which is why it makes good sense to buy them an Apple® IIc Personal Computer of their very own.

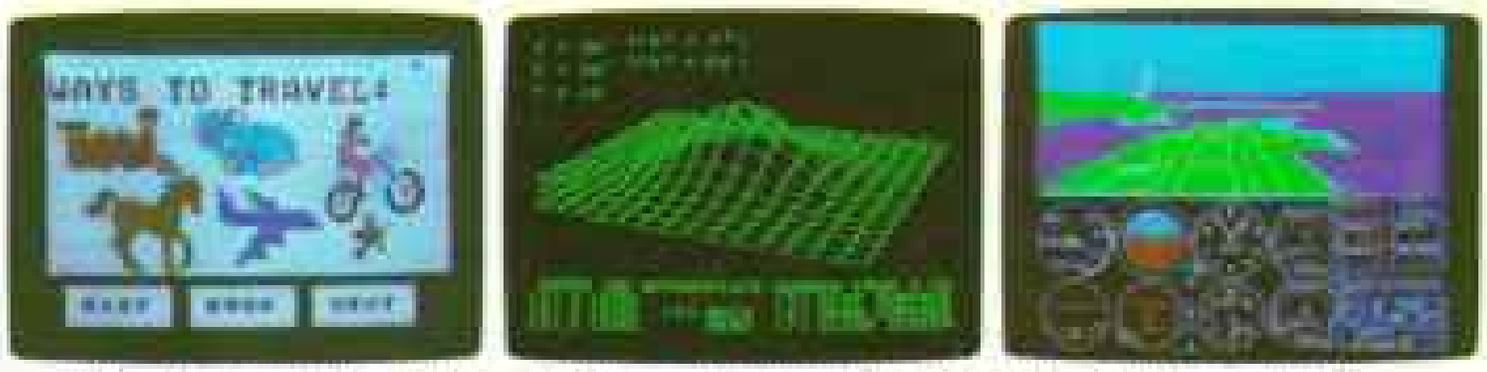
The IIc is just like the leading computer in education, the Apple IIe. Only smaller. About the size of a three-ring notebook, to be exact.

Of course, since the IIc is the legitimate offspring of the IIe, it can access the world's largest library of educational software. Everything from Stickybear Shapes™ for pre-schoolers to SAT test preparation programs for college hopefuls.

In fact, the IIc can run over 10,000 programs in all. More than a few of which you might be interested in yourself.

For example, integrated 3-in-1 business software. Home accounting and tax programs. Diet and fitness programs.

Not to mention fun programs for the whole family. Like "Genetic Mapping" and "Enzyme Kinetics."



With a IIc, your kid can do something constructive after school. Like learn to write stories. Or learn to fly. Or even learn something slightly more advanced. Like multivariable calculus.

And the Apple IIc comes

ve an Apple after school.

complete with most everything you need to start computing as soon as you get it home.

Including a free 4-diskette course to teach you how—when your kids get tired of your questions.

As well as a long list of standard built-in features that would add about $800 to the cost of a smaller-minded computer.

128K of internal memory—twice the power of the average office computer.

A built-in disk drive that could drive up the price of a less-senior machine considerably.

And built-in electronics for adding accessories like a printer, a modem, an Apple-Mouse or an extra disk drive when the time comes.

In its optional carrying case, the IIc can even run errands from home.

So while your children's shoe sizes and appetites continue to grow at an alarming rate, there's one thing you know can keep up with them. Their Apple IIc.

To learn more, visit any authorized Apple dealer. Or talk to your own computer experts.

As soon as they get home from school.

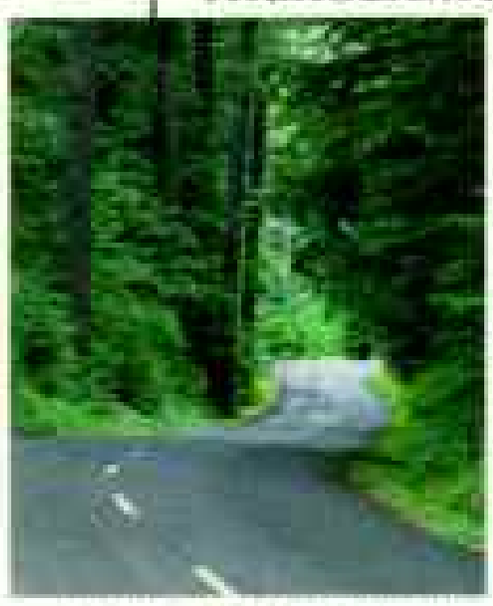
Thunderoads.

Conzelman Road, California

Get it together — Buckle up.

The engineers who designed these roads knew that they'd present a challenge. But they never expected that some would drive these roads in a Thunderbird for precisely that reason.

On roads with long, smooth straightaways, Thunderbird's sleek lines use the wind to improve the car's stability and road control at highway speeds.



Route 101, Washington

There

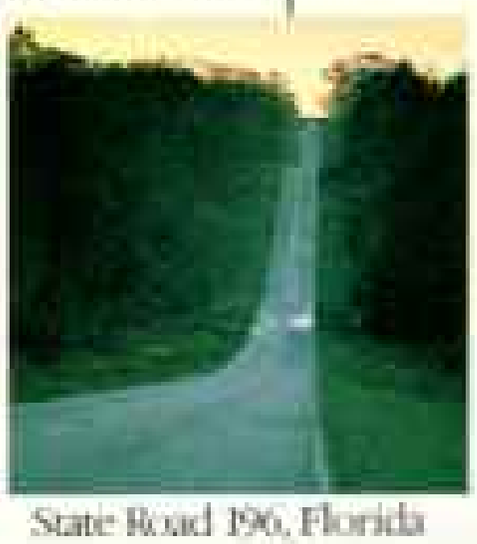
Route 112, New Hampshire

are also great driving roads with twists and turns that define the term "serpentine." On this kind of road, Thunderbird's precise steering and all-season radials do an excellent job of unwinding the road.

You may even know of a special road that closely resembles an asphalt roller-coaster.

On this kind of pavement, Thunderbird's gas-filled struts and shocks, and modified MacPherson front suspension excel.

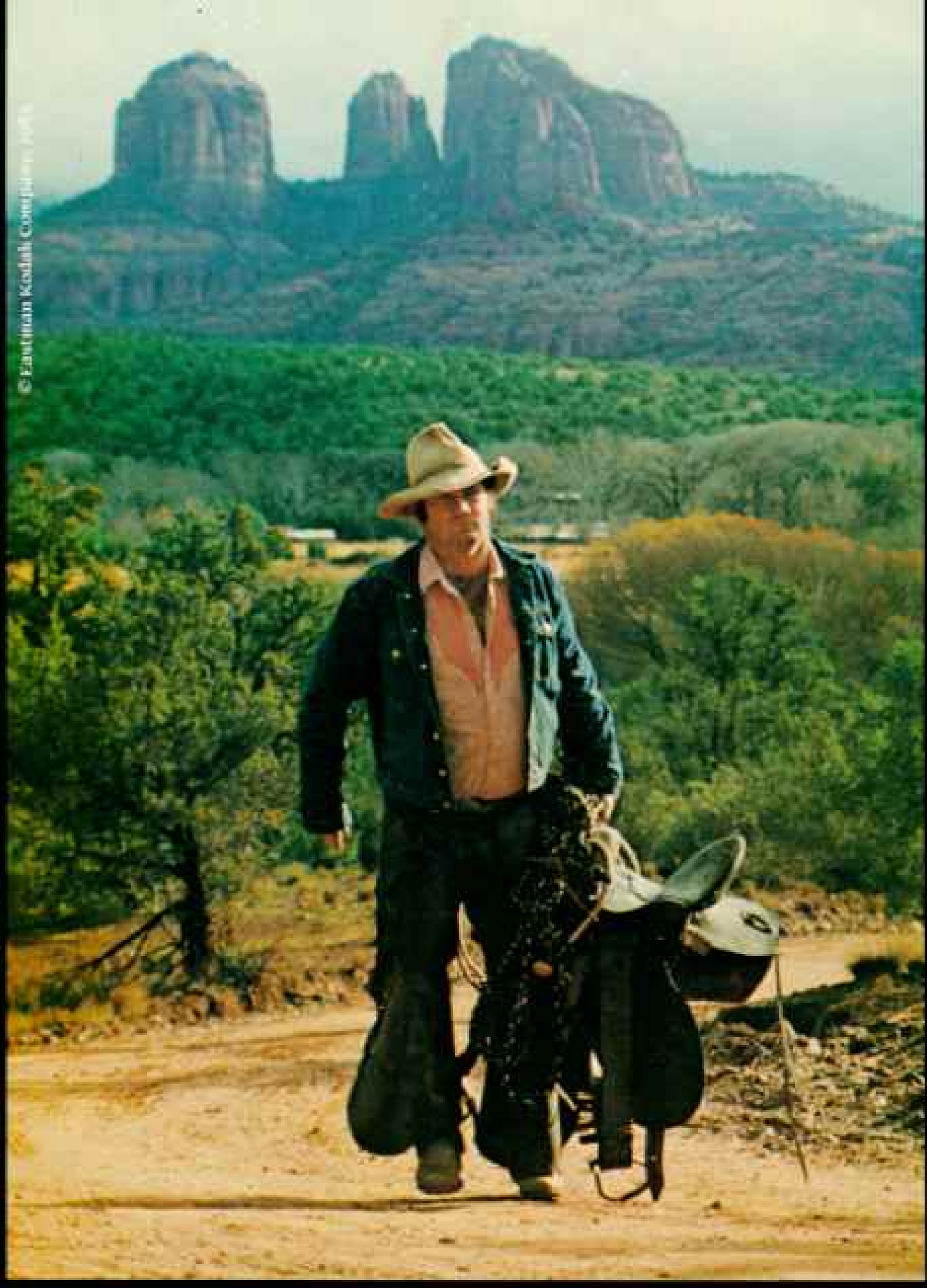
On roads like these throughout the country, a very select group of drivers are discovering the meaning of Thunderoads.



State Road 196, Florida

Have you driven a Ford... lately?

Ford



Capture the local color.

From purple mountain majesties. To a vanishing breed of real-life hero. Remember everything you see and feel along the way with Kodacolor VR 200 film. So versatile, even if the sun goes down or a colorful character disappears into the shadows, you'll bring home breathtaking beauty and the true spirit of your travels.

Kodak film. Because time goes by.

"If you want to be the best, you have to separate yourself from all the talk about quality. And put it in writing."

Lee A. Iacocca

Only Chrysler has the confidence to back
with a 5-year or 50,000-

For years a lot of sophisticated car buyers felt that they had to look to Japan for the quality they wanted in a new car. But Chrysler has changed all that. First by building better cars than we ever did before. Cars that prove in daily use they stand up better. According to warranty repair records, our quality has improved dramatically over the last five years.

This is no accident. Our commitment to quality is the thrust behind our drive to be the best.

"Anything else is just talk."

the quality of every car and truck it builds mile Protection Plan.

From the initial stages of the design through manufacturing and testing, our cars are engineered with the aid of computers. We're able to achieve more reliable and durable cars. They're assembled in some of the world's most technologically advanced plants. They're built by workers who are trained and dedicated to produce the best vehicles you can buy.

Our confidence in our quality allows us to back every car we build—every Plymouth, every Dodge and every Chrysler—with a 5-year or 50,000-mile Protection Plan* on the engine and powertrain, even the turbo, and against outer body rust-through. And we back every truck we build the same way. Nobody else gives you that protection on all its vehicles. Not Ford. Not GM. Not Toyota, Nissan or Honda. Not anybody. Only Chrysler.

Quality isn't something we just talk about. We put it in writing with our 5/50 Protection Plan.* And it doesn't cost you a cent extra.

The New Chrysler Corporation.

We don't want to be the biggest. Just the best.

*Whichever comes first. Limited warranty. Deductible applies. Excludes leases. Dealer has details.

Buckle up for safety.

Over a century of commitment to long distance.

Calls that sound as close as you feel.

Calling anywhere, anytime.

Only AT&T has over 35,000 operators to give you any help you may need.

Guaranteed discounts off AT&T's Day Rate.

Only AT&T offers calling to over 250 countries and faraway locations worldwide.

AT&T puts it all on the line for you.

AT&T makes sure you have all the long distance services you need.

Our long distance operators are there for you to call upon 24 hours a day. To help with collect or person-to-person calls, and to give immediate credit for wrong numbers.

Because AT&T has over 100 years of experience providing quality long distance service, you know your calls will sound as close as next door.

And that's not all. You get savings along with all these services. Dial direct state-to-state Sunday-Friday from 5pm-11pm, and you save 40% off AT&T's Day Rate.

All weekend till 5pm Sunday and every night from 11pm till 8am, save 60%. (Different discounts apply to Alaska.)

Plus, AT&T has special programs and plans that can help make your long distance dollar go even farther.

Who says you can't have it all?

Reach out and touch someone.®

AT&T
The right choice.

In September on Nickelodeon Cable TV: National Geographic EXPLORER

EACH SUNDAY'S PROGRAMMING IS REPEATED THE FOLLOWING SATURDAY FROM 8 TO 11 P.M. (EDT)

Sunday, Sept. 1

• 5:00 CAMERAS ON THE MOVE
Garrett Brown, inventor of Steadicam and Skycam, takes his mobile cameras on the road.

• 5:15 AFRICAN HUNTERS
Safari hunters help finance wildlife conservation in Zimbabwe.

• 6:15 AMATEUR NATURALIST
Join Gerald and Lee Durrell as they explore England's 900-year-old New Forest.

• 6:45 DROUGHT
Cycles of drought, fire, and flood scourge the land and people of Australia's outback.

• 7:45 HUMAN-POWERED VEHICLES
The world's most bizarre cycles rally in England.

Sunday, Sept. 8

• 5:00 FORMULA R — REINDEER RACING
Celebrating the long winter's end, Laplanders hold an unusual contest.

• 5:15 CLOUDWALKER
Renowned climber Jeff Lowe tackles Alaska's fearsome Moose's Tooth mountain.

• 6:00 THE SAMURAI FROM TWICKENHAM
A British samurai wins the honor of competing in Japan's Soma Wild Horse Chase.

• 6:45 POLAR BEAR ALERT
Dangerous visitors come to town in this classic National Geographic Special.

• 7:45 CAPE DISAPPOINTMENT
Coast Guard trainees ride rough waters in Washington State.

Sunday, Sept. 15

• 5:00 FIREWORKS MAKER
Marcelo Ramos lights Mexican fiestas with castles of fire.

• 5:15 BIRDSVILLE
The thirty inhabitants of this isolated Australian town play host to thousands at their annual horse race.

• 5:45 DESIRE OF THE MOTH
The much accursed moth is tenderly portrayed in all its guises, from larva to winged creature of the night.

• 6:45 THE LAND THAT DEVOURS SHIPS
Divers search Canada's arctic waters to find the *Breadalbane*, an 1853 shipwreck.

• 7:45 AVALANCHE INSTITUTE
Swiss scientists study a major peril of the mountains.

Sunday, Sept. 22

• 5:00 SMOKE JUMPERS
Parachuting fire fighters battle for the nation's forests.

• 5:15 WATER, BIRTH, PLANET EARTH
A lyrical look at water as the source of all life.

• 6:15 SUPERCHARGED
The history of Grand Prix racing's grandest cars, 1924 to 1939.

• 7:00 IMPRESSIONS OF VENICE
A poetic portrait set to music by Tommaso Albinoni.

• 7:15 OUR GOD IS A WOMAN
On a West African island, sex roles are dramatically reversed.

• 7:40 SAUDI CAMEL RACE
Bedouin and city dwellers honor their desert heritage at the king's camel race.

Sunday, Sept. 29

• 5:00 VETERINARY VANGUARD
Animals get first-class care at a high-tech hospital.

• 5:15 JOURNEY TO HAINAN
Tropical beauty and abundance surround village life on China's unspoiled island of Hainan.

• 5:55 OVER ICE
Walls of ice challenge a special breed of climber in the Alps.

• 6:15 FAMILY OF CHIMPS
Chimpanzees in a Dutch zoo have created an intriguing social structure.

• 7:15 AMATEUR NATURALIST
The Durrells journey to Canada's northern forests.

• 7:45 MOHAWKS HIGH UP
Indians help build New York City's skyline.

SEE EXPLORER on Sundays: 5 p.m. Eastern/4 p.m. Central/3 p.m. Mountain/5 p.m. Pacific
and Saturdays: 8 p.m. Eastern/7 p.m. Central/6 p.m. Mountain/8 p.m. Pacific
NOTE: Some Pacific time zone subscribers receive EXPLORER 2 p.m. Sunday, and 5 p.m. Saturday. Consult local listings or call your cable operator.

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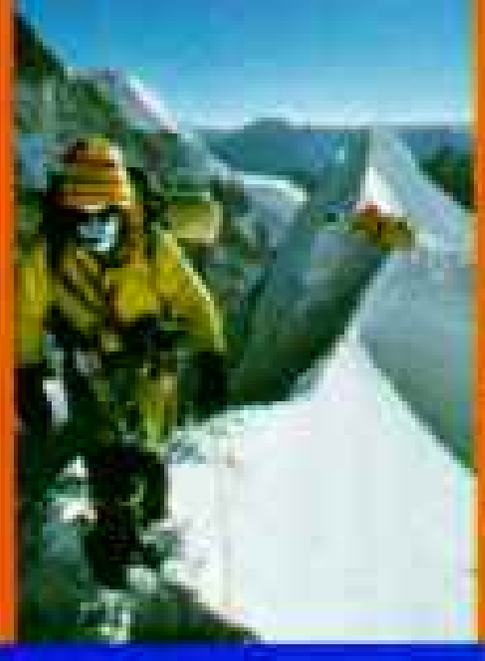
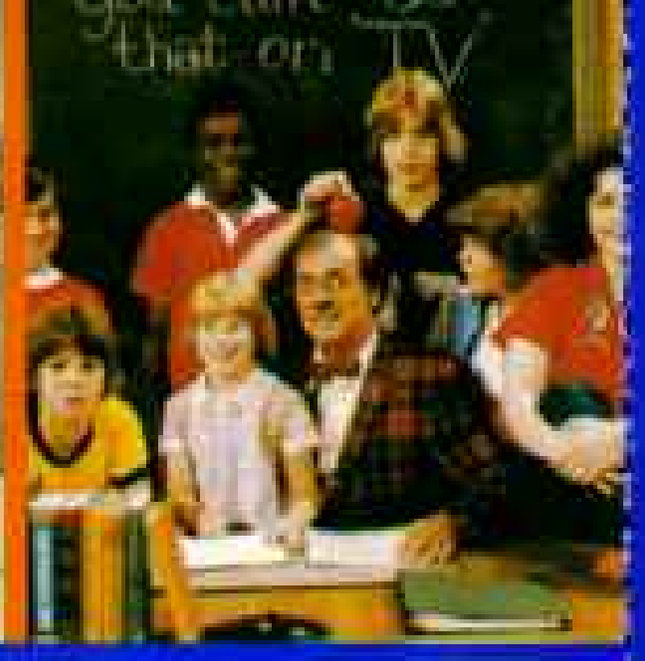




Nickelodeon, America's most respected cable network for children, is now for adults, too! We've enriched our programming with the prestigious National Geographic EXPLORER series. And thanks to the new Nick at Nite, Nickelodeon brings you quality television 24 hours a day.
To get Nickelodeon, call your local cable company.

September on Nickelodeon!

EASTERN TIME	MONDAY THROUGH FRIDAY
7:00–7:30 AM	Black Beauty ★
7:30–8:00	Lassie
8:00–8:30	Belle & Sebastian/The Little Prince
8:30–9:00	Today's Special
9:00–2:00 PM	Pinwheel ★
2:00–2:30	Today's Special
2:30–3:00	Belle & Sebastian/The Little Prince
3:00–3:30	Black Beauty
3:30–4:00	Lassie
4:00–4:30	You Can't Do That On Television
4:30–5:30	Turkey Television
5:30–6:00	Dennis the Menace
6:00–6:30	MON-WED: Mr. Wizard's World / THU-FRI: Out of Control
6:30–7:00	Nick Rocks
7:00–7:30	You Can't Do That On Television
7:30–8:00	Dangermouse

	SATURDAY	SUNDAY
7:00–9:00 AM	Pinwheel ★	
9:00–9:30	Out of Control	Powerhouse
9:30–10:00	Mr. Wizard's World	
10:00–10:30	Lassie	
10:30–11:00	The Little Prince	
11:00–11:30	Nick Rocks	Belle & Sebastian
11:30–12:00		Dangermouse
12:00–12:30 PM	You Can't Do That On Television	
12:30–1:00	Dangermouse	Nick Rocks
1:00–1:30	Belle & Sebastian	
1:30–2:00	Lassie	
2:00–4:00	Special Delivery	
4:00–5:00	Standby... Lights! Camera! Action!	
5:00–6:00	Livewire	EXPLORER
6:00–6:30	Out of Control	
6:30–7:00	Nick Rocks	
7:00–7:30	YCDTOTV	
7:30–8:00	Dangermouse	

Nick at Nite™

	MONDAY THROUGH FRIDAY
8:00–8:30	Dennis the Menace
8:30–9:00	The Donna Reed Show
9:00–11:00	Nick at Nite Movie
11:00–12:00	Turkey Television
12:00–1:00 AM	Route 66
1:00–1:30	Dennis the Menace
1:30–2:00	The Donna Reed Show
2:00–4:00	Nick at Nite Movie
4:00–5:00	Turkey Television
5:00–6:00	Route 66
6:00–6:30	Dangermouse★
6:30–7:00	Nick Rocks

	SATURDAY	SUNDAY
8:00–8:30	EXPLORER	Dennis the Menace
8:30–9:00		Donna Reed
9:00–11:00		Movie
11:00–12:00	Turkey Television	
12:00–1:00 AM	Route 66	
1:00–1:30	EXPLORER	Dennis the Menace
1:30–2:00		Donna Reed
2:00–4:00		Movie
4:00–5:00	Turkey Television	
5:00–6:00	Route 66	
6:00–6:30	Dangermouse★	
6:30–7:00	Nick Rocks	

Schedule is subject to change without notice

★ Watch Bill Cosby on "Picture Pages" after "The Adventures of Black Beauty" and during "Pinwheel" (weekdays at approximately 9:55 am and 12:55 pm and weekends at approximately 7:55 am and 8:55 am) and every day after the 6:00 am showing of "Dangermouse."

Five important things to know before you buy a home appliance.

At Whirlpool, we know that buying a new appliance is a major decision. And that there is more to it than just the selection of color, size and features. So to us, what we can do *in other ways* to make your world a little easier is just as important as what our appliances can do.

Whirlpool promise of quality.

With each Whirlpool® appliance, you get our promise of good, honest quality. It's a promise we're proud of, and one we stand behind by offering a variety of helpful programs like these:

Whirlpool toll-free, 24-hour Cool-Line service.

It's important for you to have someone to talk to whenever you have questions about any of our appliances.

Our Cool-Line® service* is an easy way to get information about proper installation, proper operation, or even hints on saving energy. Plus, it's a great way to get help should you ever have a problem with a Whirlpool appliance.

Whirlpool Do-It-Yourself Repair Manuals.

We now offer manuals that can make do-it-yourself work easier. You can obtain them through Whirlpool dealers, parts distributors or Tech-Care® service companies. We have them for our automatic washers, dryers, dishwashers and trash compactors. And soon to come, manuals for our ranges and refrigerators.

Whirlpool Tech-Care service.

If you need service on any of our appliances, our independently owned Tech-Care service franchises make sure you get it. They have the right equipment, and highly trained personnel ready to answer your call. Just look in the Yellow Pages.

Whirlpool Instant Service Parts.

Our WISP® parts service is designed to reduce your waiting time for a special-order part. It's processed within 24 hours, then given special handling and shipping at *our* expense.

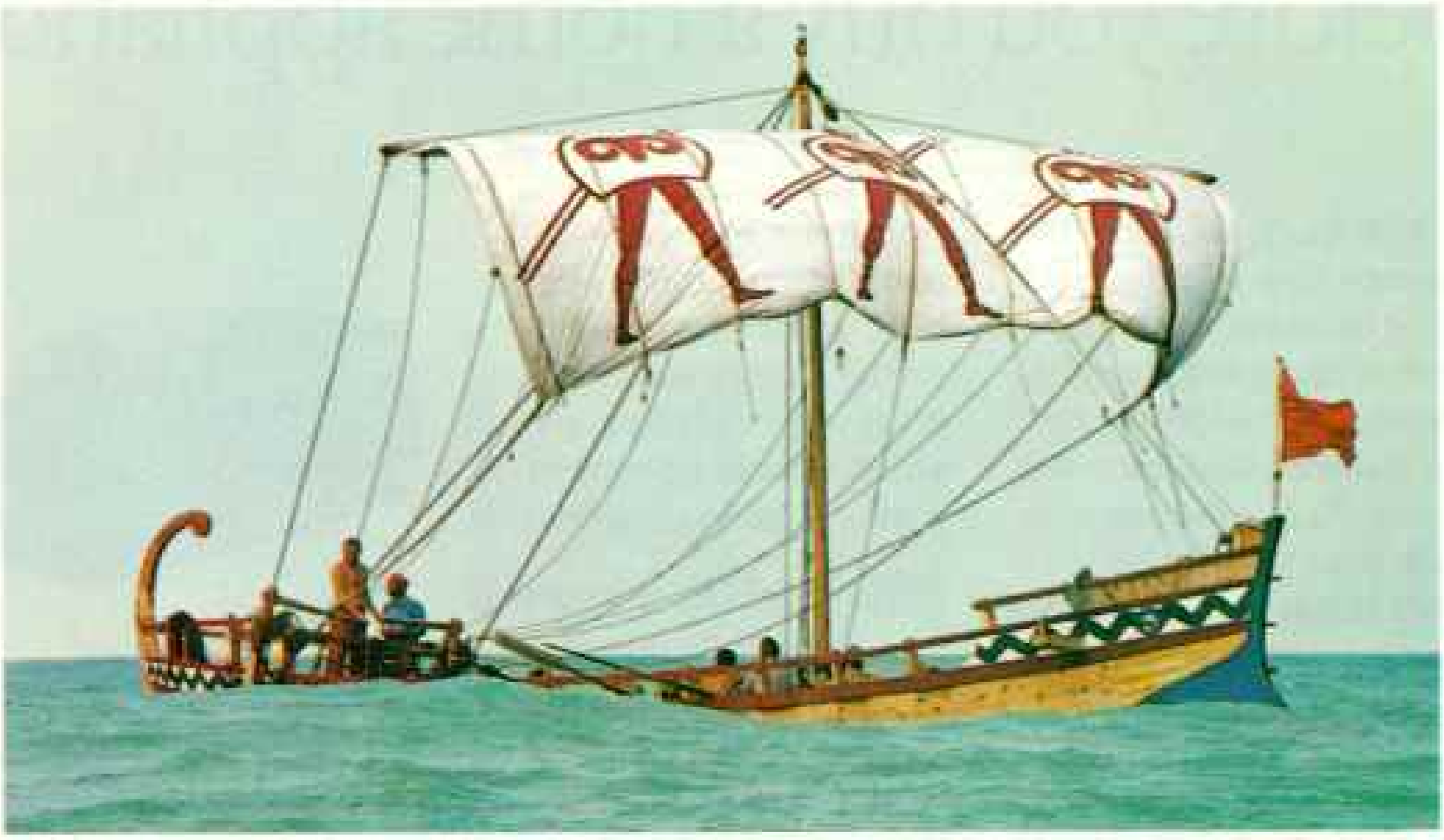
So *before* you buy your next home appliance, think about these five important things that you can count on *later*. Like our appliances, they're designed to make your world a little easier.

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

Whirlpool
Home Appliances

Making your world a little easier.

On Assignment



"IT CAN'T BE DONE—it's not real," said a classics scholar when adventurer ***Tim Severin*** set out to trace the mythical voyage of Jason and the Golden Fleece. But three months after launching from Greece in May 1984, Severin and his modern Argonauts reached Jason's destination, today's Soviet Georgia. In the Black Sea port of Poti, Georgians welcomed Severin (***right, bottom***) with flowers and song. "I never realized," he said, "how much the story of Jason remains alive in Georgian tradition."

Literary and pictorial evidence of early Aegean ships guided the design of Severin's *Argo*, built of pine by a Greek shipwright. Decorations on ancient pottery inspired her painted hull. Her sail, here hoisted in Soviet waters (***above***), bears stylized Mycenaean warriors. Rowing for more than half the journey, crew members averaged 300,000 strokes; blisters never had a chance to heal (***right, top***).

Born in India and educated in England and the U. S., Severin has traveled in the wake of such explorers as St. Brendan of Ireland (December 1977) and Sindbad the Sailor (July 1982). This navigator in search of the past now sets his sights on the wanderings of Ulysses.

ALL BY JOHN EGAN

You need a lot of truck. A truck that carries everything from tools and materials to a cab full of help. A truck that hauls everything but a heavy price.

You need a Toyota Standard Bed.

No standard small truck comes with more power. The 2.4 liter engine in the Standard Bed churns out 103 horsepower. Enough torque to move 1,400 lbs.** of whatever you're carrying with no problem.

This truck is built to work hard. But you don't have to work at all to get important features like fully transistorized ignition, vented, power assisted front disc brakes, power assisted steering, and tough, dependable full box-frame construction. All standard equipment on this truck.

1400 lbs. PAYLOAD**

If you're hoping the Standard Bed handles passengers as well as it handles cargo, you've come to the right truck. Seating in the spacious cab allows plenty of leg and headroom for three.

And if you consider yourself tough on your vehicle, consider this: Toyota owners reported the lowest incidence of repairs for any small truck—imported or domestic.***

Toyota Standard Bed. Own one and you'll be carrying everything you ever wanted. Everything except a big monthly payment.

OH WHAT A FEELING!
TOYOTA

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

**Including occupants, equipment, and cargo.
***1984 J. D. Power Compact Pickup Truck Survey.
†Calendar year 1984, Ward's Automotive Report.

#1 SELLING SMALL TRUCK IN AMERICA.†

TOYOTA'S 1985 STANDARD BED. CARRIES EVERYTHING EXCEPT A BIG PRICE!

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