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NATIONAL GEOGRAPHIC



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WHAT'S THE RECIPE for turning a monthly magazine into a valuable and useful reference work?

To start, choose a comprehensive and accurate periodical. (We hope you'll agree that we supply that ingredient.) Then meticulously index each issue, as do Jolene Blozis, head of our indexing division, and her staff. Finally, publish and offer this index every six months free to any member of the Society who requests a copy. The index for the last six months of 1983 is now complete; it may be ordered by writing the Society, Dept. 4671, Washington, D. C. 20036.

Also this month we will offer for purchase a completely new hardbound 600-page cumulative index covering 1947 through 1983. For the *GEOGRAPHIC* these were years of spectacular change and growth. The first 128 illustrated pages trace our attempt to chronicle this era of political, social, and scientific upheaval. As described by Society trustee and former astronaut Michael Collins in his introduction, the articles listed "document an explosion of knowledge, resulting in advances on all fronts."

Browsing through this new index, mate to an earlier volume covering 1888-1946, will reveal that many of the titles include such words as endangered, threatened, pollution, disaster, and new. Comfortable social values, accepted scientific theories, and political systems tumbled like tenpins during these turbulent decades. The Zimbabwes and Kampucheas replaced the Rhodesias and Cambodias. *Homo habilis*, at some two million years old, took its place on the lowest known branches of man's family tree. Our knowledge of physics has given us the hydrogen bomb—a many-megaton way to destroy ourselves in a millisecond. That same physics has taken us in another direction—a long step toward understanding the universe in the first millisecond of creation.

Above all, the new index is a useful tool. Whether you're planning a Grand Canyon vacation or trying to comprehend Middle East turmoil, you'll find relevant articles indexed and cross-referenced by subject, title, country or state, author, and photographer.

If you are among the millions of members who keep your *GEOGRAPHICS* filed away in the attic, this new index will give them new life as an instant encyclopedia.

Wilbur E. Garrett
EDITOR

NATIONAL GEOGRAPHIC

April 1984

California East of Eden 424

In that spectacular realm between Santa Barbara and Monterey, Harvey Arden and Craig Aurness explore remnants of old California where residents seek a balance between preservation and exploitation.

Japan's Izu Oceanic Park 465

Clear water, giant crabs, and fantastic corals lure marine biologist Eugenie Clark and photographer David Doubilet to the depths of one of Japan's national marine parks.

The Plain People of Pennsylvania 492

For the Amish and Mennonites of Lancaster County, life revolves around church, family, and the land. Old Order farmers, who shun modern conveniences and treat strangers with caution, permitted Jerry Irwin and Douglas Lee a rare glimpse into their plain ways.

Hunting the Greenland Narwhal 520

Harpoon and kayak arm earth's northernmost people for hazardous pursuit of the unicorn of whales, so termed for its spiraled tusk. Writer-photographer Ivars Silis chronicles the life of these self-reliant Eskimos.

Lord of the Shallows — The Great Blue Heron 540

A majestic flier and canny fisher, America's largest heron faces natural and man-made perils. Naturalist Richard J. Dolesh and photographer Cameron Davidson report on a nesting colony less than 30 miles from the nation's capital.

COVER: *Scouting for narwhals, a sled team struggles across a lead in the ice during the summer melt in Greenland's Inglefield Fjord. Photograph by Ivars Silis.*

THE NATIONAL GEOGRAPHIC MAGAZINE
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THE NATIONAL GEOGRAPHIC SOCIETY
FOUNDED 1888



On the environmentally embattled coast near Santa Barbara—that bastion of the good life—sea lions

By HARVEY ARDEN
NATIONAL GEOGRAPHIC SENIOR STAFF

Photographs by
CRAIG AURNES
WEST LIGHT

East of Eden:

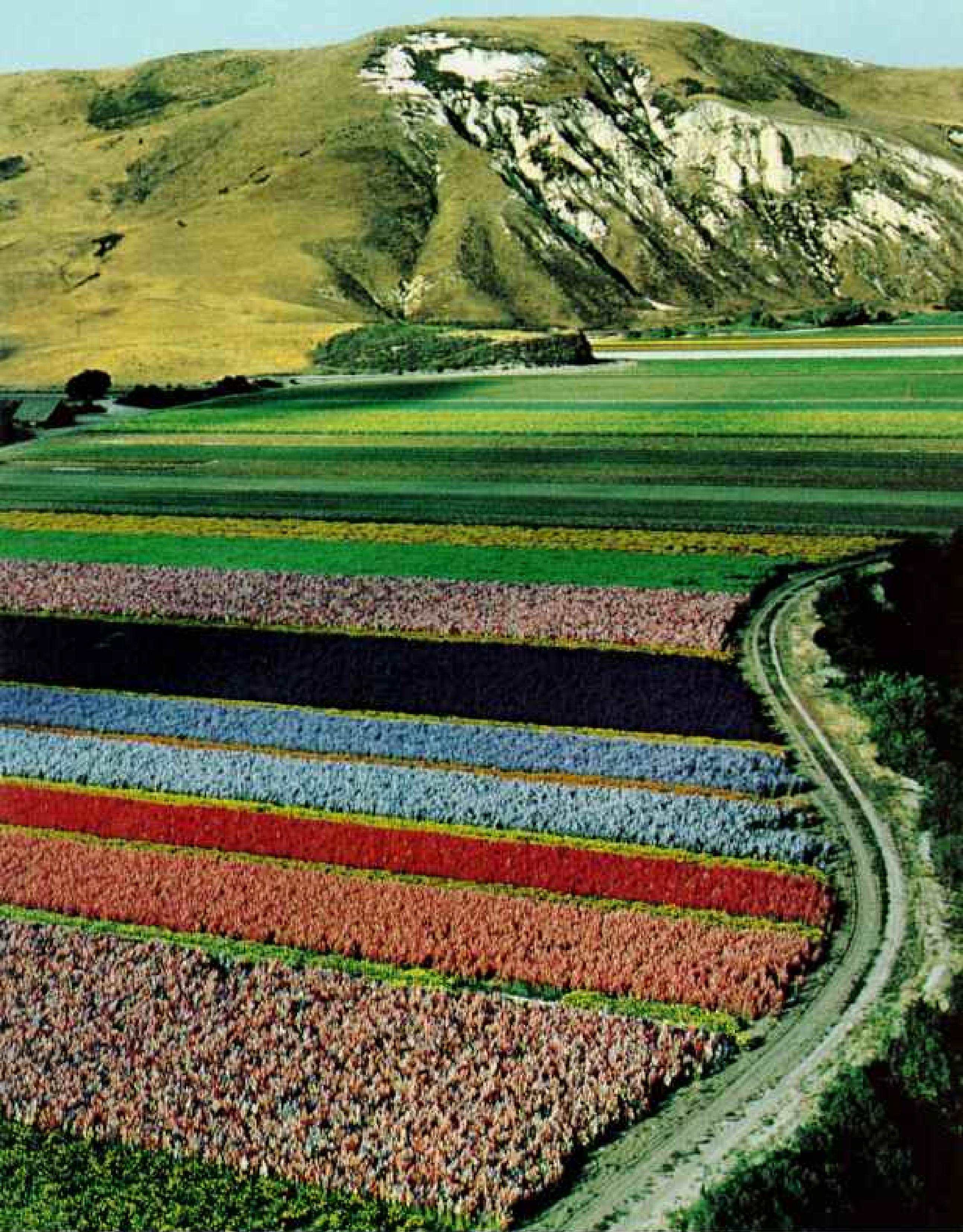


crowd oil lines spawned by huge offshore strikes.
The big question: Can oil and the good life mix?

California's Mid-coast



Wearing a coat of many colors, the Lompoc Valley produces more than half the nation's commercial



flower seeds—everything from popular marigolds and zinnias to sought-after sweet peas.



Relentless Pacific breakers have carved a welcoming doorway to the magnificent Big Sur



country at moody, isolated Pfeiffer Beach—one of myriad marvels on California's south-central coast.

SOMEWHERE north of Los Angeles, south of San Francisco, and east of Eden there's a once-and-future land I call the Middle Kingdom, a tucked-away preserve of the good life, where the old California has been lovingly resurrected. You won't find it labeled on any road map, but look again. . . .

There, where the south-central Coast Range jabs a craggy elbow and shoulder into the Pacific—between the gem cities of Santa Barbara and Monterey—a secluded realm of half-wild mountains lifts to heights of 7,000 feet until cut off by the knife-blade-flat San Joaquin Valley. The elbow is Point Conception, west of Santa Barbara; the shoulder is the Monterey Peninsula. The land they anchor is the Middle Kingdom, a world both between and apart.

Some might argue that I'm simply referring to the four California counties of Santa Barbara, San Luis Obispo, Monterey, and San Benito—collectively somewhat larger than the state of Vermont. But I like to think of this mountainous domain as a land unto itself, a diverse but cohesive unity, a mirror image of California as a whole.

Monterey, with its cool fogs, fisherman's wharf, and sophisticated cultural life, reflects San Francisco, 90 miles north. Santa Barbara, with its red-tile Spanish atmosphere, balmy climate, and heady lifeways, seems a smaller, idealized version of Los Angeles, 90 miles south.

The redwood-studded mountains of Big Sur are the Middle Kingdom's Sierra Nevada. The fertile Salinas Valley—the setting for John Steinbeck's *East of Eden*—parallels the San Joaquin Valley.

The sum of these and other spectacular parts is the Middle Kingdom—an almost Oz-like realm of improbable castles and wildflowered valleys, of dark-shadowed gorges and golden green highland meadows, of wave-eaten sea cliffs and long, lonely beaches, of moldering ghost towns and storybook cities and villages.

And of controversy:

Item: Oil, new oil in staggering quantities—the biggest U. S. strike since Alaska's Prudhoe Bay—has been discovered off Santa Barbara and up the coast off Santa Maria, less than 40 miles as the condor flies from President Ronald Reagan's ranch in the Santa Ynez Mountains.

Santa Barbara, it will be recalled, was the site of the calamitous 1969 oil spill that helped touch off the militant environmentalist movement. Now, with local production likely to soar manyfold by the 1990s, fears renew over future "black tides."

Item: Just 12 miles southwest of the lovely university town of San Luis Obispo, and right in the midst of the heavily touristed beach towns between Pismo Beach and Morro Bay, Pacific Gas & Electric's twin-unit Diablo Canyon nuclear power plant awaits licensing to begin operation after years of battle with antinuclear foes.

In 1971, while plant construction was well under way, geologists discovered a major seismic fault just two and a half miles offshore. The plant was redesigned so as to withstand an earthquake of 7.5 on the Richter scale (the 1906 San Francisco earthquake, by comparison, was approximately 8.3). But in 1981 it was found that blueprints of the redesign had been mixed up. Though all must be corrected before the plant's opening, credibility remains a serious issue. Even if the plant is seismically safe, the planned on-site storage of nuclear waste alarms environmentalists and local residents alike.

Item: In 1985 Vandenberg Air Force Base, near Santa Maria, will host launchings of the new *Discovery* space shuttle. Despite precautions, tremendous sonic booms from the shuttle lift-offs, conservationists fear, may disturb sea life along the coast.

Vandenberg is also the testing site for the MX missile, as it has been for the Minuteman ICBM. Demonstrations have resulted in hundreds of arrests.

Out on the wind-whipped dunes of Vandenberg's 100,000-acre tract, I walked

A real cliff-hanger, fog-shrouded Highway 1—one of the world's most spectacular drives—skirts the precipitous Big Sur coast near Lucia. Severed by dozens of landslides during the battering storms of early 1983, the famous highway is scheduled for reopening to through traffic by this summer.





Pacific Ocean

Set to reopen to through traffic by this summer, spectacular Highway 1 was blocked by massive landslides during the storms of early 1983.

Middle Kingdom— a land between

POISED MIDWAY between the spreading megalopolitan areas of San Francisco and Los Angeles, bracketed by the San Joaquin Valley and the Pacific Ocean, the Middle Kingdom retains its own special identity—a heady mixture of the old California and the new, of missions and missiles, of archconservatism and free-wheeling life-styles, of brooding isolation and headlong exploitation. Some 635,000 lucky residents call the Vermont-size four-county area home—joined each year by millions of visitors who wish they could.

Controversial Diablo Canyon nuclear plant began loading fuel in 1983 and should begin operation this year unless nuclear foes prevent it.

Multisegmented Los Padres National Forest straddles nearly two million acres from rugged inland ranges northeast of Santa Barbara to the wild cliffs of Big Sur. Two special refuges provide sanctuary for the endangered California condor.

among the skeletal space-age gantries with a woman who seems to me a princess of the Middle Kingdom. Her name is Juanita Centeno, and she is a descendant of the Chumash Indians who have resided for millenia along this benign coast.

Though entitled to live on the nearby Santa Ynez Indian Reservation, Juanita keeps a mobile home in the town of Lompoc—a trim, cozy little place with a lovingly tended garden outside and a veritable museum of Chumash crafts and artifacts within. She devotes much of her life to giving demonstrations of Chumash handiwork, especially her wondrous woven baskets.

She also works as an American Indian specialist observer—a position mandated by state law—monitoring archaeological sites unearthed by excavations like those for the space-shuttle launchpad.

Vandenberg, it turns out, is built right over a complex of former Chumash settlements. The shore and dunes are littered with middens—huge refuse heaps of clam, mussel, and abalone shells left by generations of Juanita's ancestors.

"I work right along with the archaeologists," she says. "If they dig up a skeleton, I call the tribe and we arrange for a proper burial. If they find only a bone or two, they let me bury it in a special place I have among the dunes.

"The archaeologists look for Indian sites, but I don't have to look. I can *feel* them. See, over there . . . I herded sheep out there as a girl. We had camps and villages among the dunes. I remember Nocto. I remember Honda. They were our homes.

"Then the government came, and the Indians had to move out. Now the villages are empty, and we can't even visit them without



first getting the Air Force's permission. We no longer have the right to hunt or gather or fish.

"You know, the Creator put us here. We had everything we needed. We lived in harmony, the happiest people on earth. . . ."

This serene existence was rudely and permanently shattered in 1769, when Spanish commander Gaspár de Portolá led a colonizing expedition to the then remote region. (See *The Making of America: Far West*, a historical map supplement with this issue.) Mission-founding Franciscan padres soon followed, led by the illustrious Father Junípero Serra.

Within a few generations the Chumash as a distinct people were all but gone, wiped out by disease and a general loss of tribal identity. Only in recent years have their

descendants reconstituted themselves into tribal units and won official government recognition.

"Well," Juanita says, tears brimming in her eyes, "at least they won't ever dig up my bones. . . . My last wish is to be cremated. My family will sprinkle my ashes here on the land my people roamed."

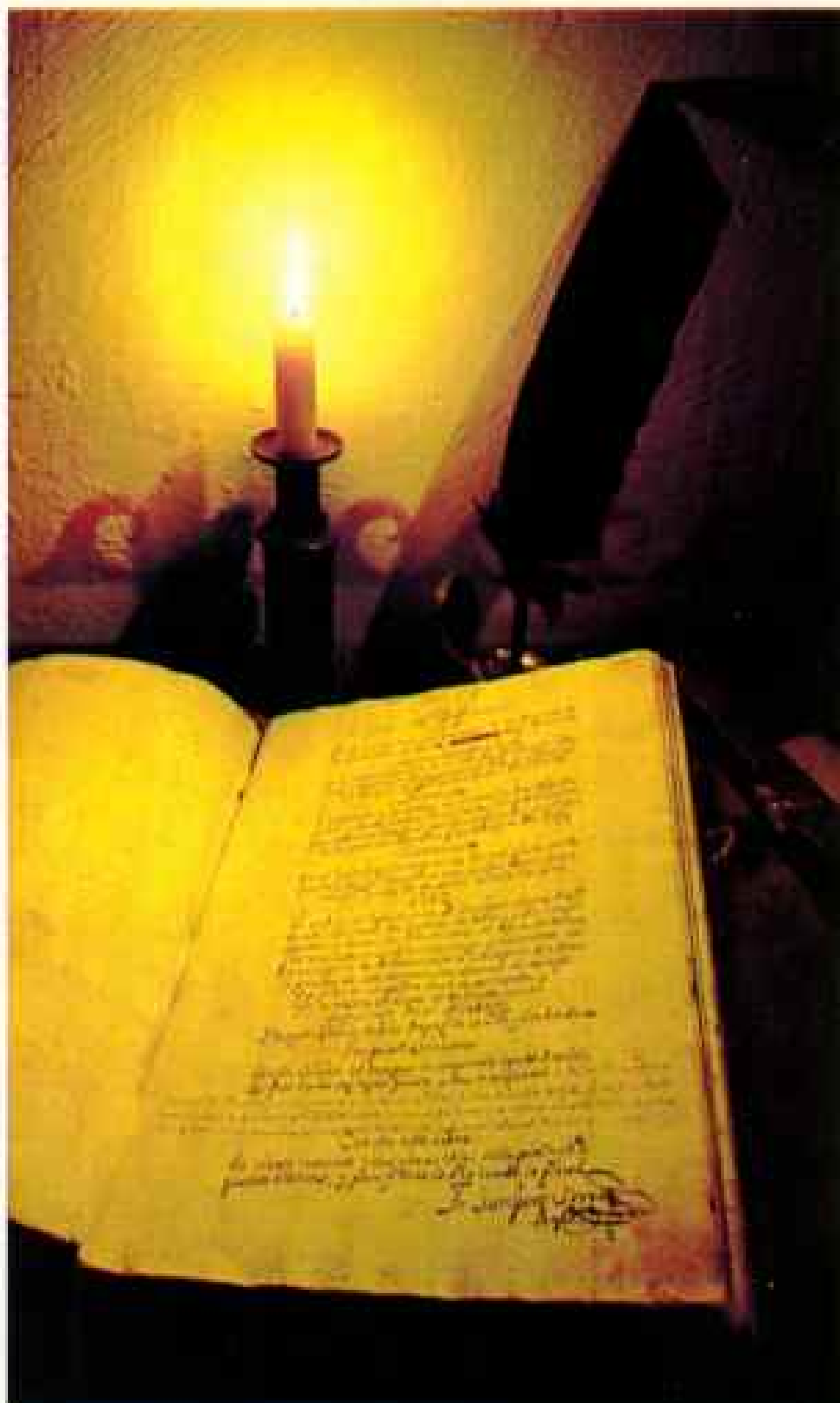
IT LOOKED for all the world like a Hollywood set for a movie about the old California—the adobe mission with its bells tolling, the hummingbirds darting among the flowering cactuses. All the *dramatis personae* were there—the gray-robed Franciscan padres and silver-spurred vaqueros, the sad-eyed Indians and mantilla-clad señoritas.

Now 700 Western-garbed horsemen



City with a mission: Ever since its devastation by earthquake in 1925, Santa Barbara has consciously resurrected the architecture and ambience of old California—as in its annual Old Spanish Days extravaganza (above), staged each August.

The city's oft-restored Queen of the Missions (far right) still houses Franciscan friars—heirs to the legacy of 18th-century mission-founding Father Junípero Serra. Serra's signature, dated 1782, appears in the Book of Deaths (right) in the mission archives.



came wending down from the rough chaparral mountains into the lovely green Santa Ynez Valley. They rode toward the mission at Solvang in a mile-long S curve among widely spaced, wind-stunted scrub oaks that seemed to have been set down in these soft-shouldered foothills by some Japanese master of bonsai.

"Ride, Rancheros, ride!" came a trail boss's shout, mingling on the air with the clangor of the bells and the shrill strains of a mariachi band tuning up.

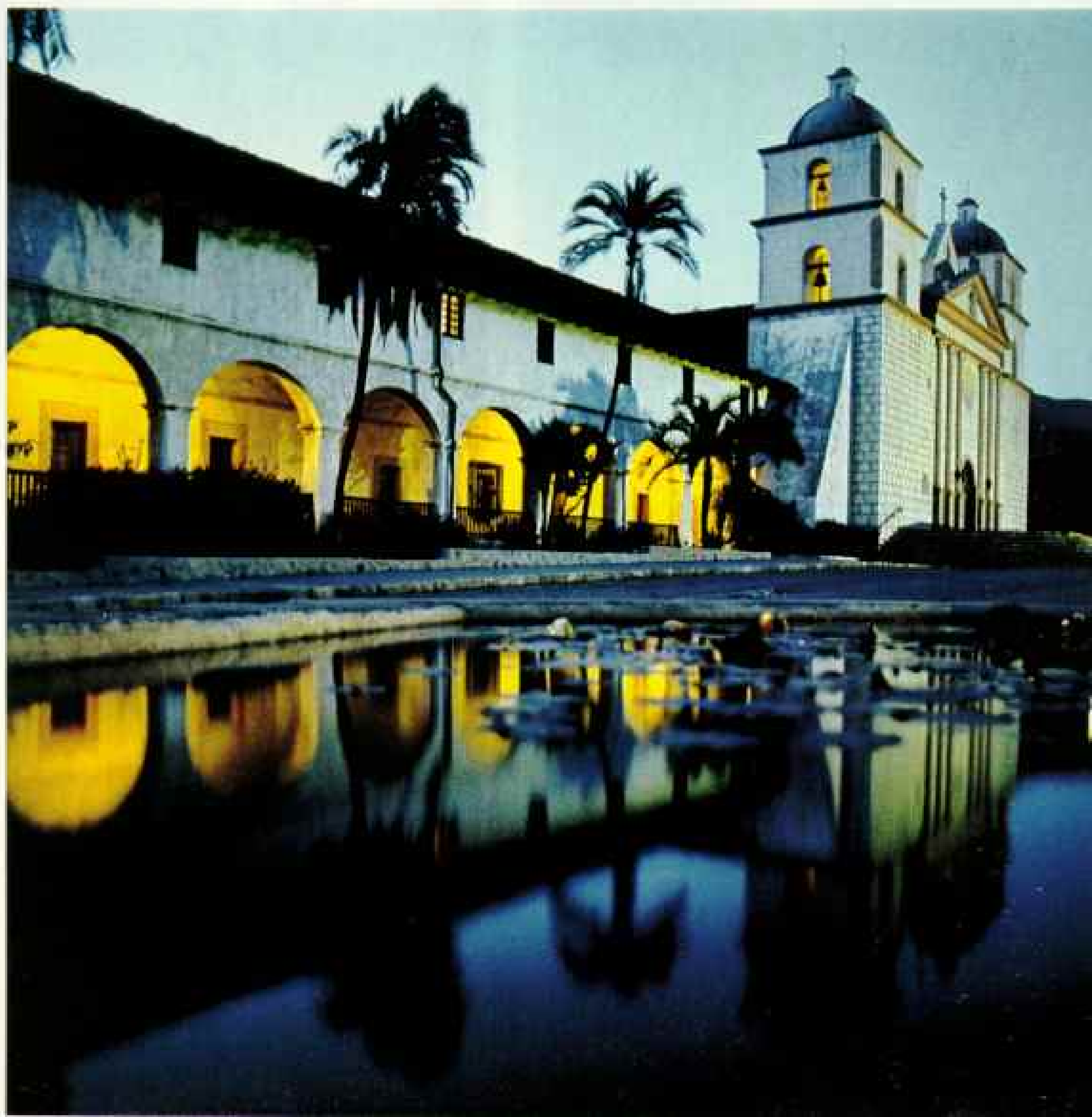
I could almost imagine that the smiling horseman on the prancing steed over there was Noah Beery, star of many an old Western movie. But, wait. It *was* Noah Beery! And, over there, another face out of an old movie. . . . Of course, rodeo star and actor Montie Montanal

Why, next thing you knew, Ronald Reagan himself would ride up waving a white hat, smiling that eternally boyish smile.

But, no, the President wouldn't be attending this spring blessing of Los Rancheros Visitadores at the Santa Inés mission, as he often has as an honorary member in the past.

"He sent word that, much as he'd love to attend, he couldn't make it this year. He has a few other duties, you know," I was told by Stewart Abercrombie, himself a former *presidente* of the famous Rancheros Visitadores—the elite national trail-riding association whose annual trek has spawned scores of other similar riding groups.

Begun back in 1930, Los Rancheros Visitadores—the Visiting Ranchers—recalls the custom of the old California dons who each spring visited from ranch to ranch rounding







***Movable harvest:** Field workers, many of them Mexican migrants, tend more than thirty crops on a year-round rotating basis in the fertile Salinas Valley—agricultural cornucopia of the Middle Kingdom.*

A union picker (above left) harvests lettuce, called “green gold”—longtime king of the valley. Other major crops grown in this “salad bowl of America” are broccoli, wine grapes, cauliflower, and artichokes.

A local labor contractor (above), himself of Mexican ancestry, hires out crews of nonunion migrant workers to

smaller Salinas Valley farmers; here he teaches his men how to distinguish weeds from tiny seedlings after the spring planting.

Mobile clothing store (left), owned by an enterprising Palestinian immigrant, follows the crews from camp to camp.

*The rough world of today’s migrant workers, many of them illegal “wets,” echoes the tumultuous era of the Okies of the 1930s—vividly described in *The Grapes of Wrath* by Salinas-born, Nobel Prize-winning novelist John Steinbeck.*

up the cattle that had run unfettered during the winter.

Though the roundup itself is no more, the spirit of fellowship remains. These days, membership isn't restricted to ranch owners but includes an elite of emphatically successful men—a who's who of the nation's leaders in business, finance, science, agriculture, and politics.

"One thing we all have in common," said Trev Povah, another former presidente. "We're all expert horsemen. No valets here. Every man takes care of his own horse and his own equipment.

"President Reagan belongs to the Campo Adolfo group of the Rancheros. But these days, it seems, there are more Adolfos in Washington, D. C., than here in camp!"

Though he couldn't be present, the President did send a deputy—none less than fellow Californian and Adolfo, then Assistant for National Security Affairs and now Secretary of the Interior William Clark.

That morning, after a U. S. flag that had flown over the White House was raised above the camp, Bill Clark read a message from the absentee President to the "boys":

"Fellow Rancheros, I regret I cannot join you. . . . I hope each of you understands why I cannot be present. *Vaya con Dios* as you ride out. . . and both have one and say one for me. Signed, Ron."

YOU KNOW HIS FACE, this very famous, very private actor. You know it so well, in fact, that he can't stroll down a city street without being gawked at, even mobbed. No, it's not Ronald Reagan—though the President's 688-acre ranch sits on a mountain not far away (pages 446-7).

Both men, like uncounted others among the super famous and super rich, have come to the Middle Kingdom for the same overriding reason: privacy.

You know them all—film and TV stars

who compose a veritable pantheon of the entertainment world, prime movers in the realm of politics, industrial magnates whose famous products stock your refrigerator and closets. To all of these seclusive residents of the Middle Kingdom I offer in these pages the anonymity they crave.

"Everyone needs privacy," my famous host says in that warm, gritty, fatherly, instantly recognizable baritone of his. "That's why I built this house out here. It's near L.A., near San Francisco, hardly a stone's throw from Santa Barbara, yet it's isolated, secure, near yet far. . . . And do you know a lovelier spot on the planet?"

He gestures to the scenery looming beyond the wall-size picture window of his multilevel redwood home. Outside, the canyon slopes glow yellow and green and gold, paisleyed with wildflowers.



Rock-balancing act finds innkeeper George Malone standing ankle-deep in the icy waters of the Big Sur River. He seeks peace of mind from the madding tourist crowd by creating whimsical, precariously balanced spires of rock.

"It's wild up in those mountains," he says. "One morning a mountain lion picked off one of my goats. You see lots of bobcats, coyotes, wild boars—even a few condors. And just down the canyon is the beach—wild and lonely as any you'll find."

He tosses a huge shrug and sighs.

"When I bought this property a few years back, I figured this was the last place on the California coast that would ever be disturbed. But now. . . ."

"There's talk about building a huge liquefied natural gas plant right out on the beach hardly a mile from here. Everywhere you look oil rigs are going up. And there's also been pressure to build a new road through here, right along the beach. The public needs 'access,' they say. But that would only bring thousands of people out here, with all their beer cans and plastic baby diapers. For

me it would destroy one of the last unspoiled shorelines on the California coast.

"So here I am, one day on the side of activists fighting the oil and gas companies; the next day fighting many of those same activists about allowing public access through my front yard.

"I promise you this: If they put a road through, I for one am moving out. . . ."

Preservation versus exploitation . . . privacy versus public access . . . overdevelopment versus overregulation . . . these are today's dilemmas in the Middle Kingdom.

This is, after all, the land of "slow growth." Virtually every coastal locality has stringent, often bafflingly complex zoning laws to restrict or even banish development. Add to these a bevy of state and federal laws—especially those implemented by the California Coastal Commission,





No, the Martians haven't landed in the Middle Kingdom. This is an encounter of another kind—an architectural design competition staged at the annual Poly-Royal celebration of the California Polytechnic State



University (CalPoly) in San Luis Obispo. Entrants had to design a portable plastic environment that could be carried into the field by hand and lived in for several days. The results produced this futuristic campsite.

created in 1972 to stand watchdog over coastal development. Almost anything from a hotel to a hot-dog stand must run an aesthetic and environmental gantlet to qualify for its existence.

APPROPRIATELY, you take the Royal Highway to get to the Middle Kingdom. The Royal Highway—that's Anglo for El Camino Real, the route of the missions, roughly traced by today's Highway 101.

Of the 21 missions founded in California between 1769 and 1823, nine lie within the Middle Kingdom. Secularized by the Mexican government in the 1830s, stripped of lands and temporal power, most missions fell into ruin—some being sold off to become stores, inns, even saloons. Today, after massive reconstruction programs, all 21 live again—time capsules of the old California.

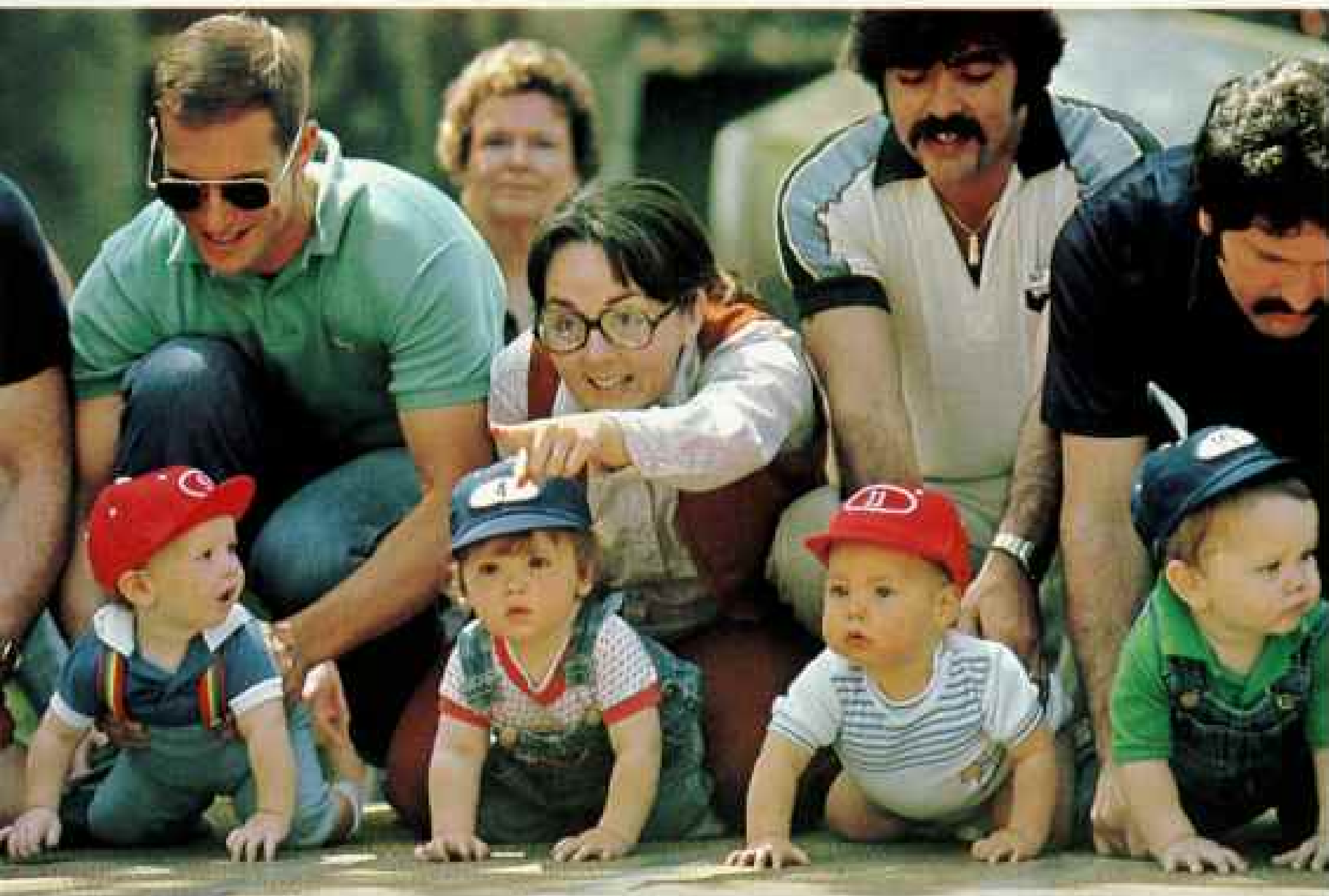
As you tour the Middle Kingdom, you

become a connoisseur of missions almost despite yourself. But, then, this is the land of the connoisseur.

Fancy fine wines? Then take a taste tour of the Middle Kingdom's wine country—rivaling Napa Valley in extent and quality. Throughout the four-county area, old pastures and farmlands are giving way to vineyards; local wineries are winning renown for their fine boutique wines, often sold to tourists on the premises.

Interested in a Thoroughbred, perhaps, or a proud Arabian, or a rare Andalusian, or just a pleasure horse? Horse breeding has been a business and a way of life here since the early Spanish days.

Dote on fine homes? The mansioned Middle Kingdom offers architectural daydreams from the Taj Mahal-like Casa Blanca in Carpinteria near Santa Barbara to the sumptuous manors along the Monterey Peninsula's famous Seventeen Mile Drive to



Life among the wet set moves at a crawl for the Diaper Derby at the Monterey County Fair in August. It is only one of the region's wild, wacky, and wonderful annual events—from Castroville's Artichoke Festival to Solvang's fairy-tale-like Danish Days to Pismo Beach's Mardi Gras.

the fabulous Hearst family estate at San Simeon—the latter now the state park system's busiest attraction, with as many as 5,500 visitors a day.

Are fine hotels your weakness? You'll find a dazzling array of plush hostelries, from—among many others—the classic Marriott Santa Barbara Biltmore and the luxuriously rustic San Ysidro guest ranch of Montecito (Jack and Jackie Kennedy honeymooned there in 1953) to Big Sur's beautifully aloof Ventana Inn and that Monterey Peninsula golfers' paradise, the Lodge at Pebble Beach, where Bing Crosby's shade benignly haunts the greens.

Indeed, some enterprising travel writer, eyeing the millionaires' market, might do well with a guidebook entitled *The Middle Kingdom on \$1,000 a Day*. Rates for top-of-the-line accommodations not infrequently run \$250 to \$500 a day for a family of four, including hot tubs. Add the cost of meals at the Middle Kingdom's gourmet restaurants, plus entertainment and travel costs, and even \$1,000 a day might seem confining.

But, wait, there's hope for the budget-conscious. The sleeping-bag set will find many a state beach or park available for a few dollars a night. Those seeking the unusual will delight in such moderately priced oddities as the bizarrely decorated Madonna Inn in San Luis Obispo or the Pepto-Bismol-hued Tickle Pink Inn in Carmel Highlands. Then there are the many salty but pleasant seaside cottages and motels around Pismo Beach and Morro Bay; the tasteful hotels of arty, tourist-crammed, but still lovely Carmel; the rustic lodges and cabins of Big Sur; and, almost everywhere, intimate hotels and bed-and-breakfast inns, often in charmingly converted historic homes.

Perhaps you collect hideaway towns? Then try lovely Santa Ynez and Los Olivos, just over the mountains from Santa Barbara; tiny little Harmony (pop. 18), off Highway 1; Danish-style Solvang, right out of a Hans Christian Andersen fairy tale; Western-style Templeton near San Luis Obispo; freestyle Cambria, near San Simeon. But . . . enough. I leave it to each incoming connoisseur to find his or her own. Follow almost any road in the Middle Kingdom and you'll eventually come to a well-worn welcome mat and an open door.

SANTA BARBARA is The Place To Be. If you live elsewhere, you may be paying for some questionable deed committed in an earlier incarnation.

The heartachingly lovely climate, the incomparable setting on a south-facing, sun-soaked littoral between lavender mountains and a too-blue-to-believe sea, the graceful red-tile-roofed architectural style imposed after an earthquake in 1925 leveled much of the old city, the piquant blend of archly conservative and freewheeling lifestyles—all conspire to create a milieu that is intoxicating, even addictive.

People can't bear to leave. Ph.D.'s from the University of California's Santa Barbara campus hang on long after graduation, slinging hash or brooming floors and paying impossible rents just for the privilege of staying on in this Cannes of California's Riviera. High-tech firms settle here simply because they can locate almost anywhere they please—and what more pleasing "anywhere" can you find?

Here wealth spends itself on palatial mansions behind concealing walls of cypress and eucalyptus in enclaves like "old money" Montecito and "new money" Hope Ranch. The talk here is of "mils," not "thous." ("Why bother speaking to S.?" asked one old-moneyed gentleman. "He's only worth 20 to 30 mil—and it's new money to boot!")

Oh, and they say cruel things about Santa Barbara. "This is where retired persons go to be near their parents," goes one canard. And another: "It's for the newlywed and the nearly dead." T-shirt slogans reflect the monotony of perfection: "Just another lousy day in paradise!"

But there's another Santa Barbara—the Santa Barbara of my friend W. B. (No, he's not famous, just prefers keeping his name to himself.)

We met at McDonald's (did you know that the first Egg McMuffin was served in Santa Barbara?). As the coffee cooled in our golden-arched cups, we talked.

W. B. is a retired cabdriver, a native Santa Barbaran, lately of no fixed address. You'll find him just about anytime down on lower State Street, where the chic shops of downtown Santa Barbara trail off into a mélange of bars, nightclubs, thrift shops, adult bookstores, (Continued on page 448)



In the land of the good life everyone plays king—so long as they can afford the upkeep and meet strict aesthetic and environmental requirements. Many half-concealed private driveways off Highway 1 lead to luxurious hideaway homes



like these at the mouth of a creek in Carmel Highlands. Access through private property to sand and surf in the public domain is rare in many areas—a dilemma sparking frequent conflicts between landowners and travelers-through.





WHITE HOUSE PHOTOGRAPHERS BILL FITZ-PATRICK (BELTON) AND MICHAEL EVANS



Meanwhile, back at the ranch . . . privacy-loving President Ronald Reagan takes refuge from Washington pressures at his cherished Rancho del Cielo—Ranch of the Sky—in the Santa Ynez Mountains, some 25 miles northwest of Santa Barbara.

Accompanied by his faithful golden retriever Victory, the President bounced around his rugged 688-acre spread for years in a near-legendary vintage jeep (above left)—the vehicle has only recently been retired from service after repeated engine changes, its upholstery in tatters. It had the distinction of being the only motor vehicle personally driven by Mr. Reagan after he was elected President in 1980.

Staunch advocate of manual labor, the President tends to chores such as clearing underbrush (above) from the ranch's many horse trails or chopping wood for the two fireplaces that provide the only heat for his Spanish-style adobe ranch home (left). The 73-year-old fitness-conscious Chief Executive has jocularly referred to such physical exercise as "pumping firewood."



Campfire cronies, Los Rancheros Visitadores—a prestigious trail-riding club that numbers President Reagan in its elite membership—stages an outing in the

movie houses, and run-down hotels. It's the nearest thing Santa Barbara has to a skid row. This, W. B. explains, is the world of the "snowbirds."

Snowbirds?

"People who fly when the snow flies," W. B. explains. "They drift into town in the fall when it gets cold elsewhere. Living's easy here. No galoshes, no overcoats. Go barefoot if you like. Sleep on the beaches or in the parks if they don't catch you. Used to be a lady had a big estate where she allowed drifters to stay. Then she died. The guys living there said she'd told them they could stay forever. But city officials eventually chased

everybody off anyway. Now it's a zoo, wouldn't you know?"

"Heck, with the right ID you can get a few dollars' welfare money and some food stamps. Hustle a few handouts, maybe. When it gets wet, you can always get a bed for four dollars a night. Then in the spring, when the rest of the country thaws out, put your pack on your back and fly off again. Snowbirds, that's what I call 'em."

The police regularly sweep the streets of them, but after the heat's off they're back, lounging on corners, panhandling, sleeping on benches. "Say," W. B. says, "like to take a drive? I know a great view!"



Santa Ynez Mountains each spring, recalling days when local ranchers joined to round up cattle and share some rough riding and good companionship.

We follow a winding street to hilltop Franceschi Park and look down on the phenomenon of Santa Barbara—a cascade of red-tile roofs funneling out of the mountains and down through an ancient river delta until coming to an abrupt, almost apocalyptic halt at the cobalt blue Pacific. Out on the horizon, through the lavender sea haze, oil platforms glimmer like burnished jewels in the gathering dusk.

“Lived here all my life,” W. B. says. “Ain’t no prettier place. Rather be poor in Santa Barbara than rich anywhere else. Me, I guess you’d call me a permanent snowbird.

“But just look at it, will you?”

He sighs with satisfaction.

“That’s my city too!”

THE MIDDLE KINGDOM is earthquake country. You can ride a motorcycle along the San Andreas Fault at the Hollister Hills State Vehicular Recreation Area in lovely, landlocked, fissure-riddled San Benito County.

Looking west across little Bird Creek, which doglegs as it intersects the fault, you can contemplate the silent collision of worlds at your feet.

Here, right here, you stand at the meeting place of two colossal pieces of earth’s

crust—the Pacific plate, which bears the Pacific Ocean and a sliver of California, and the American plate, which carries the rest of North America.

On the east side of Bird Creek the soil is a dark adobe clay; on the other side it's a light crumbly granite. In fact, that other side once stood not opposite this bank but a hundred or so miles south. Over the past few million years the Pacific plate has ground slowly but inexorably northwestward in relation to the American plate, carrying most of the Middle Kingdom right along with it.

An earthquake in January, centered 15 miles south of Monterey, was but another reminder of the powerful subterranean forces that are still shaping the uneasy Middle Kingdom.

YOU LEARN TO LIVE with earthquakes in these parts. Out in the rugged San Rafael Mountains of Los Padres National Forest I met a remarkable man who not only lives with earthquakes but also, in a sense, wins his livelihood from them.

His name: John Cody. Profession: sculptor. Favorite medium: serpentine—California's state rock, a jade-colored mineral often found along earthquake faults.

It was while searching for sculpture-quality serpentine in the canyon bottoms some years back that John Cody discovered his Shangri-la.

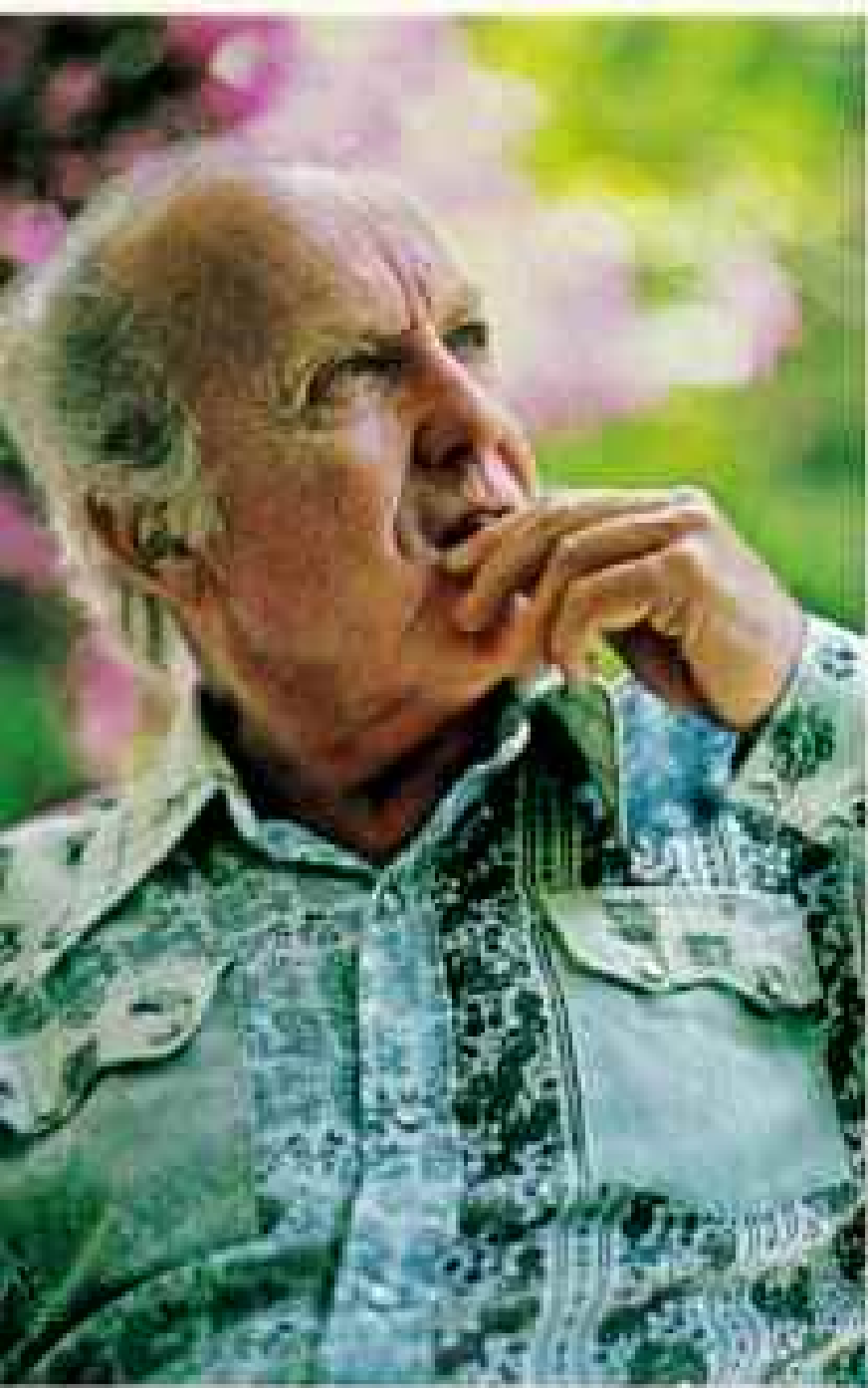
"I was climbing out of a dry riverbed and found myself in the most beautiful meadow I'd ever seen, right at the foot of a spectacular mountain pinnacle. This is the place to build a home, I told myself."

Eventually managing to buy a rare piece of private property in the center of the meadow, Cody—a Hollywood-handsome ringer for his distant relative, Buffalo Bill—built a house that can only be called wondrous.

The Enchanted Hill at San Simeon lures a million visitors a year to the 115-room castle built by publishing magnate William Randolph Hearst. The estate once covered 240,000 acres—larger than New York City. The castle and some 120 hilltop acres have been donated to the state of California.







Castle-builder's son, William Randolph Hearst, Jr.—editor-in-chief of the Hearst newspapers—recalls when he and his famous father rode horseback up the hill to watch the castle at San Simeon take shape. "It was exciting to watch the transformation of what had been a brown, barren hill with a few live oaks."

Ogling visitors (right) marvel at the 31-by-81-foot Venetian tiled indoor pool, one of the places pampered guests cavorted at the senior Hearst's legendary poolside parties.



"I built it with this area's two greatest fears in mind: earthquakes and forest fires. Problem is, stone withstands fire better, wood withstands earthquakes better. So I constructed a basic frame of heavy logs, then built separate outer walls of heavy stone, connected to the frame by flexible steel rods. For a roof I used tin sheeting."

The result: a rustic architectural gem, beautiful as a piece of driftwood, solid as a butcher's chopping block, supple as a suspension bridge. But is it safe?

"One day I heard this tremendous rumbling," Cody recalls. "I looked out and saw the trees flapping back and forth. The whole meadow was rocking. Well, I thought, now we'll see if the house can take an earthquake. Then I heard some loud creaks and moans and ran out fast as I could. But the building just rocked and rolled. It stood!"

Using serpentine rock found in earthquake zones, Cody fashions striking sculptures fraught with symbolic meaning.

"This is my current project," he says,



showing me a 13-foot-high sculpture of a condor with a huge steel wing thrust skyward, a human fetus of rare red serpentine affixed to its wing edge. The work is now on permanent display at the county courthouse in Santa Maria.

"It represents the near extinction of the condor in these mountains," he says quietly. "The fetus symbolizes mankind and our short time here on this earth. It shows that we hang from as thin a thread of life as the condor."

OUT IN THE SALINAS VALLEY, north of relatively stylish Paso Robles, you find little Western towns as scuffed and dusty as old shoes, places that seem like they're nine-tenths sky. This is cattle country, horse country, lettuce country, migrant-worker country.

It's also John Steinbeck country. *The Long Valley* he titled it in one book, *East of Eden* in another. Some take the latter as a phrase of celebration; actually it refers to the land of Adam and Eve's banishment, a place





Land with the jitters, the entire length of the Middle Kingdom is cleaved by the San Andreas Fault, which slices through the Carrizo Plain (left), north of Santa Barbara. The infamous fault marks the meeting point of two massive slabs of the earth's crust; lesser, related faults fissure the whole region, reminders of quakes such as the one that jarred the Monterey Peninsula in January of this year.

Construction on the Diablo Canyon

nuclear plant (above), near San Luis Obispo, was already well under way when geologists discovered a seismic fault just 2.5 miles offshore; anti-nuclear activists have delayed the plant's opening for years.

Nuclear foes (below) also protest at the gates to Vandenberg Air Force Base against planned testing of the hotly controversial MX missile. Demonstrations in early 1983 resulted in hundreds of arrests.

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of thorns and thistles, where only "In the sweat of thy face shalt thou eat bread."

Steinbeck's 1930s Okies of *The Grapes of Wrath* are echoed in today's Mexican migrants, many of them "wet," who can be seen out in the fields filling seemingly endless boxes with the lettuce and artichokes and carrots and tomatoes that make the Salinas Valley the "salad bowl of America."

I had lunch at Steinbeck's boyhood home in Salinas. A ladies' group serves lunches there amid memorabilia of the town's only winner of the Nobel Prize in Literature.

Pauline Pearson, Steinbeck consultant at the local public library, whisked me around viewing sites from Steinbeck's works.

"He told the real history of folk in the area, sometimes even using their real names. Maybe he revealed a few too many truths. Lots of people around here would still rather not hear his name.

"You know, you could take a tour of John's books around here. Why, over there, right across the street, there's Muller's Mortuary from *East of Eden*. It's not the original building, though. In the book that's where Kate is laid out when she dies.

"You can go down to the Salinas River where Lennie and George come up the bank at the beginning of *Of Mice and Men*. Or climb up to Fremont Peak, where Steinbeck paused on his *Travels with Charley* . . . or visit the place in *The Red Pony* where. . . ."

I WALKED right into another scene out of a novel in Monterey, where Steinbeck lived in later life—just half an hour's drive from Salinas but worlds away with its distinctive architecture, wild seacoast, rough fisherfolk, and glittering social whirl.

The scene took place not far from Cannery Row, made famous in Steinbeck's rowdy, uproarious 1945 novel of the same name. In those days Cannery Row was the "sardine capital of the world." Today the overfished sardines are gone and their soul-stirring stink along with them. The canning plants live again as chic shops and restaurants. But the raucous world Steinbeck knew persists on the docks nearby.

I watched some Sicilian squid fishermen, grizzled older men mostly, teaching a group of inner-city youths how to mend nets—part of a federal job-training program.



Shifting sands get a scouring by dune cycles (above) at Pismo Dunes State Vehicular Recreation Area, set aside for off-road enthusiasts to limit environmental damage elsewhere.

Coastal dunes conceal countless remnants of the once populous Indian tribes who flourished here for millennia. Juanita Centeno (right), a Chumash Indian, checks for remains of her ancestors at an excavation at Vandenberg Air Force Base. California law requires the presence of Native American monitors at all excavations on Indian sites.



"Why they want to teach 'em beats me," said a fisherman named Vincent. "Too many fishermen already, too few fish and squid. Anyway, even if these kids get jobs, most of 'em are too soft for this kind of life."

Just then some shouting broke out. One of the city kids, hair cut long, had drifted away from his net-mending lesson to eavesdrop on a meeting over at the guildhall nearby, where a strike was being hotly debated. The

fisherman who was teaching him blew up:

"Can't even mend a net, and already you want to go on strike!"

The kid snorted defiance. Words flew.

"Hippy!"

"Wop!"

Old Vincent stepped between the combatants with the verve of a Sicilian John Wayne. The kid raised a fist. Vincent raised an even larger fist in return. Then, in a voice that might have parted the waters of Monterey Bay, he shouted:

"No more! You're through! Get out!"

The fight drained from the kid. Muttering a few final expletives, he slunk off.

"No, sir," Vincent said, returning to my side, "it's no soft life around here."

JIM OWENS runs a roofing business in Seaside, just north of Monterey. When he isn't "up on the roof," as his wife Rosie phrases it, he's down at the beach combing the sands with his metal detector.

It was Christmas Day of 1982 when Jim made his Big Find. That winter's battering storms had left hardly a grain of sand unchurned on local beaches. Knowing such storms often uncover or toss up relics of Monterey's early history (the town was the capital of old California from 1774 to 1846), and knowing also the exact site of an old pier that had long ago disappeared, Jim gave up watching football on TV that afternoon to try his luck "coin shooting" at the beach. Slowly waving his detector over the area he'd chosen, he heard the telltale beep of a likely "target."

Any coin, even a corroded penny, will gladden the heart of a devoted coin shooter. But this one had a special gleam. Gold!

Brushing off the sand, Jim made out the date: 1851. He figured it had to be worth at least a few hundred dollars. But when he looked it up in a coin catalog, he blinked his eyes. That particular \$5 gold piece, minted in the third year of the gold rush by Shultz & Co. of San Francisco, was valued—according to his catalog—at \$12,750!

Jim showed it to a coin dealer, who promptly offered him \$20,000 on the spot. Instead Jim turned it over to a San Francisco coin auctioneer, who carried it away in a locked briefcase manacled to his wrist.

On auction day last spring, the bidding



Once-and-future land: Upstart gantries of the space age rise at Vandenberg Air Force Base, where the space shuttle Discovery is scheduled to begin launchings in 1985.

Nearby—yet seemingly centuries away—the California of old still prospers amid idyllic scenes such as this white-fenced horse-breeding ranch (facing page) nestled at the foot of the gracious San Rafael Mountains.





started at \$15,000. When the gavel sounded, the coin had sold for \$49,500—and the buyer, a coin dealer from Santa Barbara, later admitted he'd have gone another \$20,000 to \$25,000 higher.

I joined Jim for a few hours of coin shooting along the same beach, visions of gold coins dancing in my mind.

"Bad day," he said as soon as we came out. "See? The sand's soft and spongy. That means the tide's brought it in, not out. The day I found the coin the beach was two, maybe three feet lower. Doubt we'll find much today."

For hours we hovered on the sands with our metal detectors, sealing out the surf's roar with padded earphones, listening for telltale beeps with intense concentration. A few beeps came all right—producing a total for the two of us of six corroded pennies.

But Jim was still happy—with that serene patience and humility born of thousands of hours of coin shooting.

"Every penny you find," he said, "puts you one penny closer to that next Big Find. And who knows, maybe it will be one of the ten-dollar gold pieces Shultz supposedly minted back then. Those would be valued in the hundreds of thousands of dollars. See you back on the beach tomorrow."

ON THE WAVE-BEATEN COAST of Big Sur, yet another of the Middle Kingdom's separate worlds, I drove one typically foggy morning to an overlook along famous cliff-hanging Highway 1—temporarily devastated by landslides during the monster storms of early 1983. Picking my way down a steep trail to a secluded beach, I climbed out on a spray-soaked rock and communed, as they say, with the elements.

The fog in these parts comes in not on little cats' feet but on lions' paws. Redolent of seaweed, dank as the inside of a pismo clam, it envelops you, blows right through you.

You see few swimmers out here; the water's too cold for any but the hardiest until

you get as far south as Avila Beach and beyond. Still, you see the sea otters bobbing playfully on their backs in the fog-swirled waters, oblivious to the anguished debate over what to do with them.

Thought to be extinct on this coast after ruthless overhunting, the Disneyesque sea otters have made an amazing comeback from a remnant herd discovered in a Big Sur cove in the 1930s to nearly 2,000 today, zealously protected by state and federal law.

Trouble is, these seagoing gourmands dearly love many of the same treats prized by man, especially clams and abalones. You can hardly find a good-size pismo clam on Pismo Beach anymore, and thinly sliced steaks of rare abalone sell for \$20 and up at local restaurants. Some point the finger of blame at the sea otter.

What to do? Save the otters? Or save the clams and abalones, as well as the sea urchins, crabs, squid, and other species they dote on? The debate continues—one more unresolved issue in the Middle Kingdom.

Sitting on that fogbound rock, I contemplated this fascinating, unpredictable realm I'd been traveling through.

Out at the Reagans' ranch near Santa Barbara, I knew, custodians would be keeping things ready for the first family. Down at Vandenberg, Juanita Centeno would be walking among the missile gantries, searching for her ancestors in the ancient sands.

Almost everywhere mission bells would be ringing; the rich and famous would be leading their sumptuous private lives; the snowbirds would be drifting along lower State Street; the Sicilian fishermen would be setting out to sea; the migrants would be out picking lettuce; Jim Owens would be coin shooting down at the beach; the marchers would be planning their next protest over Diablo, the MX, or the oil rigs; and, oh, yes, the real estate developers would be out too, sharply eyeing new subdivisions.

Ah, well. So it goes.

All's right—or as right as it's likely to get—in California's Middle Kingdom. □

High and dry at voyage's end, a sailboat rides a rock after grounding in thick fog off Monterey Peninsula near Pacific Grove. Frequent concealing fogs add to the isolation of the craggy coast—as dangerous as it is beautiful, as fragile as it is seemingly timeless.





JAPAN'S IZU OCEANIC PARK

By EUGENIE CLARK

Photographs by
DAVID DOUBILET

BENEATH a luminous canopy of surf (*overleaf*) the ghostly shapes of four large mullet glide among the submerged rocks of Japan's Izu Oceanic Park. Swept by a mixture of temperate and tropical ocean currents, the great undersea sanctuary 60 miles southwest of Tokyo abounds with a richness and variety of marine life such as I have rarely encountered in more than 30 years of diving and marine research around the world.

Grim guardian of the depths, a moray eel (*right*) lurks amid a patch of brilliant orange soft coral 140 feet below the surface. Despite its ferocious appearance and a length as great as three feet, *Gymnothorax kidako* rarely attacks unless provoked. When photographer David Doubilet and I approached, this moray cautiously emerged from its refuge to look us over and then withdrew. A succession of such magical scenes greets the diver at Izu like an endless series of figures in a child's pop-up picture book.









COLOSSUS of coral—a treelike growth called an alcyonarian—soars nearly six feet above a rocky slope at a depth of 165 feet in the park. The foliage and trunk of the tree are a colony of millions of soft-coral animals. More than 3,000 varieties of soft corals are known, though only a few hundred have been classified.

What appears to be the foliage at the top of the tree is clusters of polyps that have opened in order to feed on plankton drifting past in the current. Feathery “shrubs” at the base of the trunk are another form of alcyonarian.

Like other divers at Izu, we frequently encountered thermoclines, abrupt temperature changes in adjoining layers of water. Depending on the season, the changes affect suspended microscopic life, which in turn determines the clarity of water at various depths. At 165 feet the water can be crystal clear, yet only 30 feet higher the visibility may be almost zero.



GHOSTLY DOUBLE, a one-inch transparent shrimp (right) and a colored shrimp hover over the mouth of a starfish. Though starfish often prey on shrimp, these appear immune to powerful suckers on their host's tube feet. This is symbiosis—perhaps a cleaning role for the shrimp in exchange for protection by the starfish.

This two-foot orange starfish

(Leiaster leachii, above) is among 75 species in Izu waters. The basic five-arm pattern has infinite variations. Arms on some starfish divide and subdivide until they have more than a hundred branches and the owner looks like a walking bush. Other starfish can shed trapped limbs and crawl away. Still others reproduce by dropping an arm, which eventually becomes another complete starfish.





DEADLY ASSEMBLAGE of venomous catfish gathers in a typically tight formation called a gonzui dama—"catfish ball." The species *Plotosus lineatus* carries a powerful poison in the spines of its dorsal



and pectoral fins. The poison, plectotoxin, from just one fish can seriously injure or possibly kill an unwary diver. These five-inch specimens already have well-developed poison glands and will grow to a foot in length.



DRAWN BY KENJI A. SYORI, NATIONAL GEOGRAPHIC CARTOGRAPHIC DIVISION

TWILIGHT HARVEST nets thousands of squid within the boundaries of Izu Oceanic Park. Using powerful floodlights to attract the delicacy known to the Japanese as ika, these fishermen from Futo employ steadying sails rigged astern to reduce the ships' roll in ocean swells.

Like a miniature headlight, the eye of a squid (right) reflects David Doubilet's flash. Blending in with the surroundings, it searches for food with its two retractable tentacles.

In a unique system, Japan's 160 national marine parks—the largest number established by any country—are administered jointly by a national park service and powerful local fishermen's associations that control



access to the underwater preserves. Thus, sport divers are forbidden to spear a single fish within the parks, while commercial fishermen operate there at will. In order to dive and photograph at Izu, we had to secure permission from the fishermen's cooperative at the town of Futo on the peninsula (map, facing page).

Izu Oceanic Park is actually a commercial enclave within a larger national preserve that includes Japan's sacred peak, Mount Fuji, the resort area of Hakone, most of the Izu Peninsula itself, and seven nearby islands. The chill waters are warmed by the great Kuroshio (Black Stream), Japan's equivalent of the Gulf Stream.



KALEIDOSCOPE of the sea, an iridescent jellyfish, *Olindias formosa*, extends its stinging tentacles in search of prey such as small fish or shrimp. The creature's brilliant colors earned it the Japanese nickname *hana gasakurage*—cherry blossom. Like all free-swimming jellyfish, this specimen is also known as a medusa, for the Greek demigoddess whose hair consisted of snakes and whose look turned men to stone.

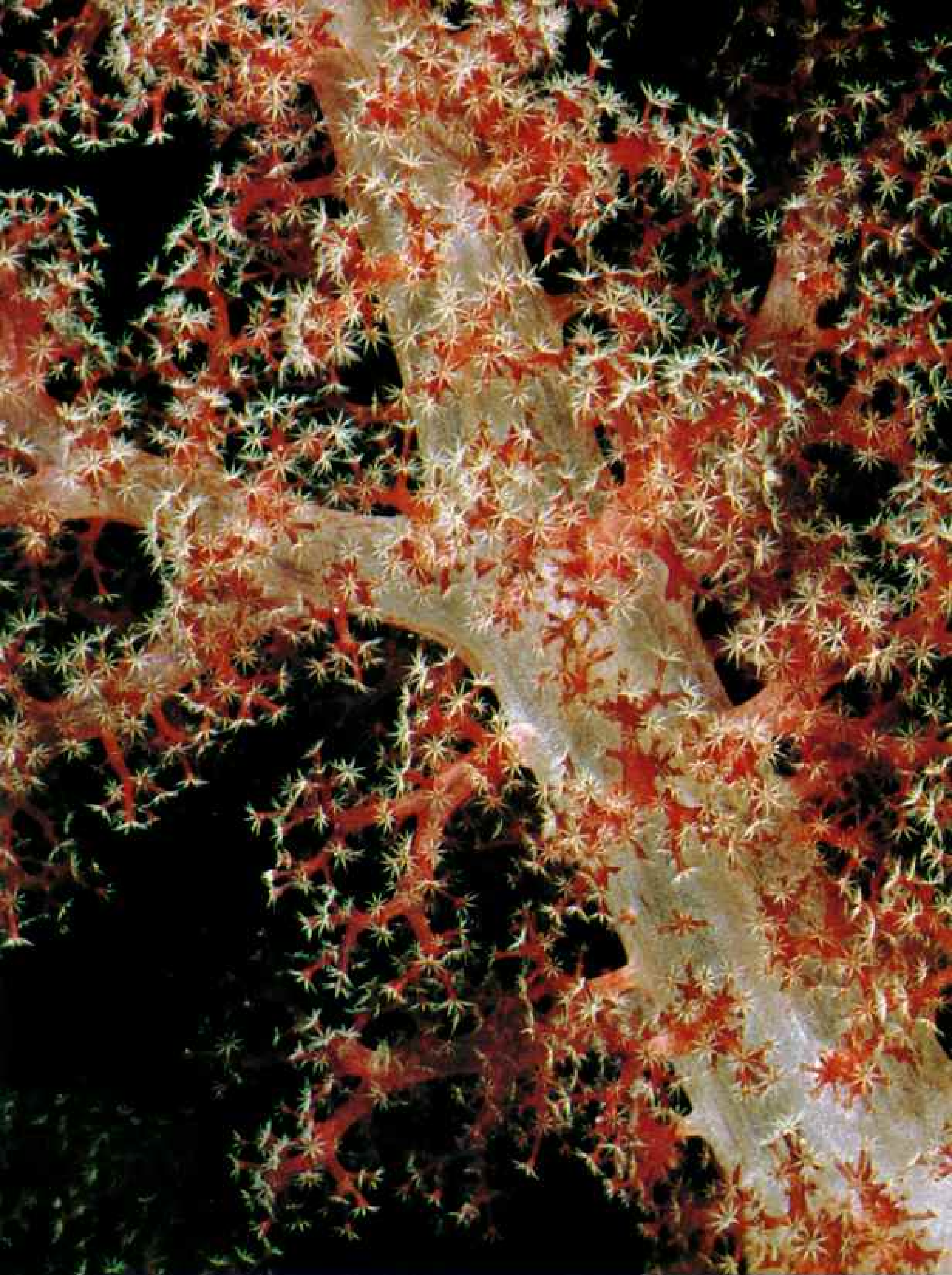
Fuchsia-tipped tentacles resembling pipe cleaners radiate from the jellyfish's two-inch-wide bell. Each tentacle is equipped with hundreds of nematocysts, or stinging cells, which paralyze a victim. The prey is then passed to the jellyfish's stomach, seen here as a red-and-yellow pouch beneath the bell. Four orange tubes branching from the stomach send digested food to the bell.

Fourteen different species of jellyfish inhabit the waters of Izu, though none matches *Olindias* for color. We encountered this specimen in the entrance of a cave at a depth of 130 feet.

ANNE LEVINE COURTESY







LIKE CHRISTMAS TINSEL, tiny white polyps festoon the branches of an alcyonarian coral and absorb seawater to maintain the branches' rigidity.



Under the impact of undersea currents or storm surges, the coral expels water and collapses, inflating again when the pressure eases.



NIGHTMARE DISGUISE transforms a porcupine fish into a monster twice its normal size. When threatened, the two-foot-long fish swells



with water, frightening enemies as large as tiger sharks. Unlike most blowfish in Japan, this Diodon is nonpoisonous to touch or eat.



CROWNLIKE FRINGE adorns the head of a two-inch-long male blenny (above), whose scientific name—*Neoclinus bryope*—is almost as long as its owner. The spiky projections on the tiny carnivore may act as sensors or serve as camouflage. Backed into its burrow in a rock face (right), the blenny warily eyed the probing finger of our diving partner, Koji Nakamura.





FACE OF A KILLER: The perpetual frown of a scorpion fish (above) resembles the villain's in a Japanese Kabuki drama. Even the fish's generic name, *Inimicus*, suggests that it has few friends. Bulbous glands on the 16 or 17 dorsal spines (right) contain a powerful venom. Among the most deadly species in the ocean, these grotesque but colorful fish lie in wait for their prey under a mantle of sand.

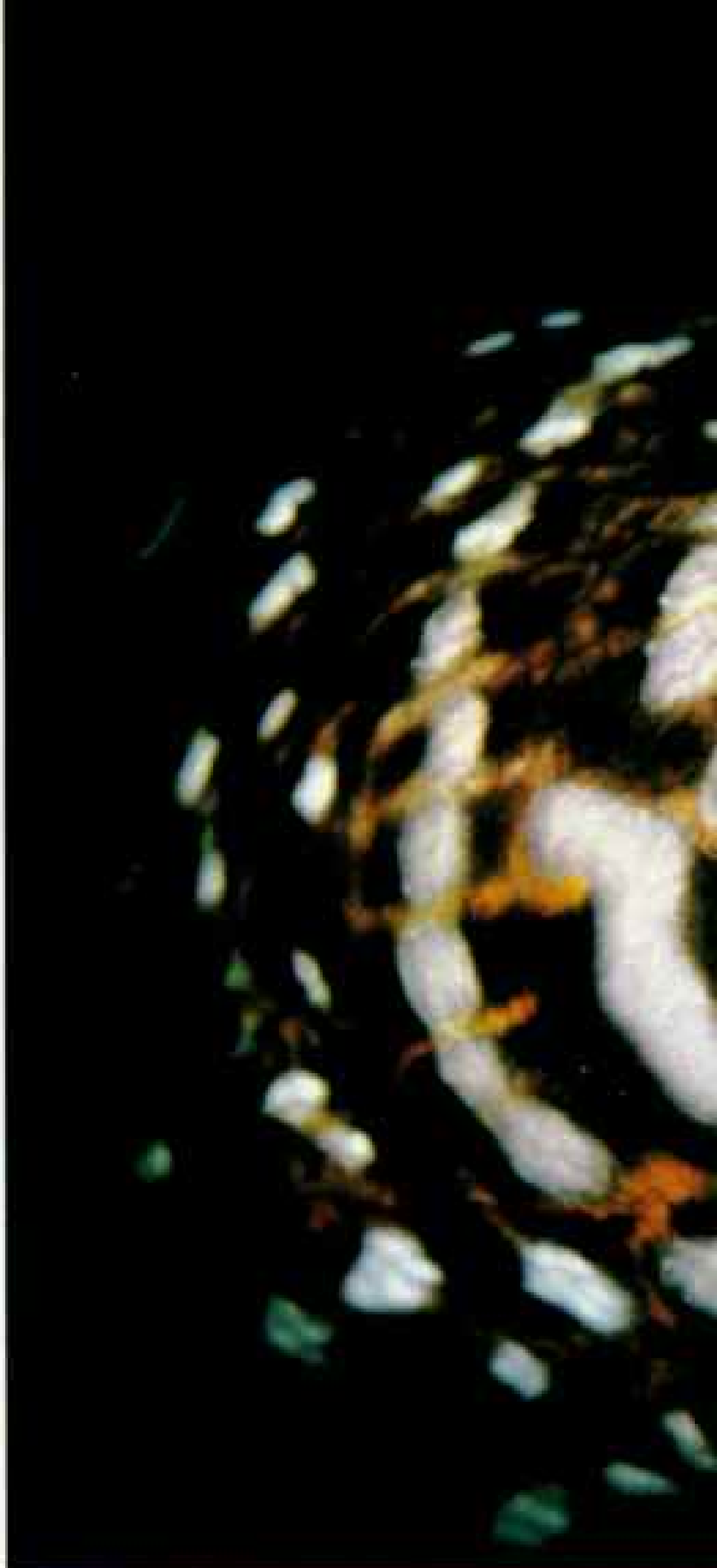
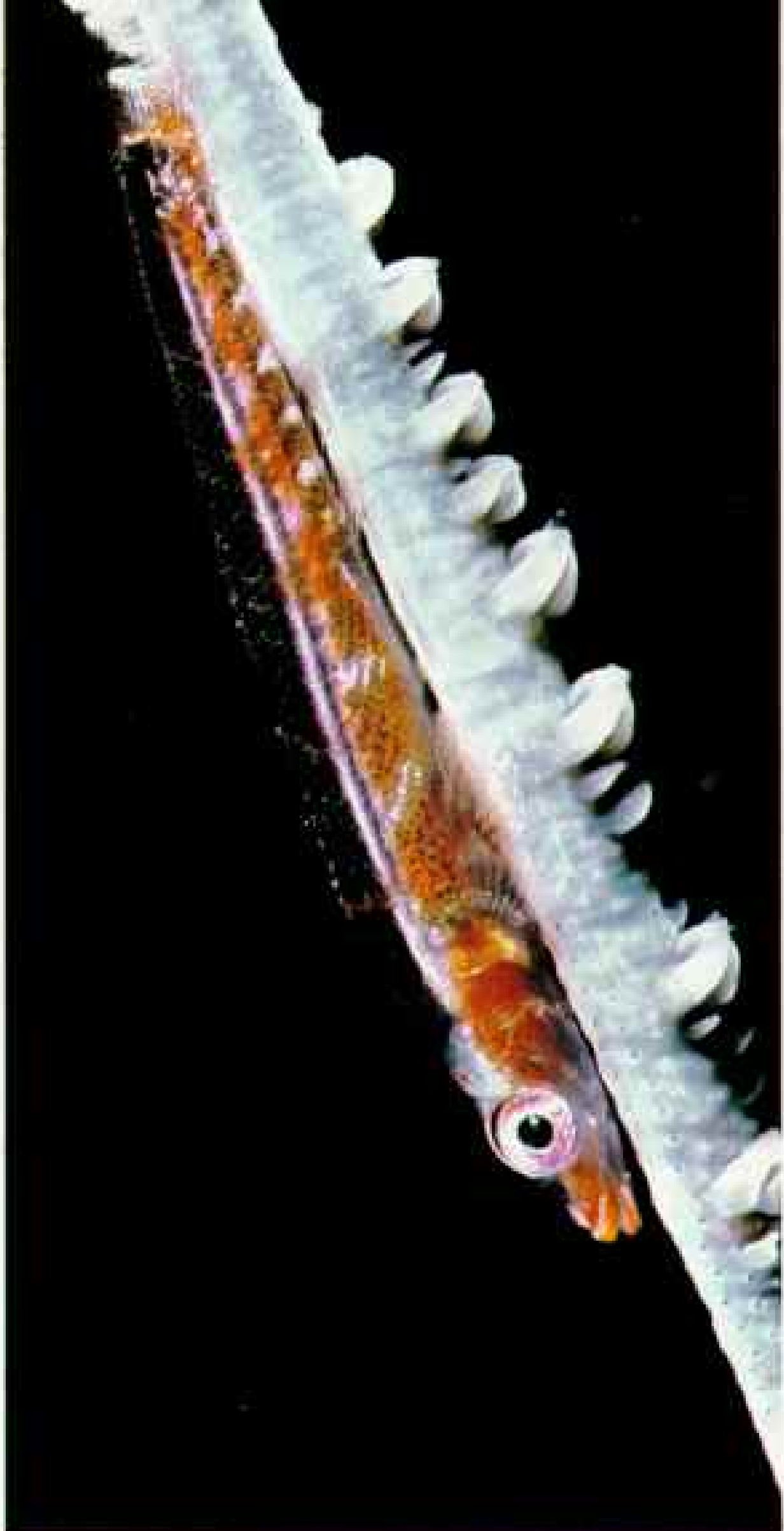




GARDEN AGLOW beneath the sea reveals at least eight varieties of corals, including the treelike alcyonarian, a fan-shaped gorgonian,



and the pinks and saffrons of related species. An orange starfish rests beneath the pink soft coral at left, and another hides at center.





FRIGHT MASK with fangs provides the harlequin moray eel (*Muraena pardalis*) with a sinister visage. Hornlike nostrils above the eyes connect with another pair projecting from the snout, adding to an undeserved air of ferocity. Like most morays, the harlequin is shy and only attacks for food or when directly threatened. Orange, brown, and white stripes that continue even inside the harlequin's mouth earned the fish the Japanese name *tora utsubo*—tiger eel. This 2.5-foot-long specimen

bares its fangs as part of its normal respiration process.

Superb camouflage (top left) protects an inch-long goby (*Luposicya lupus*) clinging to a stalk of coral.

Swim-in service (left) is provided by a four-inch cleaner wrasse (*Labroides dimidiatus*) that cleans the eye of a striped morwong (*Goniistius zonatus*). Such symbiotic relationships are common. Here the wrasse may receive a meal of fungus and bacteria, while the morwong enjoys improved vision.





World's largest crustacean

THE GIANT spider crab of Japan dwarfs all other crustaceans, with a record span of 11 feet between outstretched claws. Rarely seen, large adult spider crabs, *Macrocheira kaempferi*, normally live at depths as great as 1,200 feet, migrating in spring to shallower waters to mate and lay eggs. Females lay as many as 1.5 million eggs at a time, though only a minute fraction of them survive. Largest of Japan's estimated one thousand crab species, the spiders reach adult size within ten years and may live half a century or more.

The giant crustacean is sometimes called *shinin gani*—dead man's crab—for its practice of feeding on bodies of the drowned. Normal fare consists of fish, clams, and other mollusks.

Photographer Doubilet found this five-foot crab at a depth of 120 feet. Like most species of crabs, males are larger than females. On a later dive to 130 feet I inspected a male spider crab at close range. Males are distinguished from females not only by their larger size but also by twin penises shaped like corkscrews that extend beneath the abdomen.



DEMON of the deep decorates the back of a giant spider-crab shell, painted by an artist in the fishing port of Heda on Izu Peninsula. Despite the spider-crab's enormous reach, its body is relatively small. The largest shell ever recorded measured less than two feet across.

Ungainly and essentially timid, *Macrocheira kaempferi* is found only along Japan's Pacific coast from Honshu to Kyushu. Though mentioned

in 17th-century Japanese literature, the crab was unknown to Western scientists until 1727, when a description by German biologist Engelbert Kaempfer was published. Kaempfer included a drawing of a segment of a giant spider-crab leg he had purchased in a Japanese food shop. He described the segment as "long and full as a man's shinbone." The crab was later named for him.

Thanks to the poor

quality of its meat, the adult giant spider-crab is caught more as a curiosity than for food. The meat of the young crab, however, is excellent.

"That is one of the problems," says Dr. Tsune Sakai, Japan's leading authority on the giant spider-crab. "Adult crabs live at depths where they are difficult to catch. Now and then one is brought up in a deep-sea trawl, but that is largely by accident. Young



spider crabs, however, inhabit shallower water and can easily be caught in baited traps. Since crabs may require ten years to reach mating age, many of the younger generation are eliminated before they can reproduce. As a result, the giant spider crab may be an endangered species."

The few adult crabs brought up today are prized as tourist attractions. One Kyoto restaurant features a glass floor with an

aquarium beneath it. Guests can enjoy a seafood dinner while observing the movements of a giant spider crab directly below them.

Several large adult crabs are on display at the Sunshine Aquarium in Tokyo, where I was invited to dive in the tank with them (above). Although the crabs' claws are actually not strong enough to penetrate a rubber wet suit or gloves, I kept behind them at all times, recalling an incident during

a dive at Izu. At one point the legs of a spider crab had become entangled with my own. Each time I pried one leg loose, another slowly wrapped itself around me. Yet I felt no real sense of danger; it was like wrestling with a giant sloth underwater.

Swimming with these bizarre but harmless creatures, I could only hope they would survive in a world that increasingly threatens their existence. □

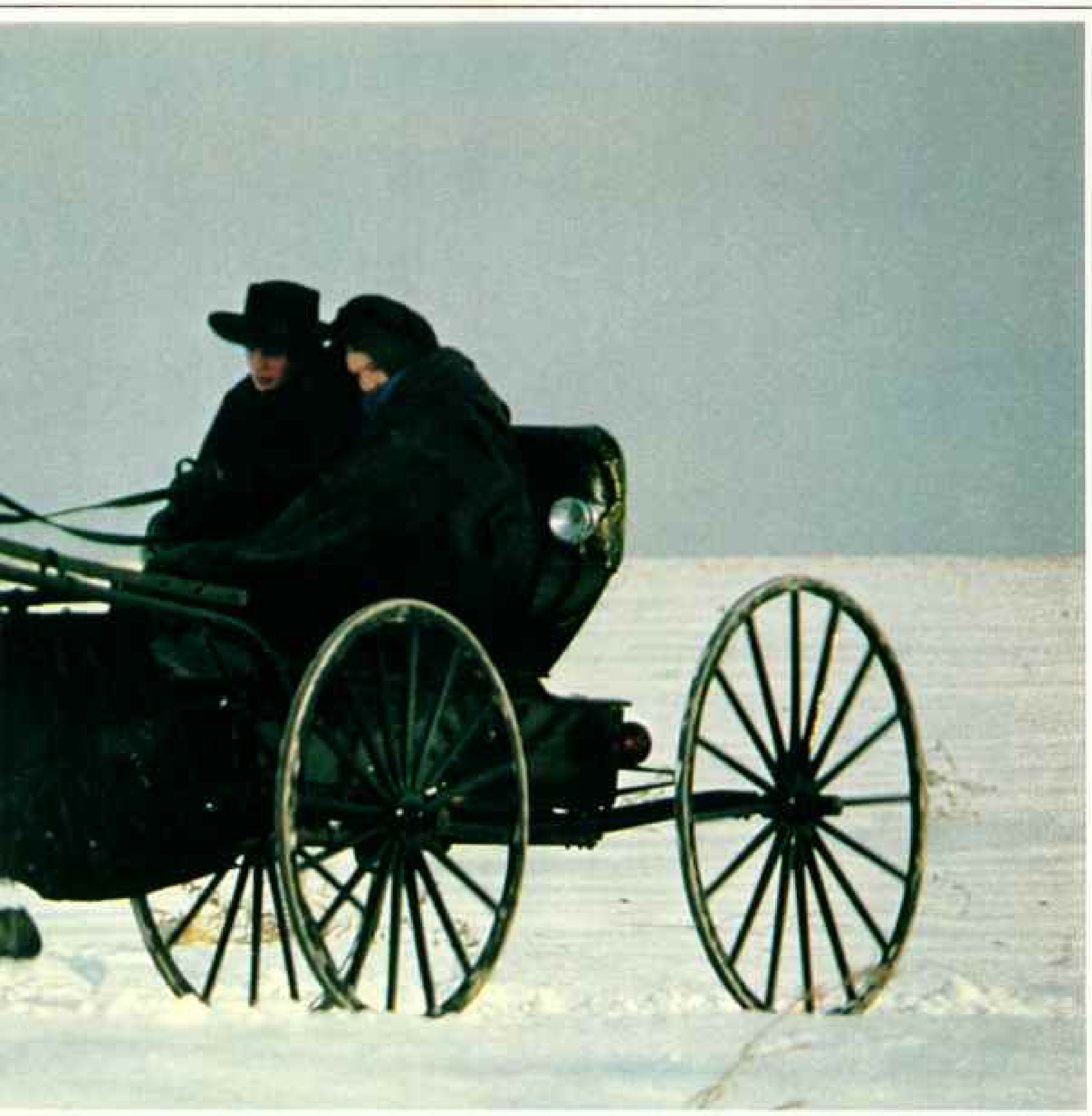


The Plain People of Pennsylvania

PHOTO ESSAY BY JERRY IRWIN

TEXT BY DOUGLAS LEE

NATIONAL GEOGRAPHIC EDITORIAL STAFF



KEEPING FAITH with teachings of church and family, a young Amish couple ride in an open buggy on a frigid winter day. Their home is in Lancaster County, where their ancestors have farmed for more than two hundred years. Their way is the plain way, a life that eschews many of the trappings of the modern world. The roots of their faith reach back to 16th-century Switzerland, where the Anabaptists, preachers of adult baptism, were persecuted for nonconformism, driving many to emigrate. The strength of their beliefs is seen today

in a culture that thrives on the borders of metropolitan America but remains true to teachings forged in Reformation Europe.

Neighbors in faith and geography, Old Order Mennonites and other groups also practice plain ways. Differences in work, home life, and worship present a bewildering array to an outsider. Some churches allow members cars, electricity, and their own telephones—all three forbidden to Old Order Amish and the most conservative Mennonites. But all share the same strong foundations: unshakable devotion to God and “our people.”





SPRITE OF WINTER, an Amish boy cuts through fields en route to sledding with friends and schoolmates. He attends a one-room schoolhouse, where he will go through eight grades, the extent of his formal education. After that his schooling will be of a practical sort, working on a farm or at a trade.

In the warmth of an Amish kitchen, a 16-year-old (*below*) presses a dress she made herself, working by the light of a butane lantern with an iron heated on a propane stove. At her age she begins *rumspringa* or "running around"—the Amish term for the freedom allowed teenagers before they join the faith and marry, settling down to live "in church."

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SETTING OUT on a path of their own choosing, Levi Yoder and Susan Hershey wed at the home of her parents, who are Methodists, while three generations of his Old Order Amish family look on. Now he may not take



vows of Amish church membership, which require marriage within that faith. "The Amish don't force you to join," Levi explains, but a member who leaves faces "shunning"—exclusion by fellow Amish from much of daily life.

BLESSED with some of the richest soil in the nation and a climate ideal for farming, the most productive agricultural county in the East has also been gifted with the stewardship of Mennonite and Amish farmers since William Penn invited them to settle in his New World colony. Among many principles laid down by the 16th-century Dutch Anabaptist leader Menno Simons, from whom the Mennonites take their name, perhaps the most important is that of a spiritual community living apart from the world and close to the soil.

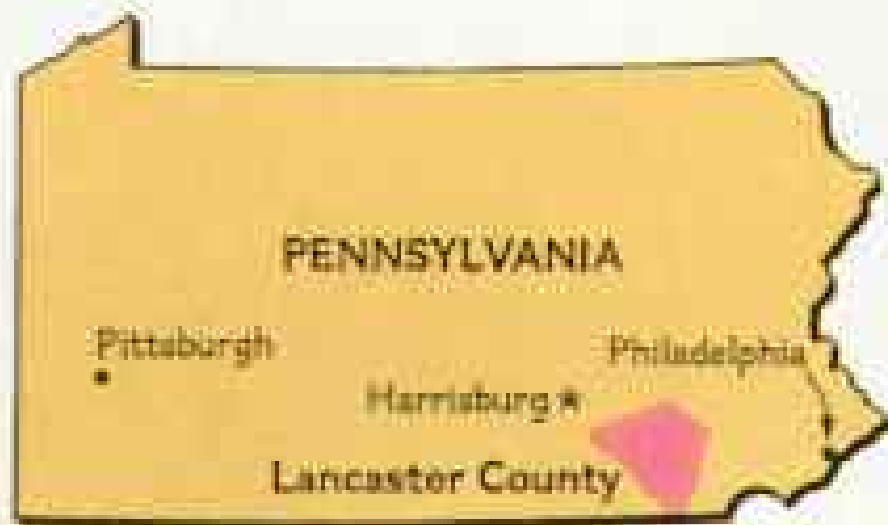
Jacob Ammann led his followers—the Amish—out of the Mennonite Church in 1693, principally because it no longer shunned nonconforming members in daily life as Simons had taught. But both groups remain close in spiritual beliefs, their lives centered on their church community. In both, those congregations that have most resisted change in life-style and worship are today called Old Order.

Amish settlements in the county cluster thickest near Intercourse and stretch south toward the Maryland line. Old Order Mennonites predominate in

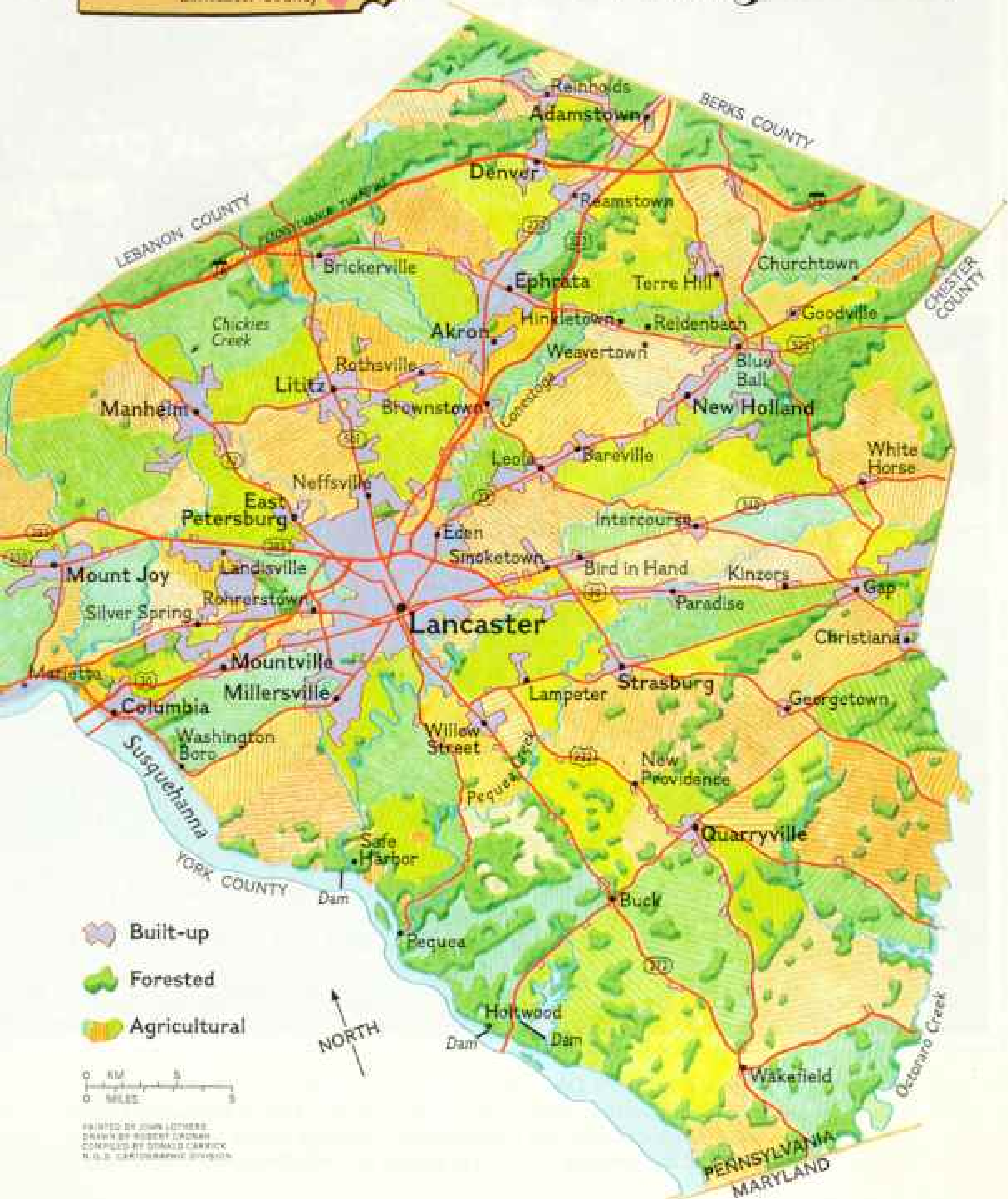
the north. All are under economic pressure explained by an Amish farmer: “The biggest problem is high land prices. We might be at fault for that. We’re increasing in population, but we don’t like to spread out.” As Old Order farmers bid for nearby land for their children, prices have skyrocketed as high as \$10,000 an acre, forcing many to subdivide or see children take jobs away from home. Some young people move to Old Order settlements elsewhere.

Also, growing industry in Lancaster brings housing development on prime farmland. Another intrusion, a booming tourist trade has sprung up on their doorstep. Vehicles at a crafts market in Intercourse (*below*) are among those that brought some five million visitors to the county last year. The Plain People themselves are the unwilling focus of tourist attention. Outsiders’ curiosity is often unwelcome to a people for whom privacy is a part of their religion.



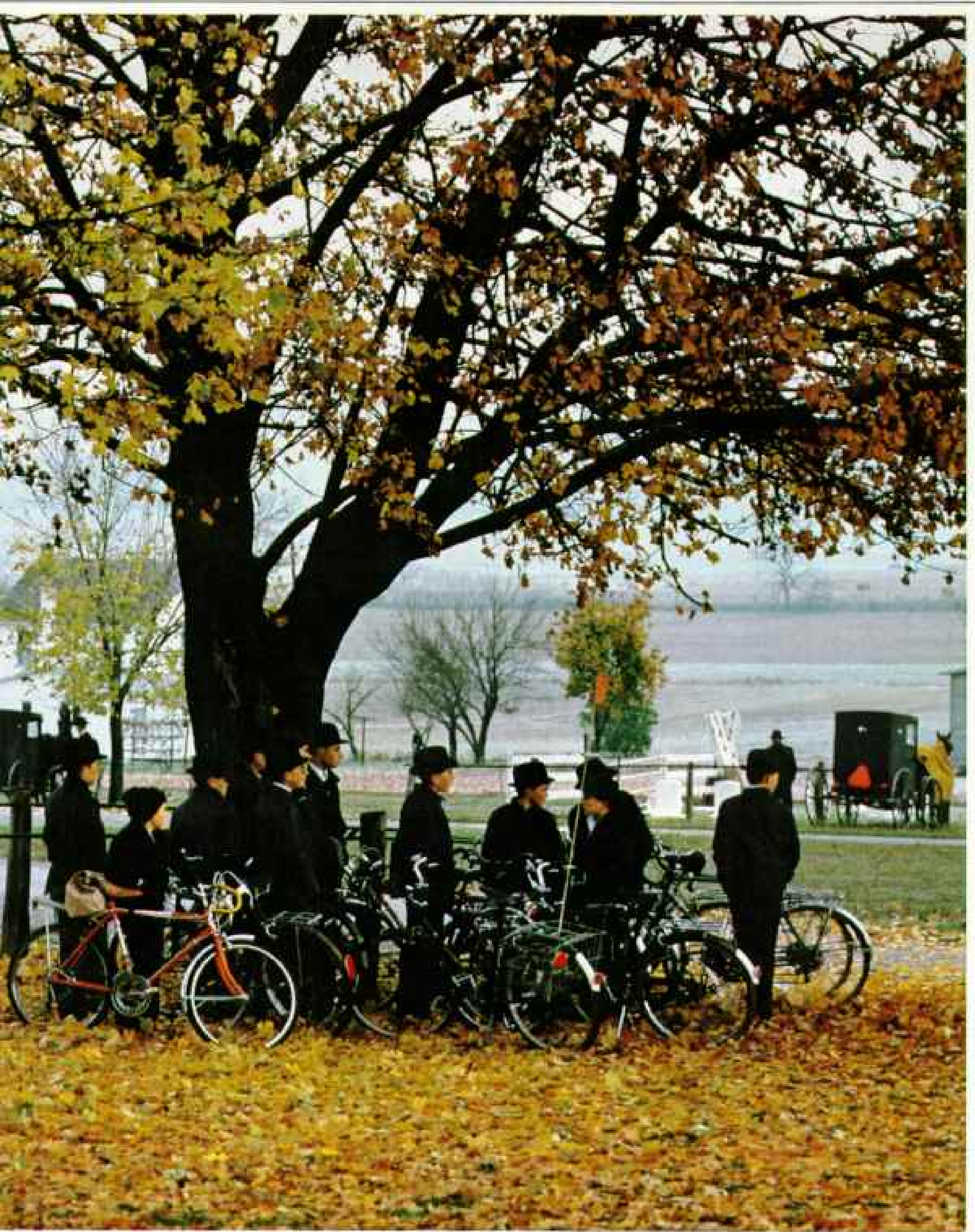


Lancaster County





THE LORD'S DAY brings bicycles and carriages to an Old Order Mennonite meetinghouse in Churchtown. One of Lancaster's nine Wenger Mennonite congregations—named for the bishop who founded the group in 1927—it is among several Mennonite Old Orders



known as Team Mennonites, who drive horse-and-buggy teams instead of cars. While Lancaster's 72 Old Order Amish congregations agree closely on their customs, Old Order Mennonites have splintered many times since disagreement over minor innovations in life and worship began in the 1860s.





CRAFTS MADE ART, traditional Amish quilts have been recently discovered by collectors. An heirloom for sale at an estate auction (*below*) bears the diamond center pattern that originated with the Amish. Drawing from broader traditions of American quilt designs, Amish Mennonite women and Amish relatives stitch a “log cabin” quilt in the basement of the Pequea Amish Mennonite Church (*left*) for sale to benefit their school.

Amish Mennonites left the Old Order Amish in 1927 over disagreements about modern amenities and practices of worship, such as Sunday school for their children. Old Order Amish feel children should learn religion at home and in regular church services so that all ages are in accord on beliefs. Amish Mennonites feel emotionally close to the Amish, but in practice are allied to the more liberal mainstream Mennonites. For instance, they support their own missions in Latin America, while Old Order Amish do not believe in proselytizing. Church-organized youth groups provide the central social life of Amish Mennonite teenagers. On a diamond at a church member’s farm, Becky Beiler of the Weavertown Church girls’ softball team hums a fast pitch (*below left*) toward a Pequea Church batter.







DRIVING ambition for most Old Order farm boys is to follow in their fathers' footsteps: Six-year-old Samuel Stoltzfus is already adept at steering a mule straight down the furrows of his family's garden, as his 17-year-old cousin Lloyd guides the harrow. Lloyd lives and works with Samuel's Old Order Amish family as a "hired boy," a practical arrangement found on many farms that provides labor where it is needed and work for boys old enough to be out of school but too young to farm or get full-time jobs on their own. Wages are paid directly to a hired boy's parents. Parents start a bank account when a child is born and turn it over to the young man or woman as a nest egg when he or she comes of age.

On Old Order Amish farms, tractors are used only as sources of power for other machines, not for field work. Jobs such as hay baling that require mechanized power in the field are done with gasoline or diesel engines mounted on horse-drawn wagons. Rules vary among Team Mennonites: Some allow tractors for field work but only if fitted with steel-treaded wheels so that they cannot be driven on roads in place of cars.



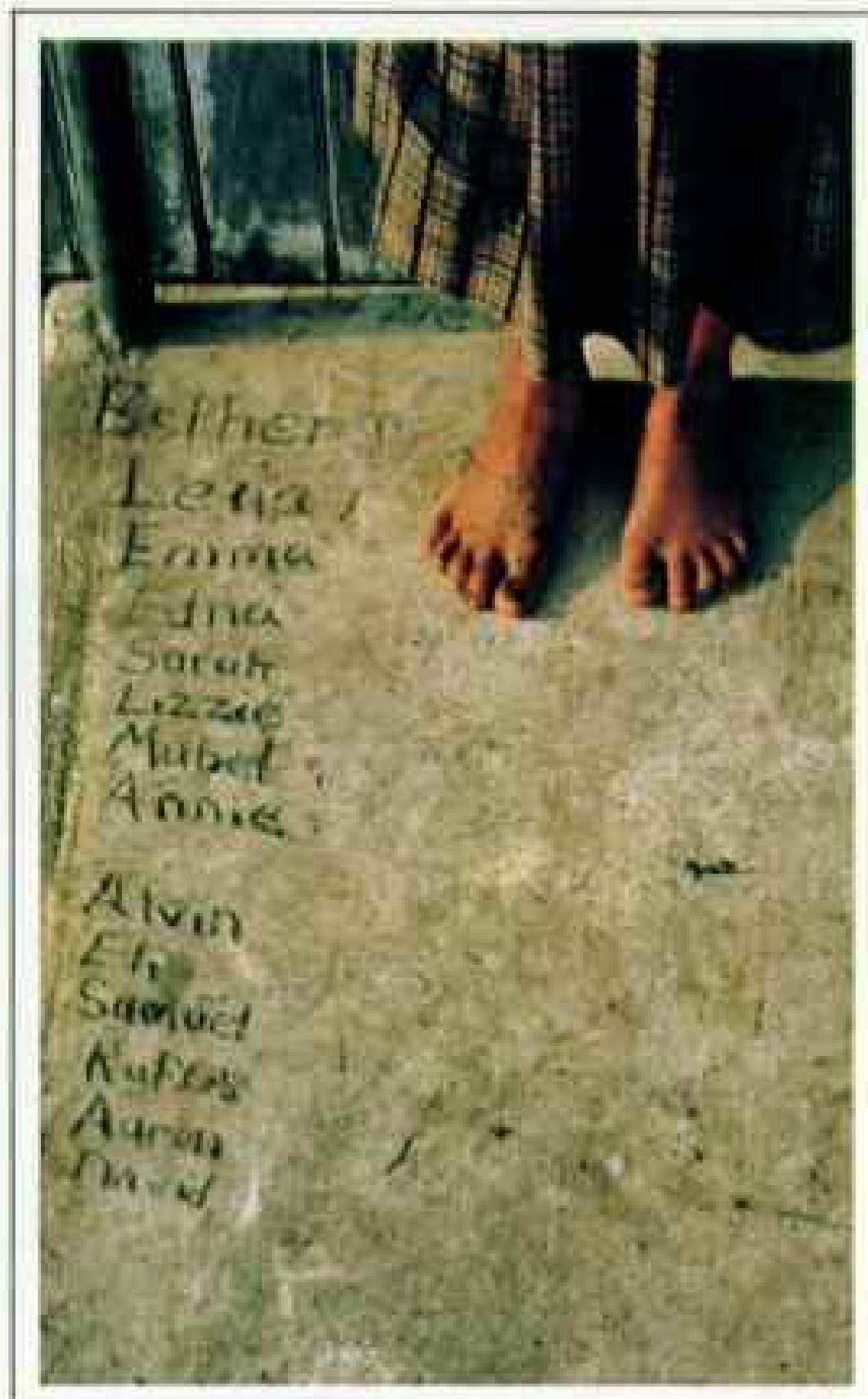
CHORES ARE a family affair on Wenger Mennonite Amos Sauder's 36-acre farm, where the younger of nine children feed ducks and chickens (*above*). Their oldest brother works as a hired boy on a nearby farm. The next oldest feeds steers being fattened for sale. "I watch after him," says Amos, "but that's his job." Along with brood sows that Amos takes care of himself, steers are the mainstay of the farm that has been in his wife's family for 150 years.

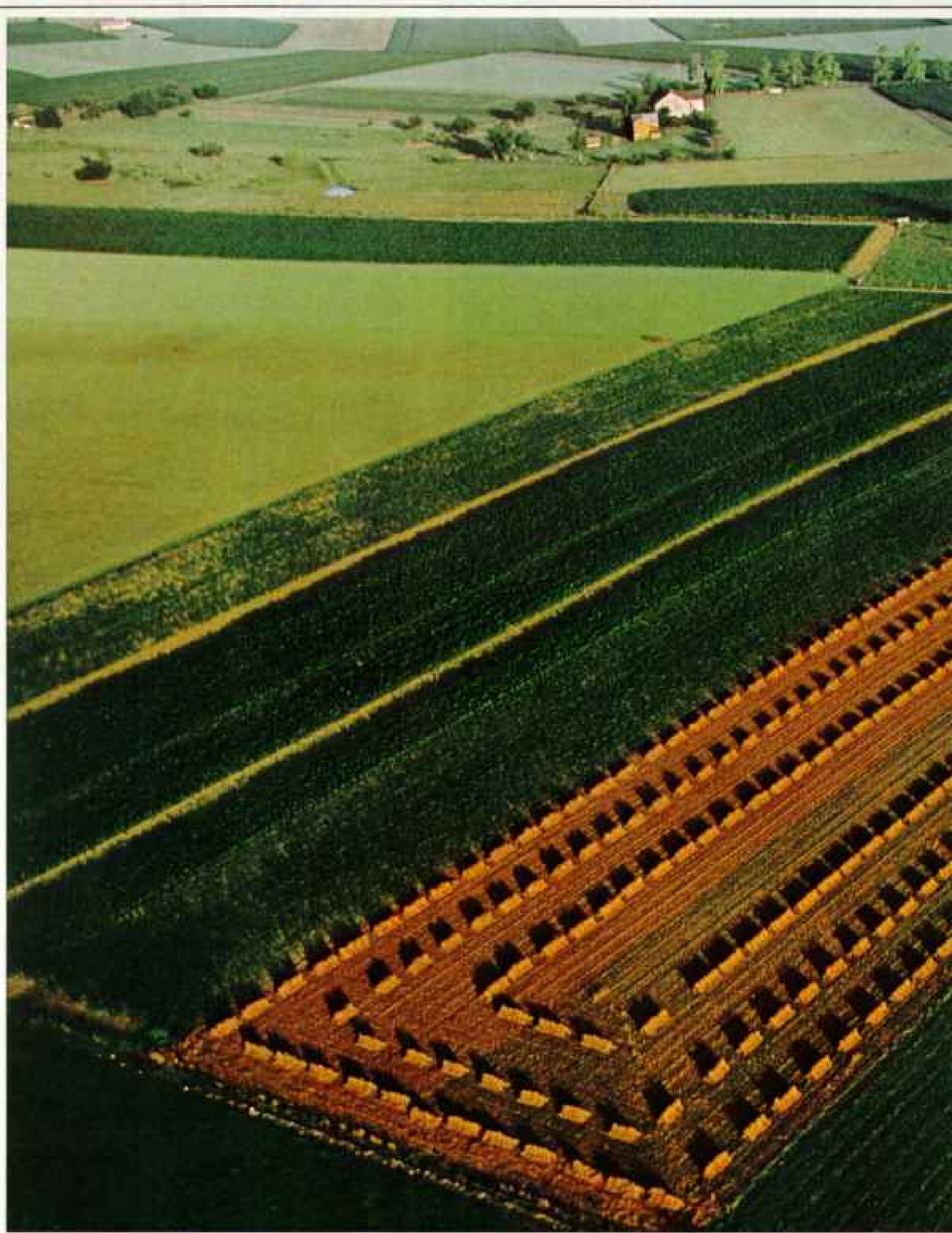
The eldest daughter baby-sits for neighbors and tends the two dairy cows that supply the family's milk. The children will husk corn in the fall and strip tobacco in winter. "Having your own

labor helps," Amos notes with a smile. When sons and sons-in-law come of age, he will help them buy farms of their own.

Labor is even more abundant on the Reidenbach Mennonite Hoover family farm, where children's names in concrete (*top right*) fail to tell the whole story: Since the concrete was poured, Henry, Edmund, Daniel, and Sesie have arrived.

Between evening milking and Sunday night church service, a light supper starts with grace at the table of Leon and Ruth Lapp (*right*). Amish Mennonites, they light their home with electricity, warm it by central heating, and drive to church by car—but have no radio or television. "We think we can well do without them."

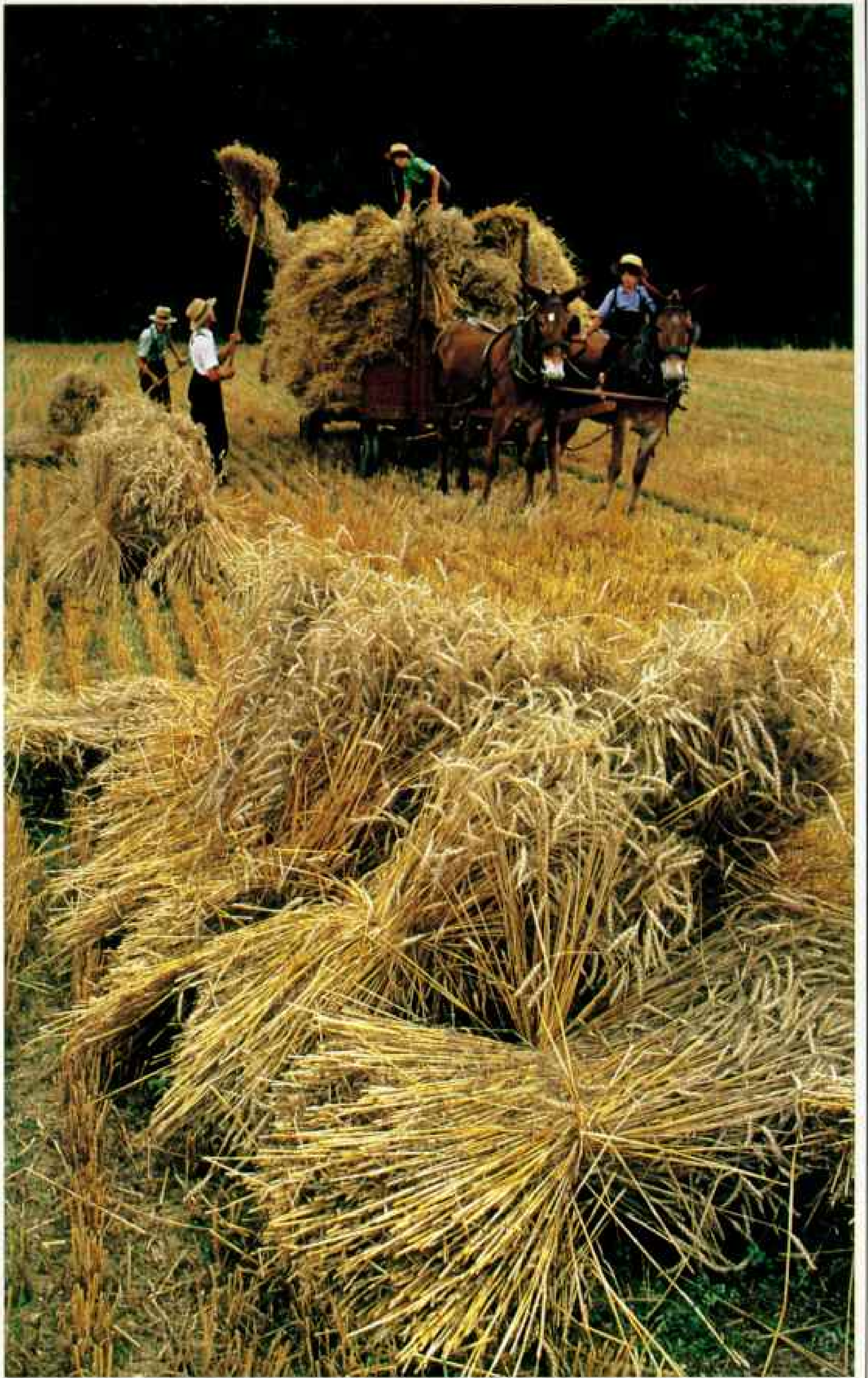




TIDY AS CAN BE, wheat shocks drying in a field attest to the meticulous care that goes into Amish farms. Averaging about 60 acres, they require intensive cultivation to survive as businesses



and support large families. Although Old Order farmers shun many mechanical conveniences, they do not hesitate to use pesticides and chemical fertilizers. Old Order farms are usually sold within the family.





“THE BIG ONES pitch it up, the middle ones stack it, and the little guys ride,” says an Amish “middle one” of his favorite part of the year, when neighbors gather to harvest wheat (*left*). The grain is sold as a cash crop; straw goes for bedding in animal stalls.

Bringing fresh produce to markets in Lancaster and other centers is a long-standing tradition for some Old Order

farmers, but the increasing tourist trade now brings the market to them. “Only problem was, we should have made it twice as big,” says an Amish farmer of the roadside stand he built last summer (*above*). Gardening and canning skills so appreciated by outsiders are a part of daily life. Ann Lapp lines her cellar with home-canned jars of cherries, apples, pears, applesauce, apricots, grape juice, and peaches (*below*).

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COMFORTABLE CLUTTER and customers she has known all their lives keep Florence Fair company in the building where she was born in 1902 (*right*). Though she is a Lutheran herself, most of her customers are Team Mennonites, for whom the Hinkletown store, within a carriage ride of their homes, is a great convenience. "The old folks pass away and the young ones take their place," she says.

An antique shop in Intercourse (*below right*) keeps the folksy look of the hardware store it once was. Formerly a sleepy village where blacksmiths shod Amishmen's horses, Intercourse today caters mostly to tourists. As fewer "English"—the Old Order term for outsiders—provide the specialized parts and skills needed to build and repair machinery for Old Order farms and homes, home shops have become increasingly widespread. As a happy side effect, Old Order craftsmen have discovered a demand for their work outside the area: At Edwin Shirk's carriage shop, eldest son Earl fastens a rubber rim onto a wheel (*below*) for a customer in the tourist trade in Philadelphia. Wenger Mennonites, the Shirks use only steel rims on wheels of their own buggies.







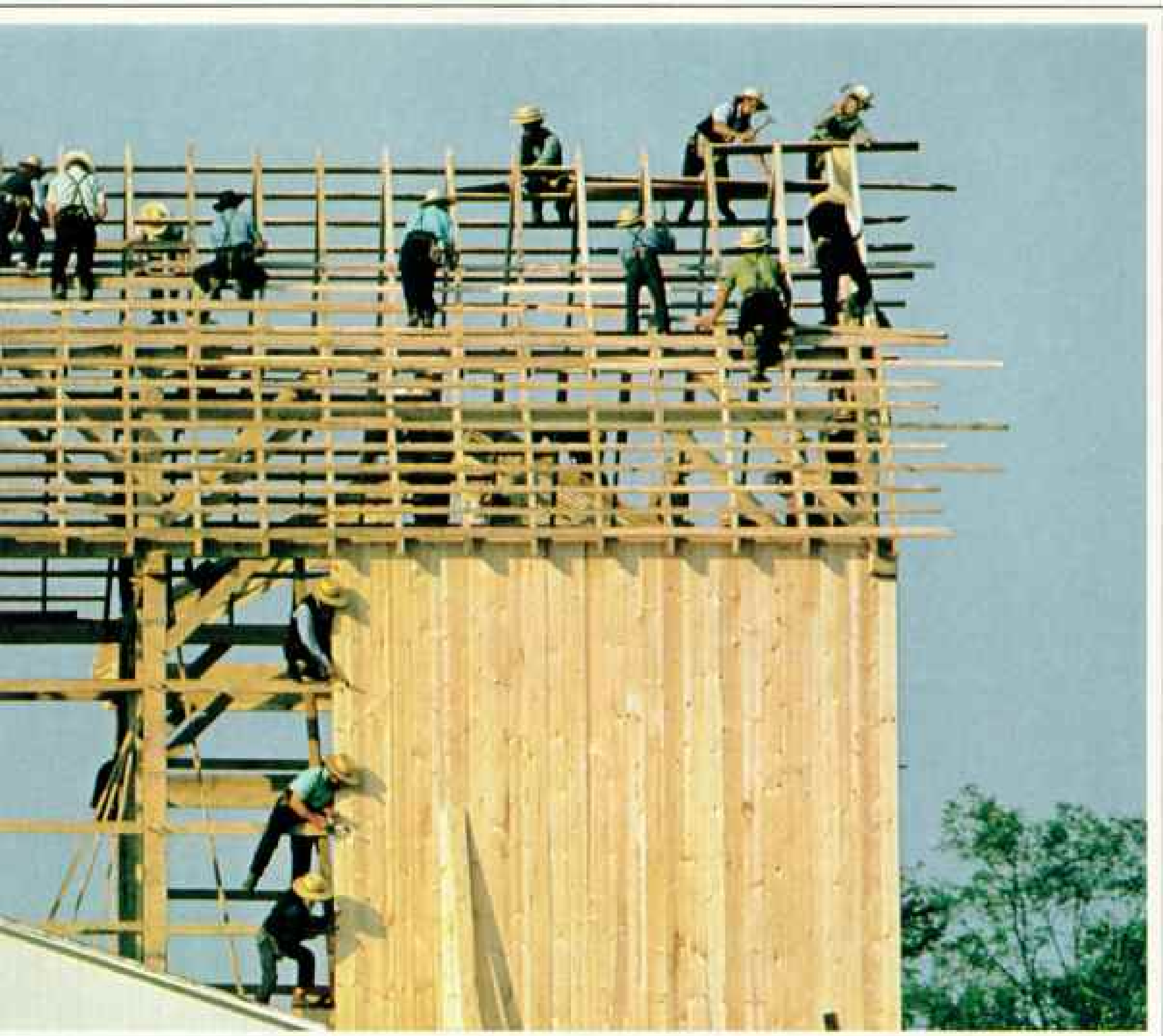
PLAIN DRESS takes the fancy of Brooklyn, New York, native Tamika Fleming, ready for Bible school with Geraldine, Lena, and Trina Lapp (left). For four summers Tamika has lived with the family for two weeks through the Fresh Air Fund, a century-old program that brings inner-city children to Lancaster farms. "The first time she came down, she was afraid to go swimming in the meadow pond because

she thought the cows were elephants," Geraldine reports, "but now she's not scared." The Lapp girls, weaned on the Pennsylvania German dialect spoken in most Lancaster plain homes, are no strangers to strangers: Seven Fresh Air children have stayed with them, and foreign-exchange students spend Thanksgiving. On many Sundays they share their table with church visitors invited home by their parents.



Poised in her 13th year, Ella Shirk received a copy of this photograph of herself—the first ever taken except for formal family portraits—after photographer Jerry Irwin visited her Wenger Mennonite family's farm for this story. Many churches by their vows ban pictures as "graven images." As individuals, many Old Order members shun photographs to avoid publicity that might make them seem proud instead of plain in others' eyes. When tourists who have come specifically to see the Amish meet with Old Order reluctance to pose, misunderstandings sometimes occur. Visitors have been known to doubt the authenticity of Amish seen at market and along roads. "Often they ask me, 'Where's the real Amish?'" Irwin says. His own photographs are the result of a five-year love affair with Lancaster County and its people.





THE RINGING OF many hammers accompanies a barn raising (*above*), where Amish traditions of carpentry skill and community support come together to replace a building that burned. “This one touched my heart,” says the planner—as many Old Order members do, he asked that his name not be used. “It belonged to a widow, and people came from all over. We can’t thank the Lord enough for people to care so much.” The builder of more than a hundred barns, he laid this one out without a blueprint. “It’s just a talent that the Lord gave me. I can close my eyes and see the whole structure sitting there.”

Mechanical care keeps a 1921 steam engine active in spring and fall steaming tobacco seedbeds (*left*) to sterilize the ground for planting. Two years ago its Amish owner faced a problem replacing boiler grates when the “English” company that made them went out of business. He bought the supplier’s molds and started his own foundry, now a business in its own right.



JAUNTY TILT of their hats signals the high spirits of Reidenbach Mennonite boys pedaling to church. Theirs is among the most conservative branches of Team Mennonites, with some congregations electing to heat and cook with wood and disallowing indoor plumbing. At 17 a boy begins going to hoedowns, where boys and girls sing and square dance to harmonica music in church members' homes. His father buys him a



“courting buggy” and a horse and pays expenses until he reaches 21. Then, the parents hope, he will marry a girl from their church and settle in the area. In old age, parents may share their home with offspring or build a *grossdawdy* house and live nearby. For the Plain People of Lancaster, Pennsylvania, success means children who join the church and carry on raising the most important crop on the farm: the next generation. □

Narwhal Hunters of

THE LONG POLAR NIGHT has begun to lift over Qaanaaq (Thule) now, and the summer narwhal hunt is not far off. As I turn the pages of my diary for an earlier hunt, the events and faces of that time come rushing back across the span of many months.

The diary is badly worn, and in some places my handwriting is almost illegible from fatigue. The pages are soiled, and they smell faintly of kerosene and narwhal blubber. To me it is the smell of adventure.

My home in Greenland lies far to the south of the Thule region, where the summer narwhal hunt takes place. Over the years, however, I have often traveled north in late June to visit my Polar Eskimo friends in the tiny village of Qeqertat (map, page 526). As a Danish resident of Greenland for the past 20 years, I have explored the island's remote reaches in my work as a geophysicist, a hunter, and more recently as a photojournalist. It was in Qeqertat that I learned to hunt the narwhal, the unicorn of whales.

FIVE-SIXTHS of Greenland, the world's largest island, is buried under ice as much as three kilometers (two miles) thick—the ice cap. Only along the coast does one find a thin strip of ice-free land, a mountainous country slashed by countless fjords. With an area of 2,175,600 square kilometers (840,000 square miles), Greenland is more than 50 times the size of its mother country, Denmark.

In Greenland's northwestern corner, known as the Thule region, the great Inglefield Fjord and its bordering straits split the coast like a giant ax blow reaching 80 kilometers (50 miles) inland.

Along this icy fjord lie a few tiny villages,

the homes of some 430 of the Polar Eskimos, who total scarcely more than 700. These people live farther north than any others on our planet and maintain a frugal existence as hunters.

The Polar Eskimos call Inglefield Fjord Kangerlussuaq—"great fjord." Farther inland it widens into an almost circular basin surrounded by enormous sandstone and granite mountains. The mountains plummet steeply into the sea, and with them five glaciers, two more than ten kilometers wide.

Here during the short arctic summer the runoff from the melting ice is tremendous. Cataracts seethe and waterfalls thunder, carrying large amounts of minerals to the fjord. The minerals produce an explosion of plankton, a thick soup on which masses of Greenland halibut feed. These large flatfish hide in the mudbanks below the glaciers, and they are the favorite repast of the elusive narwhal.

Already at the end of June, while the fjord is still covered by winter ice, thousands of narwhals—small, tusked members of the whale family—appear off the coast. Restlessly they move along the edge of the ice and wait for it to break up so that they can reach the feeding grounds at the head of the fjord. The hunters know this, and along the way they pursue the whales in age-old fashion, with kayaks and harpoons.

In the midst of this enormous larder, low, ice-scraped granite islands flank Qeqertat, smallest of the Polar Eskimo villages. Like almost all Eskimo place-names, Qeqertat is a descriptive term, meaning the "islands."

"Qeqertat is not a place one would just happen onto," I have heard people say. And in truth, most of the year the village is barely populated, a

(Continued on page 526)

In a sprint for survival, an 18-year-old Polar Eskimo in bearskin pants races to harpoon a seal spotted at the frozen edge of Greenland's Inglefield Fjord. Reliant on skills passed down through generations, these hunters, the world's northernmost inhabitants, wrest existence from the icy arctic wilderness.

Greenland

ARTICLE AND PHOTOGRAPHS BY
IVARS SILIS





On the frozen brink of disaster, dogs battle the swift current of a lead in the ice. Once the dogs have crossed, the sled is eased over the rift. This sled team, one of six towing kayaks, journeyed to the mouth of Inglefield Fjord in early July to hunt narwhals and was nearly swept away when the ice began to crack and drift. "By the following day the breakup was complete," the author recalled of the



harrowing trip. "A steady easterly wind had converted the sled road to open sea." In summer, from the end of June through August, ice melt stirs up plankton soup in mudbanks at the fjord bottom. Halibut and cod move in, and, in pursuit, schools of narwhals, some weighing nearly 1.6 tons. Normally only the male narwhal sports a tusk, actually an elongated tooth, which grows through the upper lip.



Black-bellied clouds lower over a lone kayaker watching for narwhals in Inglefield Fjord. During the summer months of constant sunlight, a Polar Eskimo may hunt for 72 hours at a stretch. His quarry includes walrus, seal, and narwhal. The



drop in sealskin prices on the world market has enhanced the economic importance of the narwhal to these hunters. A large tusk, worth \$800 or more if perfect, helps buy heating oil, radios, motorboats, and other modern comforts.

(Continued from page 520) sleepy place. The hunting families must travel far to procure their food. In fact at Qaanaaq, capital of the Thule region, many of the 350 city dwellers consider the summer narwhal hunt to be Qeqertat's only reason for existence. At that time, things really do happen.

TWO SUMMERS AGO I flew from my home in Qaqortoq (Julianehåb) to Qaanaaq. There I caught a ride aboard a chartered helicopter supply flight to Qeqertat, a distance of 65 kilometers. I had not visited the village in several years and was eager to see my friends again.

Qeqertat was silent, the windows and doors of its 11 houses sealed shut. The village appeared deserted—a ghost town in the midst of a pallid sea of fog.

Where were they all, my long-ago friends? True, I had been warned in Qaanaaq that like other villages of West Greenland, Qeqertat had lost a number of residents to larger towns along the coast. The village, which had once numbered 50 souls, now had no more than 20.

But where were those remaining 20? Had they, too, finally left? Or were they simply still asleep on this foggy morning?

My thoughts were interrupted by the sound of a wood plane that seemed to rasp shavings from the very silence. A sign of life, at least. Ducking under the guy wires that

braced a house against winter storms, I came on the source of the sound.

An athletic-looking young man of medium height stood bent over the wooden frame of a new kayak laid across two sawhorses. The man looked up with the sharp eyes of a hunter in his Mongol face, burned bluish brown by the midnight sun. The hawklike gaze softened in a boyish smile.

Now I recognized him: Qajoranguaq, whom I remembered years before as a shy youth clever at whittling toy spears. The boy had become a man now, a master carpenter putting the finishing touches on the world's most elegant craft—a sleek, lethal, six-meter-long hunting platform known as a Greenland kayak.

Qajoranguaq stepped out of the curly shavings, stuck out his hand, and greeted me in customary fashion: "Tikeraiit?—You have come?"

"I—Yes," I answered. "By helicopter. In Qaanaaq someone said you were collecting tern eggs farther up the fjord."

"That's true," Qajoranguaq answered. "But it was mostly to check on the ice. How I long for those dear narwhals and for muktuk [whale skin and a layer of blubber, an Eskimo delicacy]. The glaciers in there are pushing hard, so it won't be long before the ice breaks up. But how do things look at the mouth of the fjord?"

Having just flown over that area, I



MAP BY RAMSEY MURRAY
NATIONAL GEOGRAPHIC CARTOGRAPHIC DIVISION



A GASH in the western flank of Greenland, Inglefield Fjord knifes some 80 kilometers (50 miles) inland. Of some 700 Polar Eskimos, 430 live here, along a coast edged by glaciers and sandstone mountains, chilled by

winter temperatures that have plummeted to minus 46°C (-50°F). At a village called Qeqertat, children race (right) while their fathers hunt. The village of 20, which consists of 11 houses, a store, and a school-chapel, doubles in size during the brief summer, when relatives, hunters, and visitors arrive for the narwhal hunt.

answered that breakup of the ice was already far advanced. I added that four narwhals already had been taken along the edge of the receding ice at Qaanaaq.

Qajoranguaq continued to work steadily, adding only an occasional encouraging "*Iijai*—You don't say so," "*Takuuk*—I see," or "*Nauhinaju*—Oh, really."

It was a pleasure to watch this 25-year-old master at work, to see him adjust the long side planks, follow the lines of the ribs, and join the frame into one elastic whole that would later be covered with sealskin. A kayak should be joined without nails. It has to work with the sea, not stubbornly try to fight the forces of nature.

"Those narwhals," he asked, "the ones the hunters got out on the ice at Qaanaaq—did they have tusks?"

"Yes, all four of them," I answered, knowing the importance of my reply. The tusk of the narwhal, a feature of the male rarely found on the female, is a vital source of income to the Polar Eskimos. It has become even more important since the price of sealskins plunged drastically several years ago—a result of the conservationist campaign against large-scale commercial sealing off Newfoundland.

The hunt for narwhals has come to play a critical role in the ability to pay the installments on village houses and boats, to pay for heating oil, gasoline, ammunition, radios,

cloth for anoraks, and other items that sweeten existence in the icy polar wastes.

Adult narwhals weigh as much as 1.6 tons, more than 3,000 pounds. On a full-grown narwhal there are about 200 to 300 pounds of the tough, delicious muktuk, which is rich in vitamins. The concentration of vitamin C alone is sufficient to prevent scurvy despite a primary diet of meat.

Both male and female narwhals are born with two teeth pointing forward in the upper jaw. The left tooth of the male, however, grows through the upper lip like a bowsprit. It spirals counterclockwise toward the tip and can reach a length of three meters and weigh as much as 20 pounds (pages 536-7). A large, perfectly pointed tusk is a coveted trophy and sells for at least \$800 on the world market. On rare occasions hunters find narwhals with twin tusks, a bonanza Qajoranguaq dreams of constantly.

Northern Greenland has no wood except driftwood, seldom in generous supply, and until well into this century the Polar Eskimos used narwhal tusks as harpoon shafts and tent poles.

But what does the narwhal itself use the tusk for? Qajoranguaq rules out the theory of a weapon. He believes the tusk is much too brittle for such purposes, even though some hunters claim to have seen panic-stricken narwhals stab attacking killer whales with their tusks.





Stiletto-sleek, a six-meter-long (20-foot) kayak takes shape from ash imported from Denmark (left). To prepare the sealskin covering for the frame, hairs are scraped off the hides, and the skins are soaked in salt water for four or five days. Village women sew the skins together and stretch them over the frame while wet (right); this results in a translucent,



lightweight, yet durable covering (above). A short skirt of sealskin drawn tight around the opening will help keep kayak and hunter dry. Adjusted and tailored to the body and capabilities of the owner, the craft will fit like a snug pair of trousers.

Harpoon, knife, rifle bag, and lines secured on the kayak belonging to 16-year-old Qitdlugtoq (right) compose part of the hunter's inventory. But courage, patience, skill, and luck are critical components as well. Wounded pride darkens the face of this young hunter, whose initial narwhal hunt met with personal failure when his first harpoon throw fell short of the mark.



Qajoranguaq thinks the narwhal uses its tusk to root up food from the bottom. The worn tip seems to bear him out, though recent scientific literature dismisses the tusk as no more than a secondary sexual characteristic, like the lion's mane. But our knowledge of this very timid whale is extremely limited. When the narwhal lifts its fan-shaped tail and dives into the dark depths, it takes all its secrets with it.



Focused on the promise of prey, hunters scan the fjord from a cliff near the village. "Day and night, binocular lenses glinted," says the author. "If there was a whale in sight, and there often was, then only women sat and watched their husbands, sons, or fathers out between the icebergs."

FOLLOWING my meeting with Qajoranguaq, the days flowed together, unbroken in the perpetual midnight sun. Gradually Qeqertat came to life. Women left their houses accompanied by small children. They trudged down to the fjord to get freshwater ice from chunks of glaciers stranded near the village.

From Qajoranguaq's house his father, Angutikavsak, stepped out with a mug of coffee in his hand and a sealskin to sit on. A short, sinewy man of 55 with the most over-patched bearskin pants I have ever seen, he surveyed his son's kayak frame with an approving glance, then sat down on a hillock with a half-finished kayak paddle and began to shape it with a flensing knife.

Now and then other doors among the village houses opened quietly. Several young men regarded the still frozen fjord with a fatalistic air, yawned, and drifted down toward Qeqertat's harbor. I followed, and we met beside a scaffold with seven kayaks stored upside down on it, ready for the hunt.

It was low tide. The ice floes jostled, scoured, and sighed against the cliffs on the beach. In the distance the mournful cry of the male eider duck sounded—*aouu, aouuu*.

I joined the group, including Qajoranguaq and his younger brothers, Aleqatsiaq and Qitdlugtoq. All gathered around the row of sleek craft, checking and rechecking the hunting equipment that had been long ready for use.

One by one the harpoon heads were taken out—one made of plastic, one of aluminum, and the rest traditionally fashioned of walrus tusk. The hunters caressed the streamlined forms, admiring the clear shine of the steel edging around the heads, soon to be rose-colored by the whale's blood.

The harpoon head, which disengages from the harpoon shaft as the narwhal is struck, is fastened to a 25-meter-long nylon line coiled on the foredeck of the kayak. The line leads around the right side of the paddler to the back, where it is tied to the hunting bladder. This is an inflated sealskin, complete with flippers, which acts as a float to prevent the harpooned narwhal from sinking once it has been killed (page 532).

In addition to the harpoon, every narwhal hunter carries a rifle aboard his kayak. This must be examined before the hunt for rust in

the barrel or on the finely sharpened sights.

Inside the kayak the sitting skins of seal and polar bear must be arranged, the *akuili-saq* inspected. The latter is a short skirt of watertight sealskin drawn around the kayak hole, reaching up to the hunter's armpits and keeping water out of the craft at sea.

EACH HUNTER carries a lance strapped behind him on the kayak, and on the foredeck a pointed copper pipe and a knife. The pipe is used to inflate a harpooned whale's abdominal cavity so that it floats; the knife is an all-purpose instrument at sea. If something should go wrong, if the harpooned narwhal entangles the line with the kayak, then even the most skilled hunter will be turned over and pulled down unless he instantly cuts the line.

It is a rigid rule that one never goes on a kayak hunt alone. A man can save a cap-sized friend by making an outrigger of his spear and hunting bladder, so that the friend can hang on and be pulled aboard by his trouser bottoms.

As the young men talked beside the up-turned kayaks, one of them fished an emery stone out of his anorak pocket. He passed it around, and the harpoon heads got one more unnecessary sharpening. At length conversation ebbed, and somewhere a loon shrieked out its loneliness in the silence.

A day or so later the village seemed transformed. Nature, too, had waked from its slumber. One July afternoon fishhook-shaped clouds appeared high in the sky, riding a strong east wind. The hunters' eyes shone with hope. They let the fresh gusts rumple their hair and scatter sleep from their minds. The ice floes began to drift past the village, faster and faster, outward bound.

And the next day the fjord was clear. The icebergs, freed from the shackles of the winter ice, let themselves be seized by the current and the wind and sailed majestically back and forth. The black heads of harp seals bobbed up everywhere. From the icebergs' stately height, kittiwakes threw themselves down at the large schools of polar cod. And on the islands and islets indignant terns screamed and dived at children gathering eggs.

That same evening the wind stilled. Mirror-like the fjord rested. And then the

whales came. Carried along by the incoming tide, with the water splashing against their domed brows and with heavy whistling snorts, the narwhals took possession of the fjord.

Qajoranguaq harpooned the village's first whale, way out. Soon afterward the catch—a young male narwhal—lay at the water's edge in the harbor. The entire village turned out. The proud hunter made the first cut.



Bound up in tradition, the Eskimo equivalent of cat's cradle can continue for hours as the player manipulates string to form figures like this seal (top).

The player of another game, called ajagaq, tries to catch a perforated piece of caribou horn on a thong-attached bone pin (above).



In an explosion of sea and spray, a harpooned whale nearly capsizes a kayak (above). Because of such dangers, hunters venture in teams of two or more. At impact, the harpoon point disengages from the shaft. An inflated sealskin float (left), attached by line to the embedded point, drags behind and tires the whale. As the animal resurfaces, other hunters move in with lances to speed the kill (right). Each year hunters capture about 150 narwhals, but the species is not considered endangered.



Instantly the midnight sun flashed against long flensing knives, against the women's chopping blades, and even pocketknives.

Blood splashed. Everyone cut in, chewed muktuk so that their cheeks shone with blubber. The first narwhal of the year was a feast in Qeqertat. Qajoranguaq stored the entire tail piece in a stone-lined chamber in the ground. Next Christmas, covered with ice crystals, it would be dragged into the living room, chopped into frozen shavings with sharp axes, and eaten.

After that the hunt proceeded, whale by whale. Motorboats with kayaks balanced on their gunwales or lashed alongside poured into Qeqertat from the entire Thule region, some from more than 320 kilometers (200 miles) away. The motorboats may come

once again filled and covered. Narwhal intestines hung drying like red garlands on frames already loaded with meat.

One day the wish for something good to eat seized Qipissorssuaq, at 77 the oldest man in the village and once a great hunter. Hobbling down to the harbor on his cane, Qipissorssuaq approached a group of young men cutting into a narwhal. The old man took out his pocketknife to share in the catch, but before he could do so, one of the young men stopped him by flinging a scrap of muktuk into his hands.

Qipissorssuaq stared, speechless, at the shred. Was this all? For two generations he had stuffed the villagers and guests with all the muktuk they could hold. Was he now, in life's dusk, to be satisfied with scraps?



Victorious at sea, hunters tow a whale to the ice edge for butchering. Air blown through a copper pipe thrust into the mammal's belly inflates the body, keeping it afloat and facilitating transport; a sealskin float buoys its head.

only this far, for the law forbids the use of engines in the actual hunt.

There were usually one or two narwhals rolling among the waves in the bay to the north of the village, waiting to be cut up at low tide.

All the village houses were in use. Relatives and friends moved in, and Qeqertat echoed to the sounds of busy women and happy children. Big pots of meat bubbled outdoors and coffee kettles sang. Colorful summer tents bloomed everywhere like exotic flowers. The meat-storage holes were

Mumbling the old adage that says, "He who is smeared with blubber is kindhearted," Qipissorssuaq stumped back to his house in a rage. As he disappeared, one of the men from Qaanaaq shook his head: "Look at that old fellow. Does he think he can get free muktuk and a pension from the government too? Doesn't he realize a hunter has to sell his muktuk to support his family?"

During the hunting season Qeqertat's social gathering place—and here neither the store nor the church can compete—is the lookout, called Nasiffik. Nasiffik is a cliff

rising in easy stages about eight meters above the village's northernmost row of houses. Lichens atop the cliff have been rubbed off by generations of bearskin trousers worn by hunters seated there. Day and night, rain, shine, or wind, binocular lenses glint, panning back and forth across the fjord below.

If there are narwhals in sight, only women sit on the cliff. Alert and silent they follow their husbands, sons, or fathers way out, where they wait motionless among the icebergs. Suddenly one woman will utter a quiet, hopeful "*Paarhileqihooq!*—He is paddling!"

At once all binoculars turn on that kayak. From that moment the world is reduced to one whale, one man. All the women lean forward, holding their breath. If the hunter has to give up—and that happens most of the time, for the whales are extremely shy and fast—then there is a chorus of disappointed sighs and "*Ajoor!*—What a pity!"

BUT IF THE KAYAKER succeeds in planting the harpoon in the whale's back and the hunting bladder dances across the water, then a shout of triumph goes up: "*Nauleqihooq!*—He has harpooned one!"

The shout takes hold of the entire village, echoed by old and young. The boys throw down their cartoon books or toy harpoons and climb up to the lookout, wanting with all their hearts to be in the lucky man's place.

It looked as if the narwhals would not come to Qeqertat itself in quite their normal number this season. Angutikavsak thought that the constant shrill of outboard engines on the fjord had created too much agitation, giving the whales no peace and preventing them from following their usual migration routes in large herds.

Angutikavsak, his sons, and a friend, Inukitsoq, and I sifted through our information. Where should we go? To Qingmiunegarfik? The place where, according to legend, the white man was bred from an Eskimo girl and a sled dog? No, there were certain to be too many eager hunters camped there.

Finally Angutikavsak in his low, husky voice announced: "We will go to the inner fjord." And immediately it was settled.

The sun was breaking through the blue-gray roof of clouds as we motored by longboat toward the inner fjord, towing a dinghy and six kayaks behind. My own kayak was one of them. It had been made for me years before by a friend in Qaanaaq.

As we rounded Nuussuaq, the "great cape," we reached the invisible line beyond which the Eskimos' own laws forbid hunting by motorboat. From here on we rowed the longboat in turns. Angutikavsak sat in the stern in an old patched sweater, steering with a kayak paddle in a slalom course among the icebergs and growlers.

Angutikavsak wondered aloud why the killer whales had stayed away this summer. Normally this greedy predator, twice as long as a narwhal, follows in the latter's wake and attacks stragglers. Not infrequently the Eskimos can gather muktuk and sheets of blubber on the beach—leftovers from such massacres.

Presently Angutikavsak turned to me. Slyly he asked whether the narwhal had other enemies besides the hunter's harpoon and the killer whale's preying teeth. I could think of none except perhaps the deepwater Greenland shark. Angutikavsak shook his head, smiling.

"That's what comes of growing up with your nose in books!" he said.

Polar bears kill narwhals, too, he told us. Long ago, he said, hunters had seen two polar bears dive headfirst and in unison from a flat piece of ice onto the back of a passing narwhal. Perhaps they crushed its spine; at any rate it was killed, and the two bears hauled the young narwhal up onto the ice and enjoyed their meal.

For hours we prowled the narwhal's feeding grounds in the inner fjord. This area has its own harsh beauty: purple landmasses and nunataks—low hills surrounded by ice sheets—together with mighty glaciers and icefalls, none of them ever still. The waters are filled with ice, both chunks and bergs. In places the latter float shoulder-to-shoulder: nature's own Manhattan skyline of crystal towers. Beautiful, but fragile and perilous for him who ventures here.

Among the icebergs near the great Heilprin Glacier we settled down to wait. Angutikavsak dozed on the floorboards of the longboat while two of his sons,



Subject of fables and fabulous in form, the narwhal was known to 17th-century explorers as the "sea unicorn." The animal provides a tusk once touted as an



aphrodisiac. A cutout square of flesh on the forehead marks the most coveted piece of muktuk, or whale skin, here taken by the hunter whose harpoon struck first.



Tasting success, Qitdlugtoq pares off a piece of muktuk (above), rich in vitamin C. After the hunters take their shares, the remaining muktuk (below) will be prepared and sold to a factory in Qaanaaq for sale in other villages.

Preserved and stashed in pits for winter, such stores ensure sustenance in a land imprisoned in ice and muffled in darkness.



Qajoranguaq and the next eldest, Aleqatsiaq, filed away at some bone jewelry. The youngest son, Qitdlugtoq, kept watch with the binoculars. Inukitsoq and I munched some stale hardtack. We had very few supplies, for as the Eskimo saying goes, "The hungry man hunts best."

Small waves gurgled against the hull, and I, too, was lulled to sleep. Suddenly someone was pulling the sleeve of my anorak.

"The whales are coming—many!" Aleqatsiaq whispered in my ear, and in the same breath he added: "Not a sound, now."

Aleqatsiaq's words had the same effect as someone's sneaking an ice cube into my bearskin trousers. Angutikavsak slid like a cat across the longboat rail into his kayak. Inukitsoq pushed off next; Qitdlugtoq and I slid into our kayaks and paddled silently after the others.

Around me small pieces of ice sparkled like foam from hundreds of bottles of champagne. The midnight sun poured red gold over long swells that rolled to meet us from calving glaciers, lifting me up and down with a slight pull in my stomach.

BEFORE US we heard a long whistling and roaring sound, like a winter storm raging through a pine forest. It grew as we approached, combining heavy, whistling snorts and thunderous grunts.

The next moment tall spouts of vapor shot into the air ahead. Dark, shining backs broke the surface, rocked a little, then rolled forward and slid down. Other backs followed—many of them.

Someone, I thought, must be combing the hair of the goddess Nerrivik. She lives at the bottom of the sea, and the dirt in her hair is actually the animals that Eskimos hunt. Since Nerrivik has only one hand, she cannot comb her hair alone. She must be helped by a shaman, who is therefore vital to the hunt. Somewhere some shaman must be giving us a hand.

We stopped paddling and waited in line abreast, leaning forward with foreheads on the deck. We remained motionless, so the whales below would think us harmless ice.

Everyone knows that a fleeing narwhal is impossible to catch. The hunters have a chance to strike with the harpoon only by sneaking up on dozing whales or when an

animal swims up alongside from the stern.

I quivered with excitement, gazing down into the blue-green water. Up toward me a narwhal rose like a pale, silent spirit, with a wide-open mouth as if it were going to swallow me.

I almost capsized out of fear, but the kayak's vibration was enough to scare the monster. Quietly it faded away again in the depths. I lifted my head just in time to see Qajoranguaq grow suddenly tense. A narwhal was crossing his path. He shot forward, his paddles moving like the arms of a windmill. Then his harpoon whirled through the air, and the steel-edged ivory head embedded itself in the whale's back.

THE CREATURE'S TAIL whipped the air, drenching Qajoranguaq as he threw the hunting bladder from the rear deck of the kayak. Then he released the drifting anchor, a sealskin panel attached to the line to create drag. In a froth the bladder and anchor were pulled underwater, and at the same moment all the other whales vanished as if by magic.

Qajoranguaq's call echoed among the icebergs: "*Tik, iik*—Come, come." We answered with excitement, "*Nauleqihooq!*—He has struck!" and hurried to join him.

But where would the whale now surface? We paddled in the probable direction while we twisted our heads: "*Nauk? Nauk?*—Where? Where?" "*Auna! Auna!*—There! There!" And the hunters shot in among the icebergs.

Inukitsoq got there first and threw his harpoon. It found its mark. Now the whale had two bladders and two anchors to drag. The next time the whale broke the surface Qitdlugtoq streaked forward, but missed. The throw was short. Pride stung, he coiled the line on the foredeck and wished that he had paddled one more stroke before hurling his harpoon.

Now the whale quickly grew tired and sought the surface. Lances whistled through the air. Soon the whale rolled on its side, struggled briefly, and was still.

Meanwhile Angutikavsak had sped away. He had discovered a new herd of whales. Six hours after the hunt had begun, the hunters got out of their kayaks and climbed into the longboat. I had to be helped

up, my legs paralyzed after sitting in the same position so long. Two inflated whales, the second one harpooned by Angutikavsak, floated between the dinghy and the longboat. The row to a butchering place could begin.

A tough and bloody job awaited us. The whales had to be divided according to time-honored rules in the order that the men had "touched" them. *Nauligtoq*, a term meaning "first harpoon," receives the most. *Itersoq-qaktoq*, "second harpoon," receives the second largest portion, and so on, but everyone gets something. Sheets of muktuk were strung on a rope and thrown into the water to keep it fresh until the hunters could reach Qaanaaq and sell it.

We left the meat in holes that we dug in the ground and lined with stone at the butchering site. We covered the chambers carefully with more stones against the foxes and ravens. In winter Angutikavsak or one of his sons would return by dogsled to retrieve the frozen meat.

ON THE AFTERNOON of August 16 I stood against the wheelhouse of a chartered motorboat, looking back toward Qeqertat. The boat was bound for Qaanaaq, where I could catch a flight south to my family in Julianehåb.

By then it appeared that the narwhal catch for the season would be a little above the average of 150 animals. That was comforting, but how would the future affect the Polar Eskimos' life-style—one of the oldest cultures on our planet? Like worsening weather, thoughts of Qeqertat's declining population and of the dangers posed by the modern world collected heavy clouds around my soul.

Early autumn snow had powdered the mountains' dark walls halfway to the water. Showers of sleet drove in through the fjord, screening two distant kayakers who were headed toward a small herd of narwhals.

By the shape and color of one kayak, I recognized Qajoranguaq. Perhaps on this day a whale with twin tusks, his constant dream, awaited him. *Immaqa*—perhaps.

The engine throbbed steadily onward. When the sleet shower had drifted away, the kayakers were gone. And slowly, silently, Qeqertat sank into the blue-gray sea. □

LORD OF
THE SHALLOWS

The Great Blue Heron

By RICHARD J. DOLESH

Photographs by
CAMERON DAVIDSON

BRUCE COLEMAN, INC.

With imperious mien, a great blue heron bristles in an aggressive display to proclaim its territory. Few creatures dare challenge the bird, whose stiletto-like bill whips forward with deadly speed. Long legs and broad feet aid in fishing the shallows of ocean, lake, and river from Alaska to South America.

*Solitary stalker, the great blue heron, *Ardea herodias*, stands four feet tall and has a wingspan of more than six feet, yet it weighs but five to eight pounds.*

When used as finery on hats, the plumes of herons and like species brought more than their weight in gold. Their slaughter in the late 19th century helped spur formation of the National Audubon Society, and hunting them was banned by laws passed in the early 20th century. The great blue heron now flourishes, but conservationists closely watch the effects of man's encroachment.



DOZING under the canopy of sun-warmed trees, I awakened to the squalling of young and adult great blue herons. Half a dozen black vultures were swooping through the tops of the nearby nest trees of the heronry. To my dismay, the silent attackers wheeled and dived on a nest overcrowded with nearly fledged birds, beating them with their wings and jabbing them with their bills.

Hissing, howling, and clacking, the frightened half-grown young hunched down in mutual self-defense. I guessed that the vultures had intended to kill the helpless hatchlings while the adult herons were away fishing. Not finding easy prey, they attacked older fledglings, trying to knock them from the nest. A fallen bird would be at the mercy of the black scavengers.

Then, as quickly as the raid began, it was over. The vultures flapped away upriver. A minute or two after the attack it was as if nothing had happened.

Occupants of this Maryland heronry are not always so lucky. I have nightmarish memories of a thunderstorm in the early summer of 1979. I was on my way home from my job as director of Patuxent River Park when the wind-whipped deluge struck, splintering a neighbor's giant oaks and flipping over a large tobacco barn.

Dreading what I would find, I drove to the heronry. Could any birds have survived those winds of 80 to 90 miles an hour?

Not just a few birds were missing—half the colony was gone! Two large nest trees were uprooted. Dead and dying young herons lay scattered about; some hung grotesquely from bushes and trees. Amazingly, half the nests were still untouched, the young in them noisily crying for food.

Such are the not-uncommon perils faced by the great blue, a remarkable, well-loved bird, familiar over much of North America.

The herons I have come to know best have built their bulky nests of interwoven sticks in thick woods where a tributary, Black Swamp Creek, joins the Patuxent River in

southern Maryland (map, page 545). In spring and early summer I go there to watch this colony of more than a hundred great blues, thriving just 25 miles from the nation's capital.

Scarcely a mile from my home, the nests cluster 60 to 80 feet off the ground in the higher limbs of a grove of sycamores. Some of the trees are spectral—dead, or almost so. Others still are leafy. Constant use by the great blues—they have been breeding here for more than 30 years—seems to wear out the old trees, and the nests become more and more exposed to view and storm.

AMERICA'S largest heron, *Ardea herodias*, cuts a lordly figure. The adult great blue stands four feet tall, its slaty, white-streaked body supported on stiltlike legs, its long, serpentine neck terminating in a dagger-beaked head with steady yellow eyes.

What a heart-lifting sight it is, driving majestically across the skies on wings that span more than six feet! Yet this heron is primarily a wading bird of rivers, lakes, and marshland, where it is readily distinguished by its size, erect posture, and deliberate movements.

Most abundant in coastal areas, the great blue occupies an extensive range from northern South America and the Galapagos Islands as far north as Canada's James Bay and southern Alaska.

A supremely skillful stalker, it holds stock-still while watching for fish, then strikes in an eye blink. In flight the sinuous neck, at first fully extended, is gradually drawn back to the body in a graceful double curve as the bird gains altitude and speed. People most often see the great blue motionless and alert, a still hunter at the water's edge, displaying stately self-possession.

Great blues are colonial; they rarely nest in isolated pairs. A colony may comprise a handful of nests or as many as a thousand; forty to sixty is the average. The threescore nests at Black Swamp Creek form a heronry ideally located. The nearby Patuxent River, bordered by brackish tidal marshes, was until recently a prime fish-spawning area. White and yellow perch, channel catfish, croakers, herring, shad, and rockfish (striped bass) have provided bountiful

Naturalist Richard J. Dolesh has been studying great blue herons near Chesapeake Bay for ten years. Free-lance photographer Cameron Davidson contributed to the new National Geographic book *The Wonder of Birds*.



Springtime overtures begin before winter ends as herons gather for breeding season at Black Swamp Creek near Chesapeake Bay (above). True to their colonial nature, great blues assemble in numbers before nesting. "They are now in their full beauty," observed John James Audubon. "The males walk about with an air of great dignity, bidding defiance to their rivals, and the females croak to invite the males to pay their addresses to them." Except when mating, the sexes are indistinguishable.

Favoring the tallest trees, males customarily select breeding sites, competing for the most stable of old nests. Though only a few feet separate them (below), nests constitute





very private—and vigorously defended—turf. While a neighbor attends to repair chores, at left, a bird performs the flamboyant stretch display. This includes “howling,” an announcement of its readiness to mate—though males initially fight off the amorous females. The ritual is also used by both sexes to communicate with their partners. In building a nest or renovating an old one, the female will stretch to signal her mate to fetch sticks. New nests are often so thinly constructed that eggs can be seen from below. After mate selection, pairs solidify their bonds by passing twigs, locking bills, and preening each other’s feathers.



New life begins on a precarious perch (above) as a male prepares to grasp the female’s neck for stability during mating. Paired for the season, herons share parental duties. Males help incubate the eggs—usually three to five—and rotate with the female in bringing food to the young.



Chesapeake heronries

HIGH LIFE amid bare sycamore branches at Black Swamp Creek (left) helps guard against predators seeking eggs and nestlings. Belying their fragile appearance, nests can withstand gale-force winds. Occupation by great blues can spell eventual destruction for heronry trees. Nest building denudes branches, and a constant rain of harsh droppings rich in minerals upsets the nutrient balance of soil and ultimately poisons the tree.

With its 8,000-mile tidal shoreline and 150 tributaries, Chesapeake Bay (right) offers a wealth of habitats for thousands of blues. Though colonies average 40 to 60 nests, Nanjemoy Creek counts more than 950 nests, one of North America's largest concentrations.



catches for local watermen—and for herons. As in many parts of the Chesapeake Bay region, however, shellfish and finfish resources have been depleted by sedimentation, pollution, and oxygen-consuming algae fed by excessive nitrates and phosphates from sewage effluent.*

While Black Swamp Creek herons forage primarily in the tidal Patuxent, the birds also fish in nearby tobacco irrigation ponds, most of them stocked with bluegill and bass. They supplement their diet of fish with snakes, frogs, aquatic insects, and small mammals taken from nontidal wetlands, spongy meadows, or dry farm fields.

Yet even such a versatile feeder as the great blue survives here ever more precariously, its habitat continuously degraded and the diversity of its prey species suffering steady decline. There is, however, a welcome plus: Although human activities such as farming, recreational boating, and commercial fishing impinge on nesting sites, the birds tolerate man's presence fairly well.

In 1982 the Black Swamp Creek heronry was assured long-term protection by coming

under state jurisdiction. For 20 years Donald and Betty Peed owned a 264-acre riverside farm that enfolds the great blues' nesting area. When the Peeds looked into selling their property, they had attractive offers for their land for residential development. But they didn't want it subdivided and were firm that the heronry should be protected. At the recommendation of the Maryland-National Capital Park and Planning Commission (M-NCPPC), the state Department of Natural Resources (DNR) purchased the property. The land has been designated a natural-resource management area. The Maryland DNR and the M-NCPPC will manage it jointly.

WHEN I THINK ABOUT what triggered my interest in great blues, old "A. D." at once comes to mind. I met Arthur D. Jones, a retired game warden, soon after I became a naturalist with the M-NCPPC. Rural game wardens are never the most popular folk, yet

*See "My Chesapeake—Queen of Bays," by Allan C. Fisher, Jr., *GEOGRAPHIC*, October 1980.

A. D., now 88 years old, gained wide respect for his uncompromising fairness. He became a local legend for his ability to smell out illegal hunting and trapping. Old-timers say he would have locked up his brother for a violation, but then would have turned around and paid the fine.

This extraordinary man guided me to the burrows of trap-door spiders, the nests of

chipping sparrows, and the mudbank slides of river otters. And it was A. D. who introduced me to the extensive heronry near Nanjemoy Creek, 30 miles southwest of Black Swamp Creek. We hiked in through woods crisscrossed by small streams. Grunts, croaks, clicks, and indescribable squawks reached our ears before we sighted the first nests high in the trees. But the noise

Tufts of nestling down give way to adult plumage, preparing the



was insignificant compared to the overpowering odor of rotting fish and excrement. The stink was exquisite.

The adult birds closest to us flushed from their nests with a whoosh of beating wings. The young chicks fell silent. I counted several hundred nests. Large patches of the ground were whitewashed with bird droppings encircling each nesting tree, and

enormous pokeweed grew thickly all about.

The timing of our visit was fortunate: In another week or two there would have been enough older fledglings sticking their heads over the edges of the nests to bombard us with a shower of regurgitated, partially digested fish. An observer so fouled can certainly appreciate the effectiveness of this defense mechanism.

fledglings for their first hazardous attempts at flight.

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Patience of Job rewards a young adult with a tasty dinner. As it haunts the shoreline (right), the heron alternately stalks and stands motionless, poised to strike. Pivoting on its leg joints, the bird hurls its entire body into the attack (below) and surfaces with a blue crab (bottom). Though the heron almost always clasps its victims, it has been observed with prey impaled—apparently inadvertently—on its bill. Great blues also prey on



insects, rodents, and other birds. Early attempts at fishing are usually inept; unsuccessful birds return to their parents for feeding. Continued failure to develop hunting skills is frequent—and fatal. Because of this, as well as predation and disease, most herons die in their first year.



I could have stayed for hours, but A. D. kept our visit short to avoid disturbing the birds. Looking back, I know that was the day I became hooked on great blues.

Working as a naturalist along the Patuxent, I found herons almost everywhere during all seasons of the year, except in the bitterest winter weather. Yet once, on a January day with the temperature hovering near zero, I flushed a great blue from ice-locked swamps on the upper Patuxent, far from any open water. Desperate for food, it may have been hunting rodents or picking berries that still clung to bushes.

BREEDING SEASON begins very early in the spring. Adult birds gather near the Black Swamp Creek nesting area after winter dispersal throughout a broad area of the mid-Atlantic coast. Both sexes are elegantly feathered and display their striking nuptial breast, head, and back plumes. Their bills and legs are brilliant in breeding colors.

The assembled birds pick a convenient beach, mud flat, or open field near the heronry for the courtship ritual: Some birds stand around passively, watching others strut, display, and fight with wing blows and bill jabs—mostly ritual posturing. Occasionally the courting birds fly in circles over their prospective mates.

Each male selects a nest site in the upper branches of one of the heronry's giant sycamores, and he then selects a mate. This breeding territory, perhaps only a few feet across, is vigorously defended. Old nests are preferred and are added to year after year, but rarely are there enough to go around, so some couples fashion new ones from branches and twigs. Typically, the female builds the nest with materials flown in by the male. New nests may be so flimsy and insubstantial that the eggs can be seen from below through the loose mesh of the twig basket.

Females lay three to five eggs, but only one egg or as many as six are possible. The parents share the incubating task, and the behavior of the adult birds settles into a predictable and patient rhythm. When one of the pair returns to the nest, the sitting bird promptly relinquishes its place. Rising from the eggs, it steps to the edge of the nest and shakes and stretches. I have often observed

the adults slowly and deliberately swaying back and forth above the eggs before they settle down to incubating duties, which may last for hours.

During the brooding period, weather can sharply affect activity in the heronry. Once in early April I checked the nests at the tail end of a severe, three-day cold snap punctuated by high winds.

All nests with eggs were occupied by incubating adults, but only their rounded, hunched backs were visible. During my hour-long visit one heron flew in; none left.

Once again I marveled at the herons' nest-building skill. Though gale-force winds had buffeted the exposed nests for days, this time not one appeared damaged, nor were any blown out of the trees.

In about 28 days the young peck out of the shells. Weak, helpless, fuzzy in their natal down, they huddle deep in the nest until feeding time. When the adults fly in with food, the young beg noisily, but the partially digested food can only be regurgitated a little at a time. The adult dips its head to feed each youngster for a few moments, the young often grasping the parent's bill to signal their hunger.

As time goes by, the adults start bringing fish, soft-shell crabs, snakes, and small mammals. Even if food is plentiful, infant mortality is high. Few nests fledge more than three young because of competition for the food or for reasons not fully understood.

Feeding their offspring tests the parents' hunting skills to the utmost. Each day fledglings require a quantity of food equal to a quarter of their weight. At dusk the sky resembles the approaches to a busy airport. For miles in all directions great blues can be seen homing in on the heronry. If conditions are right, devoted parents forage around the clock: On calm moonlit nights the ghostly stalkers drip silver from their feet as they cautiously tread the shallows.

AT SEVERAL WEEKS the young begin in earnest to exercise their wings. Gradually a scruffy-looking, mismatched collection of avian parts metamorphoses into a majestic bird of beauty and grace. Gaining confidence and strength each day, they leave the nest for nearby branches to practice "flying" in place. Their wings,



they discover, will lift them into the air on any wind stronger than a breeze.

One day I watched some eight- to nine-week-old birds jump from branch to branch and tree to tree. Occasionally they over-compensated, furiously flapping when landing, lurching to keep balance. What a contrast to the self-assured adults that sail into the colony with scarcely a twitch of feathers to land, drop a fish, then soar away!

The awkward youngsters seemed unaware of their peril. To fall from the tall sycamores into the thick undergrowth would mean certain death: The adults would not feed them on the ground, nor could they regain the nest.

As I watched, one of those still ungainly youngsters took the biggest step of its life. It flapped for a moment, then jumped off the edge of the nest into the nearest piece of sky. Broad, powerful wings bore it away. I tracked it toward the river. But the bird was not ready yet to risk landing on the shore. Instead, it braked to a perch on the top of a tall red oak, first flight achieved.

Between the eighth and twelfth weeks, the fully feathered young leave the heronry at Black Swamp Creek for good. Once they take their first extended flight, these young birds show no particular attachment to the heronry itself. The adults, however, follow their young for some time, for the fledged birds are not fully capable of foraging on their own and must depend on their parents to supplement their food gathering.

Until the spring of their third year, when great blues reach sexual maturity, they wander widely, probably finding habitats beyond the feeding range of established heronries. Some offspring of Black Swamp Creek will likely return there as breeding birds.

Something of a mystery is just how young great blues learn to find and capture food. Their solitary nature probably prevents the young birds from imitating the successful feeding techniques of the adult herons. From parents that forage far from the heronry the young can at best only learn prey identification. Instinct and practice must guide the young bird in catching a swift fish or stalking a hiding crab—a vulnerable soft-shell. A young heron soon realizes that a blue crab is prey for him only in the few short hours after it sheds its old shell



Earsplitting ruckus erupts as a parent returns from a food run (above). By clasp- ing the adult's bill, the youngsters signal the parent to regurgitate partially digested food. As the older and stronger nestlings jockey for the best positions, weaker siblings get trampled and sometimes jostled from the nest. If bumped or blown out of the nest by a storm (below), they get no help from the parents and face nearly certain death from starvation or predators such as raccoons and foxes. A juvenile shows its developing grace in flight as it prepares to land (facing page).



and before the new shell turns bone hard.

Young herons that survive the rigors of foraging and learning to feed themselves quickly enlarge their survival skills. As they mature, they acquire other feeding behaviors beyond the familiar techniques of standing and stalking. They may plunge into water from a perch, or float, wings outspread, on deep water searching for prey.

Juvenile herons are remarkably tolerant of human presence. Poking around the marshes in a canoe or small boat, I have glided within a few feet of feeding youngsters. Adult great blues are another matter.

One still morning at Jug Bay in the Patuxent marshes, I paddle my canoe near a heron feeding in the shallows. As I approach, the big bird pretends not to notice. I come closer. He extends his neck and poises himself

for flight. With a crouch and a push, he leaps out of the water, flaps a few wingbeats, and glides to a graceful splashdown a hundred yards downriver.

At my next approach, the heron reluctantly relinquishes the new spot to fly another short way downstream. Eventually the bird concludes that I am not going to deviate in my direction of travel. He takes to the air again, but instead of another descent into more distant shallows, he gains altitude, banks, and circles back over me—to settle down once more in his original feeding spot. Nor is he above showing his disdain with a squirt of whitewash in my direction as he sweeps around me on his way upriver.

Despite the adult herons' wariness, on occasion they develop a remarkable affinity for humans.

Enjoying a free lunch, herons help themselves to fish trapped in pound nets near the Chalk Point Generating Station (below). At Benedict, Maryland, restaurant



For 26 years Francis and Catherine Chappellear have owned a restaurant overlooking the Patuxent in Benedict, five miles downstream from the heronry. Mr. Chappellear told me about one faithful patron:

"In the winter of 1964 the river froze across. Once I went down to check my boat and saw this blue heron standing on the ice between the piers. He looked very young and just about starved to death.

"There were a lot of sea gulls around, but I threw out some small fish anyway. The heron could hardly walk, but he fought the gulls to get fish. Next day he came back, and every day after that. We named him Johnny."

In the spring Johnny left. The Chappellears thought they had seen the last of their panhandling friend, but in October Johnny was back at the end of the pier waiting for

food. And every day of every winter for 17 years Johnny came to the restaurant for a handout. Longevity of 15 to 20 years is not unusual among great blues.

"Once another heron flew in and tried to snatch a fish away from Johnny," Mr. Chappellear reminisced. "They started fighting, and both fell into the water. You never heard such a racket. Johnny drove him off, though, and came back for his fish."

Johnny was quite a choosy eater. "He refused to eat herring or bull minnows, but he could eat eight or ten small eels just like that," continued Mr. Chappellear, snapping his fingers.

"You know, we called him Johnny," interjected Mrs. Chappellear, "but for all we know, he could have been a Suzie." (Distinguishing sex is difficult with great blues.)

owner Francis Chappellear (below right) greets his old friend Johnny, who got a handout in 1964 and returned every winter's day for the following 17 years.



Patuxent waterman Harry Gray Messick told me about other opportunistic birds.

"When I go out to pull my pound nets in the winter, I often see a dozen or more herons picking out trapped fish," Mr. Messick said. "As I come alongside, the birds stand on the net rope till the last possible moment. Then they'll fly around in circles. Can't wait till you leave. In all my years, I never saw but one caught up in the net."

WHAT LIES ahead for the herons of Black Swamp Creek? They may soon begin to suffer from man's encroachment. Farsighted actions, such as acquisition and protection of heronries, are among the best ways to ensure against such damage and loss. Easements and other voluntary protection plans can also be effective.

The purchase price of the Peed farm, which includes the Black Swamp Creek heronry, was provided by Maryland's Program Open Space. This nationally acclaimed project, financed by a half of one percent real estate transfer tax, has generated 316 million dollars, which in the past 15 years has funded more than 2,000 Maryland park, recreation, and natural-area projects. In a parallel operation to prevent logging on the awesome heronry at Nanjemoy Creek, with more than 950 active nests, an urgent campaign by the Nature Conservancy quickly raised \$135,000 to acquire 237 acres at the site, and another 50 acres were donated by adjacent landowners. The Nature Conservancy owns and maintains the preserve. Largest heronry in the Chesapeake Bay region, the Nanjemoy Creek sanctuary protects an outstanding wildlife resource.

But survival cannot be guaranteed for these heronries, vulnerable by their very existence. Nests, birds, and eggs are large and highly visible. Logging, storms, severe winters, and human pressure have all threatened these colonies and continue to do so. Beavers, currently thriving in southern Maryland, have girdled and killed many nest trees in Nanjemoy. The death of trees from years of accumulated bird droppings, "guanotrophy," also threatens heronries.

Predators of adult great blues are few, but some—crows, for instance—will alertly dart in to steal eggs when adults temporarily

leave the nests. I've observed that the commonly assumed predators, such as hawks, owls, and eagles, infiltrate the heronry without causing the birds to vacate their nests or even show undue alarm. If man intrudes, however, the adults always fly away, opening the way for predators to sneak in. A colony may even be abandoned if disturbance is significant or repeated.

Relatively little is known about all the causes of mortality. Parasites, environmental contaminants, and loss of food supply are among the unmeasured factors that can affect both parents and offspring.

Great blues are not the easiest birds to study. They usually nest high in trees that are treacherous to climb. Nesting great blues panic easily, and visitors must take care not to alarm them.

A work trip into a heronry can be a "pretty pestiferous activity," says Dr. William J. L. Sladen of Johns Hopkins University, a well-known scientist who for six years has had to cope with biting insects, droppings, and foul odors while banding great blues with color-coded leg bands in two Chesapeake colonies.

On the positive side, the degeneration of heron habitat on the Patuxent and the Chesapeake is reversible. New restoration efforts are being mounted by Maryland, Virginia, and Pennsylvania. Despite severe corruption, the basic ecosystem of fertile waters and sheltering lands still survives and still supports more than 300 species of birds.

I recently talked with Chandler Robbins, the eminent ornithologist who chairs the Nanjemoy Creek Stewardship Committee. How, I asked, can we help the herons?

"The chief need is education," Chan told me. "No matter what is done by state and private conservation agencies, you can't protect herons or any other species over the long haul without the interest of people.

"Above all," he continued, "you can't have herons just for the sake of having herons. You must have a balance of nature—an integrated ecology."

For me, the great blue heron is the symbol of rivers and lakes, tidal wetlands and coastal marshes. Self-sufficient and adaptable, it is nevertheless vulnerable and—more and more—dependent on man for its continued welfare. □

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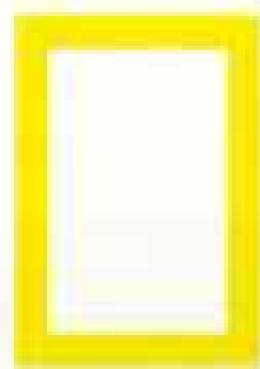


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IT BEGINS with a running start and a hop into the air. Then with altitude the wing strokes lengthen and smooth into a rhythmic rowing cadence. Finally, the whooping cranes soar across the wind, trimming flight with the merest adjustment of their pinions. To see them is to experience a beauty beyond naming. The sum total of these birds in the wild is just over a hundred.

I had been watching a cut of *Flight of the Whooping Crane*—the Society's final TV Special in our ninth season of partnership with WQED/ Pittsburgh and Gulf Oil Cor-



TONY D. MANGELSON

poration—to be aired April 4 on PBS TV.

Whooping cranes have been eased a half step back from the rim of extinction by hard-working and caring people. Without such help from thousands of scientists and volunteers in scores of organizations worldwide, the roster of extinct animals would be much longer and far sadder.

For generations the Society has helped contribute to wildlife preservation by increasing public awareness and by funding research projects. Last month's issue of NATIONAL GEOGRAPHIC addressed the plight of the world's rhinos. The most immediate threats to their survival are poachers who supply rhino horn for dagger handles and home remedies. Yet even if poaching could

be stopped, rhinos would still face habitat encroachment and destruction.

GEOGRAPHIC articles on such subjects have appeared often and stretch back at least to 1913, when the author of "Saving the Ducks and Geese" remarked that the passenger pigeon is now "entirely extinct, the last survivor dying in the Zoo at Cincinnati a few days ago." A 1937 article observed that whooping cranes are "apparently a doomed species." Fortunately, as our TV Special makes clear, there is now some hope.

In the past four years alone, the Society through its members has funded research on more than 20 species of wildlife officially listed as endangered or threatened. Animals studied have been as various as the American crocodile and Grevy's zebra, and one investigation concentrated on the black rhinoceros. This is critical scientific work, for unless the animals and their habitats are well understood, neither goodwill nor direct action can ensure their preservation.

One sequence in *Flight of the Whooping Crane* shows a joint Canadian-U. S. air-and-ground team following the spring migration of three birds, one banded with a radio transmitter. David Blankinship of the National Audubon Society and Leonard Young of the U. S. Fish and Wildlife Service track the birds by road from Texas to the Northwest Territories, using a radio-homing antenna. They have problems with their car, the roads, and the weather, but with local help they fix up, make do, and adapt.

The cranes aloft need even more help, for they cannot so readily adapt. However they may soar, the ground beneath them unrolls as a landscape alien to their needs. It is our own habitat of towns, farms, roads, power lines, and drained marshes. We cannot unmake our world, but, as the program shows, we can help establish other whooping cranes in nesting areas on more nearly wilderness flyways. In the meantime, the cranes have fine escorts in their flight toward survival.

Silbert H. Browner

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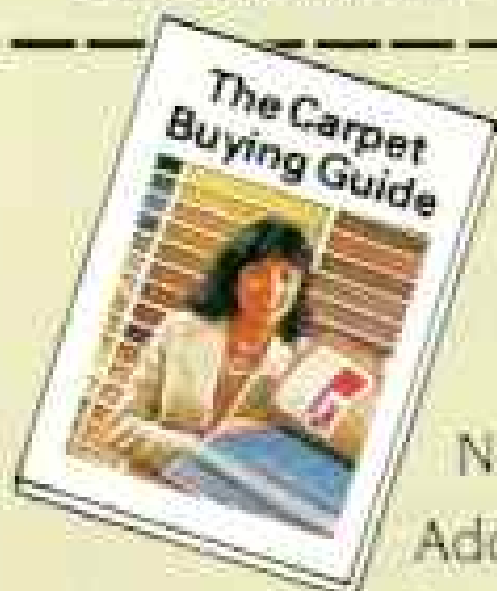
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Members Forum

Catalonia

"Catalonia: Spain's Country Within a Country" (January 1984) was an excellent article, but there was one flaw. Catalonians are not descendants of Greeks, Carthaginians, Romans, and Visigoths, but rather a mix of Iberians and Celts. The Greeks and Carthaginians did not leave any marks on the true Catalonians' physical makeup, and the Romans and Visigoths only added a few touches to their physical traits.

Maria A. Sarasola
Jackson Heights, New York

Our reference was more to cultural than physical heritage. Although the Visigoths left little evidence of their 300-year sway, the Greeks nurtured olive groves and vineyards and established colonies. Barcelona traces its founding to the Carthaginians, and the Romans built roads, aqueducts, and cities and supplied the Latin base for the Catalan language.

In your tale of the Catalonians, it seems unreal to read of Pablo Picasso, Joan Miró, Salvador Dalí, and Lluís Llach, while their number one expatriate—Pablo Casals—is ignored.

Paul M. Connelly
Orchard Park, New York

Byzantine Empire

The article on the Byzantine Empire in the December issue was fascinating. Historians tell us, however, that it was Ivan the Terrible (1530-84), and not Ivan the Great (1440-1505), who first used the title of tsar.

Elena B. Craver
Penney Farms, Florida

Although Ivan the Terrible was the first ruler of Muscovy to be officially crowned tsar, his grandfather Ivan the Great occasionally used the title during his reign.

Regarding "the famous bronze horses now adorning the Cathedral of St. Mark," the present horses are copies of the originals. The real horses, suffering from air pollution and in danger of destruction, were removed, were treated for their "bronze disease," and permanently reside in the cathedral's Museo Marciano.

Scott C. van Fossen
San Francisco, California

December's "Byzantine Empire" displayed a historical map locating Laodicea in Syria, just below Antioch. This seventh city addressed in Revelations 2 and 3 has always been situated in ancient Anatolia, southeast of Ephesus.

M. R. Kluender
Martinez, California

Several ancient towns were named Laodicea in honor of Seleucus I's mother. Laodicea ad Lycum, the town referred to in Revelations, is in Anatolia. The Byzantine map shows Laodicea ad Mare, a port in northern Syria important to both the Byzantines and the Crusaders.

Europe Map

Your highly interesting historical map of Europe states that "more than a million men fell dead or wounded in 1916's Battle of the Somme." This may be true for the battles of the Somme and of Verdun together. But the main battle of that year, and in terms of life the most costly, was at Verdun, where the French lost 380,000 dead and wounded and the Germans 330,000. The fighting on the Somme was important, but the turning point, and most of the carnage, was at Verdun.

Jean Hervé
Commugny, Switzerland

Most references cite one million casualties at the Somme as a conservative estimate. British losses were estimated at more than 400,000, the French at some 200,000, and the German between 400,000 and 500,000, an example of incredible suffering with no strategic success.

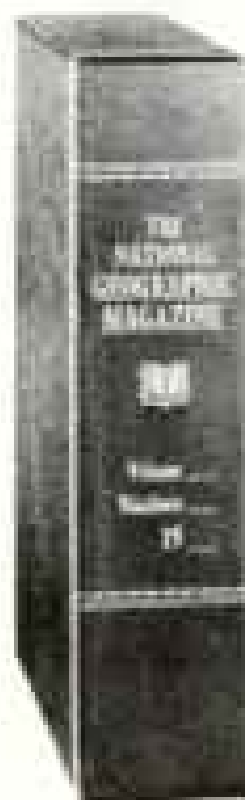
Low Country

"Savannah to Charleston—A Good Life in the Low Country" (December 1983) brought to mind my first visit to Charleston after moving south some years ago. While there, much to the amusement of my Chinese-born husband, we learned that "Charlestonians are like the Chinese—they eat lots of rice and worship their ancestors!"

Susan Wainwright Lai
Savannah, Georgia

As a native of the South Carolina Low Country and an architectural historian, I was quite interested in John J. Putman's article. However, I must take issue with the explanation of the Charleston single house. While the points mentioned are correct, they had only incidental impact on the single-house form.

The single house is a direct response to a very humid, subtropical climate. The piazza shades the garden facade, providing a generous amount of sheltered outdoor space. The fireplaces and chimneys in the opposite wall provide excellent ventilation across the one-room-wide house with its large open central stairhall.



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Yvette Richardson Guy
Savannah, Georgia

The article showed an old home with iron support rods to guard against earthquake damage. That picture reminded me of an account of the Charleston earthquake in Ridpath's *History of the World*. I've never heard of any other major earthquakes on the East Coast. Was that particular one a freak or a special kind of earthquake?

Paul Jackson, Jr.
Baton Rouge, Louisiana

The Charleston quake of 1886 was not unique in the East. Boston suffered one in 1755, and the St. Lawrence River Valley has experienced many large quakes. Small, unfelt quakes occur often. Scientists are still trying to determine the causes for such "mid-plate" quakes.

Last Supper

In November 1983 I read about the Last Supper: "Several large-scale copies were completed during Leonardo's lifetime, including at least two by his students." One of the two last copies hangs in my abbey: the Norbertine Abbey of Tongerlo (Belgium), founded in 1130. This is considered the best copy of the decayed fresco. Magnificently restored after the conflagration of the abbey in April 1929, the original coat of paint with beautiful soft colors and details is brought to light.

Engelbert Frans Doex
Geel, Belgium

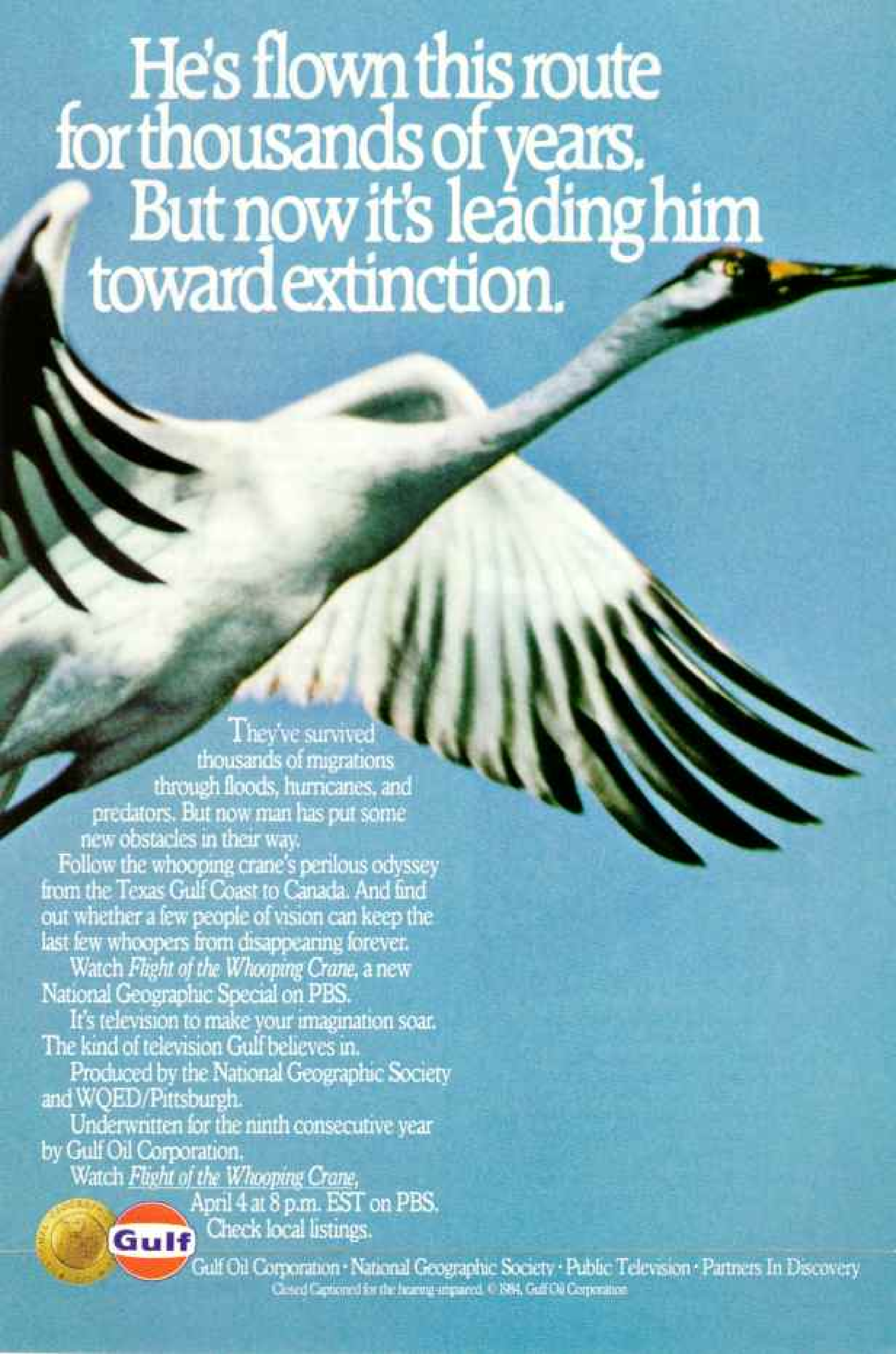
Platinum

You excluded from your article "The Miracle Metal: Platinum" (November 1983) the fact that platinum was, and still is, used in photography in a printing/developing paper. The process not only had a beautiful, delicate, and extremely long tonal range, but it was also very permanent. Today many people are rediscovering the process and its infinite pleasures.

Eric Hammer
Modesto, California

"Platinotypes" were popular from 1880 until World War I, when the government commandeered platinum supplies. The paper is no longer commercially available, but hobbyists make it.

In the Platinum report we learn that all platinum ever mined would fill a 14-foot cube. I calculated that this amounts to a total production of 1,670,580 kilograms. As 1981 world production



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of 2,842,000 troy ounces equals 88,396 kilograms, this means the production rate has increased tremendously (the 14-foot cube represents only 18.9 years at the 1981 production level). Is that so?

Claude Thibaut
 Lillebonne, France

You are correct; both demand and production have increased greatly in recent years.

Mississippi Delta

As an old subscriber, I have noticed the following: In relation to the Ob-Irtysh (Siberia) river system, your magazine (February 1976) indicates: "From source to mouth, the Ob-Irtysh river system, fourth longest in the world, flows nearly 3,500 miles." But in the August 1983 edition, the last paragraph says, relative to the Mississippi Delta: "Here the world's fourth longest river system seeks the sea through many mouths." Explain this confusion.

Gil Mejía Acosta
 Bayamón, Puerto Rico

New measurements of the Yangtze moved that river into third place, pushing the Mississippi-Missouri to fourth and Ob-Irtysh to fifth place.

Alaska and Secession

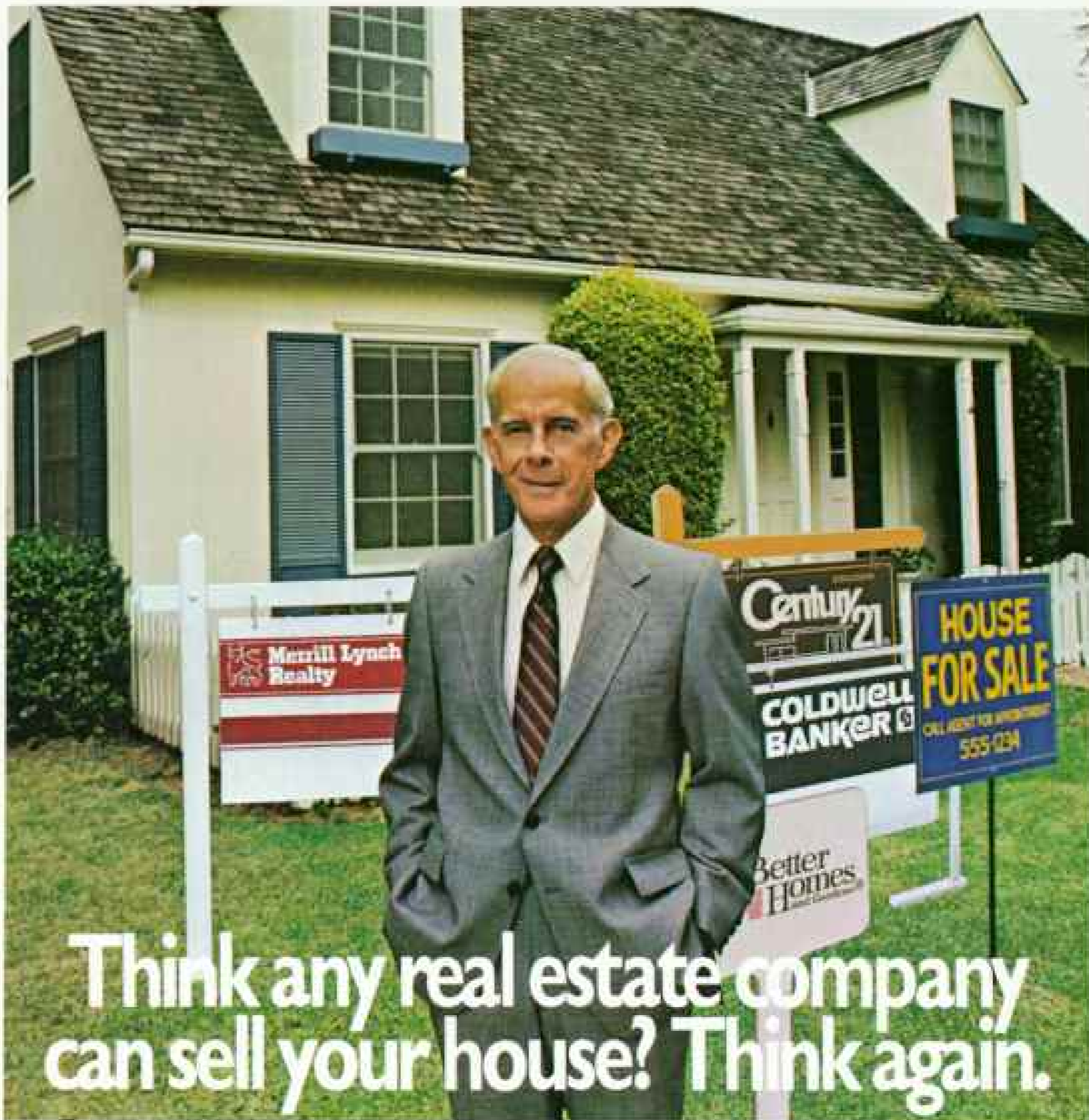
The Editor's column about Alaska statehood (November 1983) raised an interesting question about constitutional law. He writes that "one of the alternatives explored in the million-dollar study was secession from the Union." Secession was one of the major issues of the Civil War. Jefferson Davis, President of the Confederacy, was arrested for treason in 1865, confined for two years, and released on bail in 1867. The case was dropped by the federal government in 1868. This left the legality of secession unresolved.

Surely the Alaska Statehood Commission must have explored the legality of secession thoroughly and would not have considered the people of Alaska in an attitude of rebellion had the commission recommended secession from the U. S.

Robert E. Kennedy
 San Antonio, Texas

The commissioners rejected the idea of secession early in their work, though they later explored legal separation of Alaska from the Union through a constitutional amendment or an act of Congress. This, too, they rejected for patriotic reasons.

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



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If you have a larger lawn and you'd rather spend less time mowing it and more time enjoying it, you may prefer one of the five new John Deere riding mowers. Even the 8-hp R70, the lowest-cost model, will mow a half-acre in just 30 to 45 minutes, depending on the amount of trimming to be done. In fact, when you consider the high-quality features and solid construction of the R70, you probably can't find a better rider for the money. It has a 30-inch mower, a full-length welded steel frame, a 5-speed shift-on-the-go gear-drive transmission, and an optional 6½-bushel rear grass bag.

Or, if you own an acre or more, and mowing's become a big production, a John Deere lawn tractor may be in order. The 116, for instance, with a 46-inch mower and 16-hp engine, will mow an acre of lawn in about 45 minutes. All seven John Deere lawn tractors provide added versatility with an optional front blade, snow thrower, dumpcart, lawn thatcher, and rear-mounted grass bagger (for 30- or 38-inch mowers).

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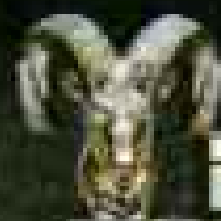
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On Assignment

FIRST I SAW the quality of the land, rolling landscapes uncluttered by telephone poles and electric lines," says *Jerry Irwin* of photographic forays into the rich farming country of Lancaster County, Pennsylvania, that began in 1978. "Then I started realizing how warm and real the people are." That realization drew him back again and again, often for weeks at a time, until finally, in 1981, he made the region his home. His photo essay in this issue portrays the warmth he feels in return for the county's Plain People—the Amish, Mennonites, and others of related faiths who dress and live in distinct fashions prescribed by their respective churches.

Because of Jerry's willingness to see things their way, the *piktur-nahmer*—picture-taker, as he explains himself—was widely accepted even by people whose religion does not allow them to pose for photographs. Many of Lancaster's Plain People are also not permitted by their churches to own cars. Instead they ride buggies or bicycles, or simply walk.

"The first thing I did was park my car and

walk—all day, every day," Jerry recalls. "Immediately your perspective changes, and also the way people look at you. Most of my first real contacts with the Amish came on the road. Farmers would actually stop in the middle of work and come over to talk to me. They're just as curious about me as I am about them."

On the Amish Mennonite farm of John and Ann Lapp, Lapp children swarming around Jerry giggle at his phrases in the Pennsylvania German dialect they speak as fluently as English (*below*). Jerry is a welcome visitor in many plain homes in Lancaster; he once lived for six months as a working member of an Old Order Amish farm family.

"That was more a living experience than a photographic one," says the former locomotive engineer, world-class sky diver, and 1983 Nikon Photo Contest International grand prize winner. "There wasn't much sitting around. The first morning we shoveled manure for two hours. I asked, kind of kidding, 'How often do you do this—once a week?' They said, 'No. Twice a day.'"



DENNIS DETHMAN

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What are the symptoms of diabetes?

There may be none. Or there may be such simple things as an increase in skin infections or a slower healing of bruises and cuts. Also, be aware of excessive thirst or hunger, frequent need to urinate and extreme fatigue.

These symptoms do not necessarily occur all at once and they usually develop gradually. So it's easy to understand how they can be overlooked or considered part of the normal aging process.

It is important, therefore, to be alert to changes in your body and report them directly to your doctor. You have a greater chance of being diabetic if you are over 40, overweight or have a history of diabetes anywhere in the family.

What is diabetes?

Diabetes is a disorder in which the body cannot control the levels of sugar in the blood. Normally the hormone, insulin, regulates the blood sugar level. But if your body does not produce or effectively use its insulin, diabetes results.

Treatment of diabetes.

Diabetes usually can be successfully managed. Some diabetics need no more than weight reduction, the right foods and moderate exercise to bring blood sugar levels under control. And, if these changes are not enough, a simple oral medication is all that may be needed. Today, even those who need insulin can be better and more comfortably managed by their doctors than ever before.

The diagnosis is easy.

But only your doctor can make it. And remember, if you are over 40 and overweight, or have diabetes in your family, you should have regular blood and urine tests. Early diagnosis in adults can lead to better management and fewer problems later on.

Only your doctor can prescribe treatment.

Follow your doctor's advice about diet, exercise and medication. Also, be aware that you have a support system, which we call...

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