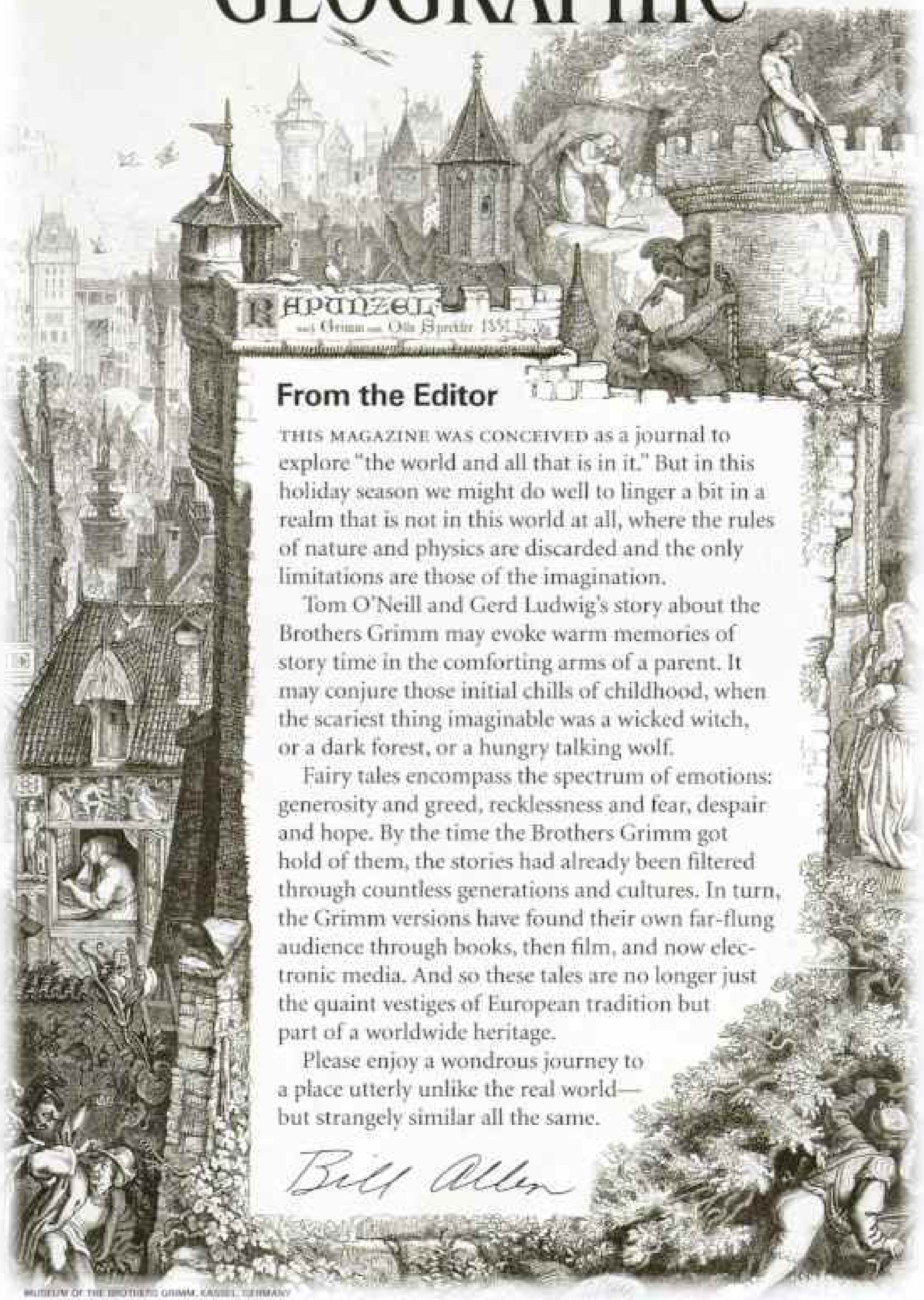
NATIONAL
GEOGRAPHIC



From the Editor

THIS MAGAZINE WAS CONCEIVED as a journal to explore "the world and all that is in it." But in this holiday season we might do well to linger a bit in a realm that is not in this world at all, where the rules of nature and physics are discarded and the only limitations are those of the imagination.

Tom O'Neill and Gerd Ludwig's story about the Brothers Grimm may evoke warm memories of story time in the comforting arms of a parent. It may conjure those initial chills of childhood, when the scariest thing imaginable was a wicked witch, or a dark forest, or a hungry talking wolf.

Fairy tales encompass the spectrum of emotions: generosity and greed, recklessness and fear, despair and hope. By the time the Brothers Grimm got hold of them, the stories had already been filtered through countless generations and cultures. In turn, the Grimm versions have found their own far-flung audience through books, then film, and now electronic media. And so these tales are no longer just the quaint vestiges of European tradition but part of a worldwide heritage.

Please enjoy a wondrous journey to a place utterly unlike the real world—but strangely similar all the same.

Bill Allen

MUSEUM OF THE BROTHERS GRIMM, KASSEL, GERMANY

CHEETAHS
GHOSTS OF THE GRASSLANDS

Sunset catches a cheetah cub in Botswana's Okavango Delta.

Though the world's fastest land mammals, cheetahs can't keep up as shrinking habitat and predators reduce their numbers in the wild.

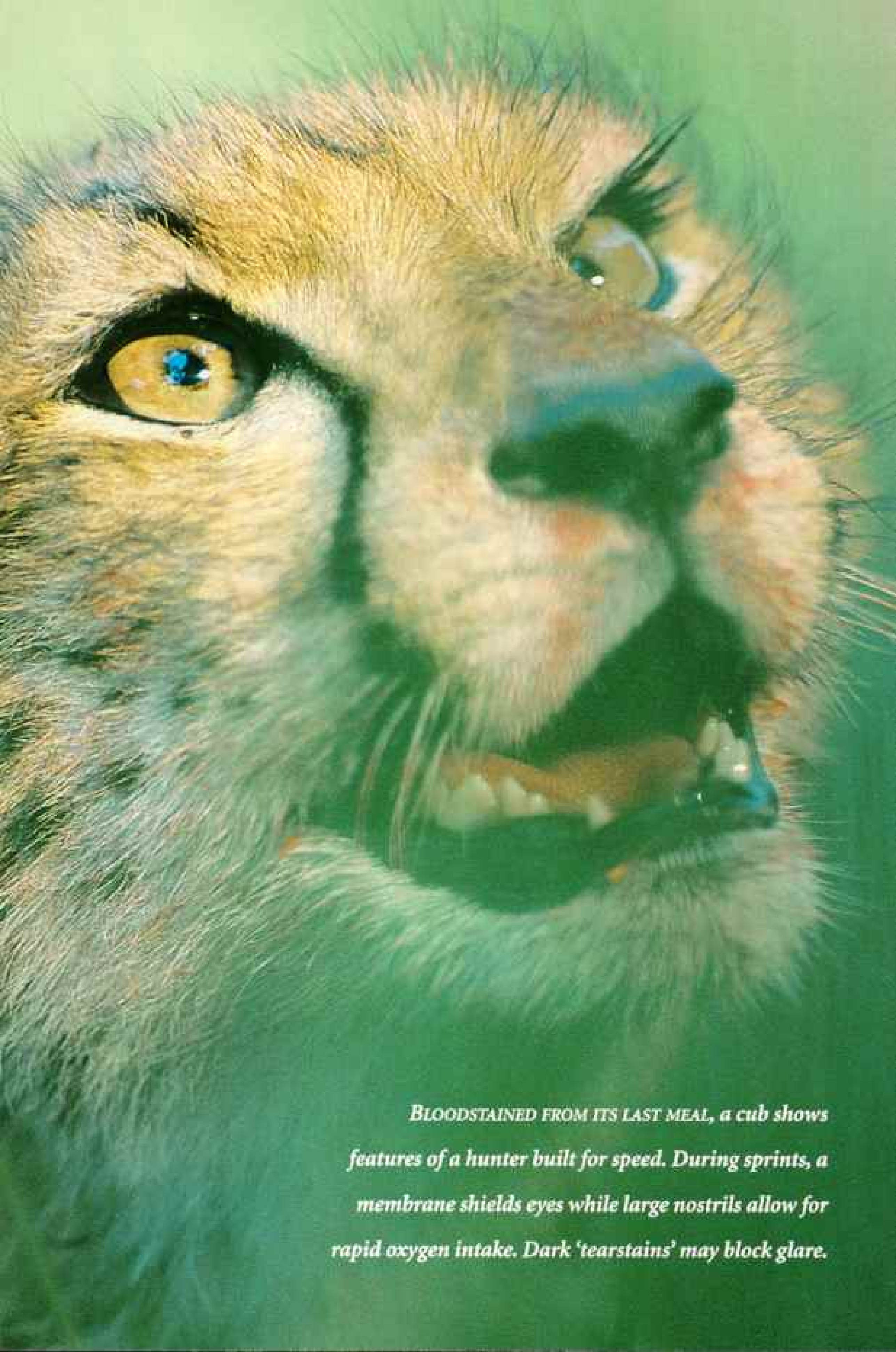
Down for the count, an exhausted impala expires in a female cheetah's deadly stranglehold. Cheetahs' teeth are too small to use as daggers for large kill, but strong jaws lock around the throat of prey until the victim stops breathing.

SURPRISE ATTACKS from the cover of tall grass are all in a day's play for 14-month-old cubs. Such behavior may teach young cheetahs the skills of survival in the wild—where in a few months they must fend for themselves.

IT WAS OPEN SEASON on babies in the Serengeti. Since mid-February the vast antelope herds had been raining down fawns on the rolling African plains. They were tender, glossy-eyed creatures on unsteady legs. Their mothers bedded them down under grassy tussocks and whistling thorn acacias, hoping they would go unnoticed until they were strong enough to run with the herd. All a cheetah had to do was meander around like a child on an Easter egg hunt, nosing under the vegetation till it found a treat. A seven-year-old named Talisker and her four cubs had just finished off a young Thomson's gazelle. Two of the cheetah cubs sat and rasped their long tongues up one another's cheeks, preening with pleasure. When they walked, biologist Sarah Durant studied their bellies through her binoculars. The cubs ranked a 9 and Talisker an 8 on the Serengeti Cheetah Research Project's belly-fullness scale of 1 to 14, with 14 defined as "swallowed a basketball" and 8 being about hungry enough to start hunting again. In the distance a column of sunlight broke through the slate-colored clouds. Talisker took up sentry duty atop a termite mound.

"There's a wildebeest calf over there," said Durant, as if hinting to Talisker. No one here roots for Bambi, except as Bambi tartare. Talisker soon spotted the calf, a tawny creature about the size of a horse foal, which had made the fatal error of becoming separated from its herd. The cheetah closed on the calf from the left rear flank at a trot, not bothering to stalk or slink.

When the wildebeest started to run, Talisker dug in behind. The two turned, the cheetah's great doglike paws kicking up clots of dirt and grass. The distance between them narrowed. Still running, Talisker reached out and swatted the wildebeest across the haunches with her forepaw, driving it down in a tumult of dust. The wildebeest struggled to its feet and reared up to shake off the demon now locked on its windpipe. Talisker went up on her hind legs and hung on. The four cubs came bounding up from behind and shoved the wildebeest back down again. They stood on its



Bloodstained from its last meal, a cub shows features of a hunter built for speed. During sprints, a membrane shields eyes while large nostrils allow for rapid oxygen intake. Dark 'tearstains' may block glare.

haunches while Talisker adjusted her bite for the slow strangulation. The wildebeest's hoofs flailed in the air. The cubs wandered off, looking vacantly away from the kill. "Waiting for mum to prepare the food," Durant said.

We waited too, and I reflected that I had come to a strange pass in my career as a natural history writer. The predation was familiar enough, but I wasn't accustomed to such pretty killers. My inclination has always been to write about the less popular animals on Earth, so taking on cheetahs was a bit like a crime reporter being asked to profile a *Sports Illustrated* bathing suit model. I was appalled, and also ineluctably attracted.

A cheetah ambling across a field is among the most beautiful animals on Earth, long legged and slim, shoulders rolling, lithe as a fashion model on the runway. Then the cheetah breaks into its 60-mile-an-hour sprint, and it's as if Naomi Campbell has transformed instantly into Jackie Joyner-Kersee: The spine flexes up and down with each huge stride, the wide nostrils flare, the head weaves back and forth to fix the cheetah's big copper-colored eyes on its prey, and the tail stretches out to counterbalance the cheetah's weight on sharp turns. It becomes a blur of golden fur and dark spots, all speed and deadly finesse.

So why appalled? It had to do with human attitudes. Partly it was my own misguided notion that a creature as beautiful as the cheetah, the poster child of tire companies and tourist hotels, should need no help from me. And partly it was because cheetahs are cats, and they elicit the sort of cat-lover sentimentality that makes me cringe. One day a conservationist who ought to have known better pointed out the characteristic black lines running down from the inside corners of the cheetah's eyes and described the cheetah to me as "the cat that cries."

Something about cheetahs makes us patronize them. Maybe it's because they're the only big cats that do not normally attack humans or because they're the only ones that cannot roar.

RICHARD CONNIFF's most recent book, *Every Creeping Thing: True Tales of Faintly Repulsive Wildlife*, was published last year by Henry Holt.

(They growl and hiss. But they also chirp at one another like birds.) Humans have tamed cheetahs as pets and kept them as hunting animals for at least 3,700 years, and our ability to dominate them has given us the idea that cheetahs are only half wild.

In fact, about 1,300 cheetahs now live in captivity and perhaps 12,000 in the wild. In my lifetime they have vanished from Asia, except for a few in Iran and Pakistan, and dwindled to a rumor in North Africa. They are disappearing below the Sahara too as the growing human population encroaches on old cheetah habitat. Parks provide some refuge, but most parks are overloaded with lions, which kill cheetah babies and steal cheetah kills.

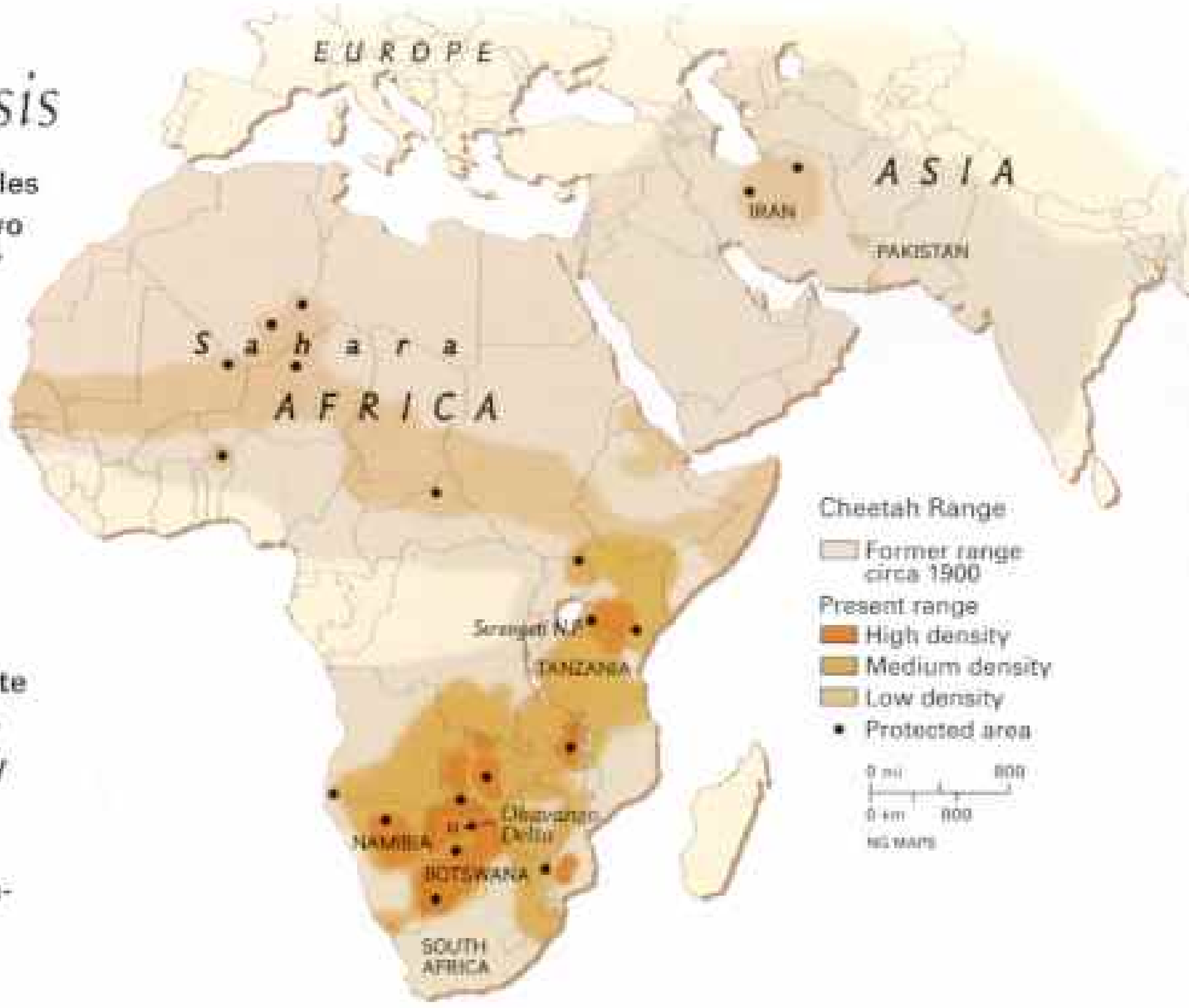
THE SERENGETI in northern Tanzania is one place where it's still possible to see how cheetahs live in the wild, untainted by sentiment. Over the past 25 years biologists at the Serengeti Cheetah Research Project have come to know more than 400 individual cheetahs, using their distinctive spot patterns as identifiers. They have also constructed genealogies, stretching back in Talisker's case to her great-grandmother. Durant, who now heads the project, is a tall, handsome Englishwoman from the Zoological Society of London, 36 years old, strong-chinned and soft-spoken.

As we waited at the wildebeest carcass, Durant recalled meeting Talisker as a cub and later as "a hopeless adolescent." The cheetah's deadly finesse does not come easy, Durant said. Cubs spend about 18 months with their mothers learning how to survive, and it may take them another year or two to become good hunters. They often start out chasing wildly inappropriate prey, including buffalo. Talisker, said Durant, would hunt right in front of a hyena and then be surprised when it took away her kill. But she also learned from her mistakes. "Talisker's a pretty switched-on cheetah. She's quite vigilant, and she moves away if she sees a lion or a hyena. She hides her kill where she can. She's a good hunter." She's also a successful mother, having already reared two litters to independence. Most females, said Durant, rear fewer than two *individual* cubs to independence in an average lifetime of seven years.

Talisker was now sitting off to one side, leaving her cubs to sort out the wildebeest. One of them touched it gingerly with a forepaw. Another stared down at it, then at his mother, then back at the carcass, like a kid confronting

Cats in Crisis

A termite mound doubles as a watchtower for two brothers—a "coalition"—that scout for predators and prey in their territory. Cheetahs once thrived in Africa and Asia. But lion predation haunts their young, and farms and ranches have reduced their habitat, leading to indiscriminate killing by ranchers protecting livestock. Today some 12,000 cheetahs live in 30 countries, helped by conservationists—and a growing number of ranchers.



Freshly killed impala fills the bellies of cubs while their mother scans for trouble. Starting at the meaty hindquarters, cheetahs eat fast before lions, hyenas, and even a flock of vultures force them away.

his first lobster dinner and hoping for help. "Wildebeest have thick skin, compared with gazelles," Durant said. Cheetahs also have small, delicate mouths. Their big eyes are set forward, the better to focus on prey, and the foreshortened face leaves little room for the mouth. One cub practiced a clumsy throat bite on the carcass. Another gnawed at the thin, webbed flesh where the hind leg joins the belly.

The heat shimmered sideways across the open plain. The clouds became cottony and less ominous. When the cubs came up from the kill now, their mouths were blood-red. Talisker joined them, and the wildebeest's midsection seethed with golden fur and spots and black ears and sharp elbows. Sometimes two cheetahs fed opposite each other, with the tops of their heads pressed together like bookends. Sometimes they ate cheek to cheek and growled at one another over tidbits. After an hour the cubs had clownish round bellies, and their faces looked like Kabuki warriors', covered with blood all the way back to the ears. They took turns eating now.

"She's about a 12," Durant said, eyeing Talisker's belly. Still room for topping off. "It might hurt, but she'll do it." Cheetahs normally get a kill only every one to three days and sometimes lose their dinner to lions and hyenas. So gorging makes sense. Three hours later the cheetahs were still occasionally picking at their food, but mostly lying around, their bellies now spotted white hillocks rising from their midsections. Vultures had begun to edge closer, like waiters who want a banquet to be over so they can clean up and go home.

One day Durant and I were talking about why cheetahs are so scarce, and I asked her, "Do you ever get to hate lions?"

"Surely everyone does?" she joked. "They are the thugs and bullies of the Serengeti. Of everywhere, really."

Cheetahs are not sturdy enough to defend themselves from either lions or hyenas, so they have become expert at being elsewhere employed. If their rivals hunt mainly by night, cheetahs hunt by day. If their rivals favor thick herds of wildebeest, cheetahs concentrate on gazelles and hunt where the prey is less dense and there are fewer eyes to notice them slinking through the grass. The cheetah's famously swift chase lasts, on average, only ten seconds, and brevity is a good thing. It means the flurry of a chase is less likely to attract attention. After bringing down her prey, a cheetah will typically lie still for several minutes to recover her breath

and also to check that no one is watching.

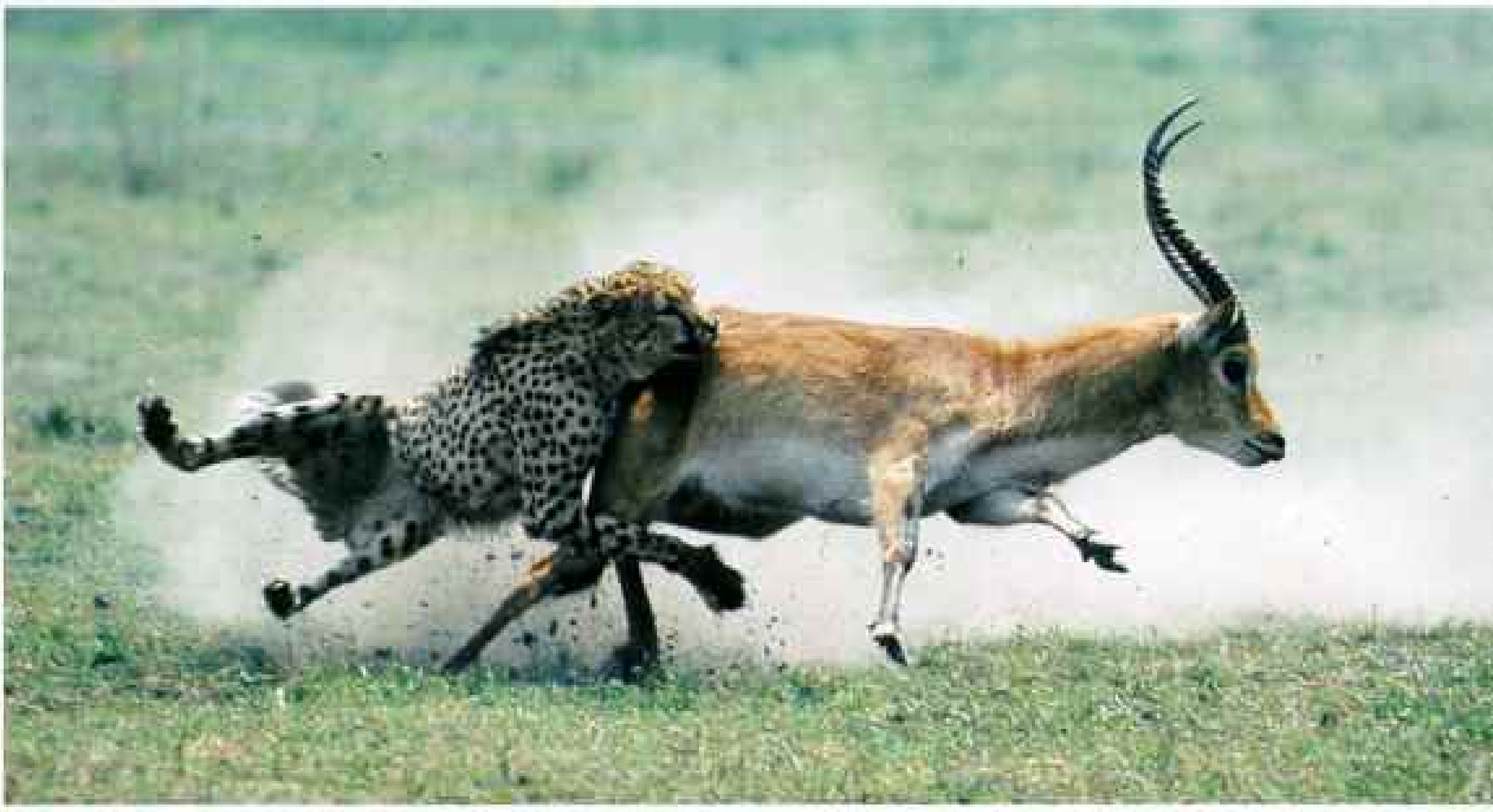
For a cheetah the real danger is not losing a kill but losing her cubs. Ninety-five percent of cheetah cubs die before reaching independence. Hyenas kill them out of hunger, lions apparently out of bad habit. Durant theorizes that killing cheetah cubs is simply an extension of the male lion's urge to kill the cubs of any unknown lioness so he can get her pregnant with his own cubs. Lionesses kill cheetah young too, to protect their territory. Female cheetahs deal with the threat by constantly moving, preferably before their rivals even know they're around. They coexist as a phantom species, slipping into temporary vacancies between prides of lions and packs of hyenas. Over the course of a year a female in the Serengeti will typically wander an area of some 320 square miles, larger than New York City. Several females may overlap in their wanderings, but, even so, cheetahs tend to be thin on the ground. Durant believes that there are no more than 250 cheetahs spread out across the Serengeti ecosystem, versus 2,800 lions and 9,000 spotted hyenas. The entire cheetah population of sub-Saharan Africa may have been small even in the best of times.

If females wander the whole city, males usually stick to a few choice saloons on the Upper East Side. Because they have no cubs to worry about, they can maintain and defend small territories, averaging about 20 square miles. Two or three males, usually brothers, may hold a territory jointly. One day Durant and I watched such a coalition, two males both pushing 12 on the belly-fullness scale, prowl through the bush, stopping now and then to gaze at antelopes and wildebeests. "I often think they watch prey the way we watch television," said Durant, "because it's comforting and mindless."

The cheetahs headed for the tallest tree in the neighborhood, an umbrella acacia, and squirted urine on the trunk at roughly cheetah nose height—a message that, according to one researcher, tells rival males, "If I catch

Days before birth, four cheetah fetuses (opposite) died after a Namibian farmer shot their mother. In Namibia 90 percent of wild cheetahs roam private farmland, but conservationists like Laurie Marker, tagging a captured cheetah with farmer Ralf Ritter, hope ranchers will call them for help rather than kill these predators. "I want my children to grow up where cheetahs run free," Ritter says.

Trapped for eight days, a cheetah caught near injured calves waits to be picked up by conservationists. During its captivity it was fed and watered, then treated for minor injuries before being tagged and released.



DAVE HAMMAN

Tag-team Pursuit of Prey

Capable of speeds of up to 65 miles an hour, a male cheetah catches up with a lechwe in the wetlands of Botswana and attempts to swat it down with his paw (top). Desperate and struggling, the animal manages to reach a water hole, but there the cheetah's brother joins in to wrestle the lechwe down for good. Lacking the strength of larger cats, cheetahs are masters of maneuvers. In this case, they hold the winded antelope underwater until it drowns—a form of cheetah kill rarely, if ever, before recorded.

you in my territory, I will kill you." It's also a way to get the attention of passing females.

Paternity is one of the great unknowns of cheetah biology, not just for researchers but for the cheetahs themselves. A female's home range may contain three or four male territories, and she may mate with any of the resident males, as well as with floater males that pass through. Durant has seen cheetahs mating just once. It involved a coalition of three males named Daniel, Day, and Lewis, after the actor, and a female named Florence. All of them disappeared into the bush. After a few seconds Durant saw what she called "stacked cheetahs," Daniel, Day, and Lewis mounted one atop the other, with Florence "looking rather squashed" on the bottom. But confusion can be a good thing. Unlike lions, male cheetahs have never been known to kill cubs, perhaps because they have no way of knowing whether the cubs are their own offspring.

The question of who fathers the cubs is of special interest because cheetahs are a genetic mystery. In the 1980s researchers discovered that all cheetahs are genetically similar—so much so that skin grafts from one cheetah to another produce no immune reaction. The finding caused geneticists to rethink the cheetah's evolutionary history: Roughly 20,000 years ago cheetahs ranged around the world. At different times there were two species in North America. But cheetah populations apparently suffered a drastic decline about 10,000 years ago, and all cheetahs now living appear to be descended from a relative handful of survivors. No one really knows what this signifies for the future of the species. Some biologists suggest that, having survived the population bottleneck and recovered, cheetahs in the wild suffer no ill effects from their genetic homogeneity.

Others believe that they may be unusually vulnerable to any small change in their environment, particularly disease. Either way, the cheetah is a conundrum: The fastest animal on land, an apparent model of evolutionary fitness, is also as inbred as the average lab mouse.

"The more information you get, the more fascinating an animal becomes," Durant said one day. "It doesn't matter if it shows that an animal is more peaceful than we thought, as gorillas seem to be, or more aggressive, as with chimps. It's the information itself. Anything that makes people value an animal for what it is, rather than for our fantasy of what it is, the better it is for the animal." I had a small problem figuring out how to value the Lion King as a cub killer and a kleptoparasite. But cheetahs were beginning to grow on me.

I WENT to Namibia, on the southwestern coast of Africa, where people were advocating a different, distinctly utilitarian view of cheetahs. The world's largest wild cheetah population lives here and thrives largely because landowners have exterminated lions from the huge private ranches that dominate the countryside. Unfortunately the ranchers mostly regard cheetahs as vermin too; they're just not so easy to get rid of. Namibia has about 3,000 cheetahs, down from perhaps 6,000 in the 1980s, and many ranchers argue that the best hope for saving the cheetahs is to let wealthy foreigners trophy-hunt a small percentage of them each year. It's a measure of how tangled and difficult the question of cheetah conservation has become that even some environmentalists say the ranchers are right.

Traveling Namibia's excellent two-lane blacktop highways, I frequently had the strange sensation that I'd just woken up in Wyoming. The highway rolled for hours through a flat landscape of parched grass and tangled gray scrub. Red rock reared up in knobbled sandstone ridges and strange, fanciful promontories, here a pyramid, there a planetarium. The descendants of European colonizers, mostly Germans and Afrikaners, make up only about 5 percent of the population in Namibia, which won its independence from South Africa in 1990, but they still dominate the rural landscape. Their lovingly tended desert towns have rows of palm trees planted in the medians and little churches lifted intact out of the Bavarian countryside. Their long fences divide the desert into vast, arid ranches where antelope roam, along with cattle and cheetahs. Almost all the ranchers I visited were dyspeptic on the subject of predators, the way American ranchers talk about wolves or grizzlies.

At his 19,000-acre ranch south of the Waterberg Plateau, Tinus van Rensburg came out to greet me and immediately held up his left hand to ask if I'd brought him a new finger to replace one bitten off a few months before by a cheetah. He was wearing a surplus German Army overcoat, and he had scraggly dark hair, a thick beard, a gap-toothed grin. Inside we sat by the fire with an old cheetah-skin rug beneath our feet and a caracal hide covering the table. Van Rensburg began to recite the basic problem with cheetahs: In short, they eat the same meat we do and often get there first.

As a cattle rancher, van Rensburg said, he used to lose 15 calves a year to predators. The problem only got worse when he abandoned cattle and converted his ranch to trophy hunting. He stocked his ranch with black-faced impalas, springbok, and blesbok, and the cheetahs ate almost all of them—$24,000 (U.S.) worth in the past three years.

"Oh!" he said, "my heart pumps blood. One day you feel that the cheetah also has a right to stay here. But you get angry, and the moment you see a cheetah, you start shooting. I think you would feel the same." I asked him how many cheetahs he typically took off his land. "Oh, that's a lot," he said. "Last year I think I catch and shoot 17."

The accident that cost van Rensburg an index finger happened when he released his grip on the neck of a cheetah he had trapped and it spun around, catching his finger in its side teeth and holding on. "I could do nothing. I must sit and wait till he is finished," van Rensburg said. He killed the cheetah. But he meant to suggest that his antipathy toward the

Too closely related for comfort, cheetahs as a species are genetically almost identical. Some 10,000 years ago cheetah populations were decimated. A smattering of survivors gave rise to those living today—animals whose homogeneity may make them more vulnerable to disease.

Rough Rebuff of a Night Attack

When a female and her adolescent cubs wander into their territory, two brothers—dubbed the Steroid Boys—move in, aggressively challenging the mother (below). Fearing for her cubs' safety, she bats one of the males away (left) and shoves the other (right). Female cheetahs live alone with their young and mate just before the cubs reach independence at between 18 and 22 months. This cheetah paid a painful price for successfully fending off the brothers: Cuts on her leg sent her limping into the night. But she is lucky to be alive.

species was merely practical, not pathological, not Ahab after his white whale. Of the finger, he said, "I think that was my own stupid thing to do. But I blame the cheetah for the small game because I've lost a lot of money."

The ranchers I talked with readily volunteered that their cheetah problems were at least partly of their own making. "There's far more cheetahs today than there were a hundred years ago," one rancher said. Back then, when the water vanished during the dry season, the grazing herds went elsewhere, along with their predators. But the ranchers put cattle watering holes everywhere, inadvertently making it possible for game and cheetahs alike to remain in the desert year-round. The ranchers also wiped out hyenas and lions, leaving cheetahs and leopards as the top predators. In the 1980s Namibia's cheetahs were thriving on a growing population of antelope, particularly kudu.

Then the kudu went bust because of drought and disease, and the cheetahs increasingly turned to livestock. Ranchers were allowed to kill cheetahs without limitation, and the government estimates that they took as many as 600 a year. "They were required to report kills," a professional hunter named Volker Grellmann recalled. "But most didn't. They threw 'em into an aardvark hole and covered 'em up." The killing has since slowed to about 180 cheetahs a year, according to a Namibian wildlife official, though he added that the number may still be "way underreported."

None of this sounded to me like an argument for trophy hunting. But that was one of the main strategies being discussed for cheetah conservation, as a way to make cheetahs valuable to the ranchers. The Namibian government and several hunters have applied to the U.S. Department of the Interior for permission to import up to 50 trophy cheetahs a year. U.S. permission matters because American hunters are willing to pay big trophy fees for cheetahs.

"The fate of the cheetahs is in the hands of the ranchers," said Grellmann, a Hemingway look-alike with a broad face, a white beard, and blue eyes peering over black reading glasses. "You have to appeal to their goodwill and offer them something in return to compensate them for their losses." If ranchers could invite hunters onto their property, he said, and charge them a thousand-dollar trophy fee to kill a cheetah, with 15 percent going to a conservation fund and the rest split between the landowner and hunting guide (often the same person), then cheetahs might become an asset instead of a nuisance. The parsimonious mind-set of ranchers strongly militates against flinging thousand-dollar animals into aardvark holes. Trophy hunting has worked with other species. The grazing herds of wildlife are once again abundant, Grellmann said, because ranchers protect them as a cash crop. Cattle now sell for about $300. But a kudu can be worth $900 just for its head, and as one incredulous old rancher put it, "You get to keep the meat." The cheetah, he said, must also "become part of the utilization process."

ONE EVENING I went out to watch a tame cheetah getting his exercise in a huge hayfield, with the long red bluff of the Waterberg Plateau lit up by the setting sun in the background. The exercise lure, a bright rag on a ground-level wire-and-pulley system, took off, and the cheetah lit out in pursuit till he pinned it down with his forepaws. Then he lay panting helplessly on the ground. He allowed me to handle the tire-tread pads on his feet and the cleatlike, semi-retractile claws. I felt the curved dewclaw on his foreleg with which cheetahs snag and trip their prey when they swat out at the end of the chase.

The cheetah's owner, an American conservationist named Laurie Marker, was explaining to a group of Namibian agriculture students that cheetahs are relatively weak killers. They can't pierce a victim's neck with their teeth, as leopards do. The adaptations that help make them such fast, efficient hunters also make them vulnerable at the moment of success to more powerful cats, like the lion. The students regarded the animal warily. Marker treated the cheetah like a pet, but to them it was still a predator, the enemy.

Wild at heart but raised in captivity, three-year-old Chewbaaka was orphaned in infancy. Rescued by Laurie Marker, founder of the Cheetah Conservation Fund in Namibia, he regularly chases a mechanical lure for exercise. Captive cheetahs sometimes suffer from obesity and often develop stomach and kidney problems.

Back in the 1980s when Laurie Marker first heard how many cheetahs were being killed each year in Namibia, her impulse was to save the animals by catching them and putting them in parks or zoos. She'd made a career as a specialist in captive breeding of cheetahs in the United States. But Marker began to think that zoos could be part of the problem, as well as the solution. So in 1991 she moved to Namibia and formed the Cheetah Conservation Fund (CCF) with the aim of saving cheetahs in the wild.

Marker, a 44-year-old with big, tinted eyeglasses and dark ringleted hair, had little experience with animals in the wild. She is a lover of dogs, goats, and house cats, all of which she addresses affectionately: "Aren't you the most beautiful girl? Yes, you are." She talks almost the same way to visitors to her cheetah education center on a farm outside the town of Otjiwarongo. Moreover, she does not speak German or Afrikaans, the languages of the ranchers. Not surprisingly, the ranchers gave her the sort of warm welcome customarily reserved for Americans arriving in foreign countries to tell the locals how to behave. "In the beginning," Marker said, "I thought we were going to get shot."

But her arrival in Namibia, and the cheetah survey she began to conduct among the ranchers there, sent a message: The outside world, which otherwise scarcely knew the place existed, actually cared about Namibia's cheetahs. At their ranch on the other side of Otjiwarongo, Wayne and Lise Hanssen soon formed a homegrown cheetah and leopard conservation group called AfriCat. Though the egos on both sides frequently clash, AfriCat and CCF take the same approach of gentle persuasion with hostile ranchers. "We never say 'Don't kill cats,'" Marker said, "because the door just closes."

Wayne Hanssen, a 35-year-old with a red mustache, a bush hat, and a skinning knife at his belt, won his first reluctant convert in his father, a traditional rancher who had been losing more than 20 calves a year to predators and shooting any cat he came across. "He said he'd stop shooting when we got the loss down to five calves a year," Hanssen recalled, sitting on the hood of his Land Rover. To reduce predator losses, the Hanssens tried using guard animals, building better fences, and penning up the calves at night. "Now, after ten years, he can't explain why he shot those cats. We proved by intensive farming methods that we could minimize the losses."

Most ranchers, Hanssen quickly added, aren't willing to make the effort. But the campaign of gentle persuasion appears to have

produced at least one significant change: Having trapped a cheetah, many ranchers are no longer so eager to kill it. Instead, they call AfriCat or CCF to collect the animal. AfriCat was originally paying up to $250 for cheetahs, but both groups now oppose payment.

One day I went with Lise Hanssen to retrieve a trapped cheetah. Three generations of the von Oppen family and their farmworkers drove out to the trap in a festive caravan. Jennifer Lee von Oppen, a nine-year-old, was planning to do a school report about cheetahs, and the last thing anybody wanted was to see the cheetah dead or to break up a cheetah family. Hanssen had picked up one cheetah from the von Oppens a few days earlier, and now two more cheetahs waited outside the trap. They fled as we approached, leaving their trapped brother to pace nervously in the cage. He spat when Hanssen came near, and she spoke to him soothingly, "I've got your mama at home."

Hanssen aimed a long aluminum blowpipe at the caged animal and quickly fired a tranquilizer into his flanks. Then the children carried the unconscious 70-pound cub to a truck for a medical examination and the trip back to the Hanssens' ranch, where he would rejoin his mother. By the end of the week the whole cheetah family was reunited in captivity, and after a six-week quarantine Hanssen released them into a game reserve as part of a large-carnivore reintroduction program.

One problem with this warm scenario is that trapping can become a feel-good way to eliminate cheetahs in the wild. In South Africa most of the cheetahs have already vanished from private lands into zoos and game parks, which can be a reproductive dead end because of the cheetah's complex mating behavior and the potential for inadvertent inbreeding. Most U.S. and European zoos now swap animals and cooperate in other ways to improve reproduction by captive cheetahs. But South African zoos and

"I'm the only mother he's known," says Marker, with Chewbaaka (left). Without the skills passed on by their real mothers, captive cubs will not survive if released into the wild. Many are sold to zoos for up to $6,000 (U.S.). Still just a prince (below), a rare king cheetah (worth $25,000) is the result of a recessive gene. Except for darker elongated spots, kings are genetically identical to other cheetahs.

FRAMED BENEATH A FULL MOON, a cheetah prowls for impala and small game. Though these cats typically hunt during the day, they're clearly opportunists. "Cheetahs are very creative," says one researcher. "Nothing they do surprises me."

game parks have been slow to get involved, according to Laurie Marker, who manages the International Cheetah Studbook. Many of them treat captive-born cheetah cubs, which sell for up to $6,000 apiece, as a lucrative business. "When they have animals that don't reproduce, they call up farmers in Namibia and say, 'Please, will you catch some cats?'" Marker said. "Most want females, and for every female caught, the farmer typically catches 10 or 15 males."

"The perception is that zoos are saving the cheetahs because they're taking problem animals that would be shot," said Bonnie Schumann, a South African on the CCF staff. "But they aren't just taking problem animals. Sometimes they create problems by paying farmers to open their cages and catch cheetahs."

Despite the apparent success of captive-breeding programs at some zoos, no one is attempting to reintroduce captive cheetahs to the wild. There are relatively few wild places left in Africa or Asia big enough to accommodate cheetahs or willing to accept them. Thus both CCF and AfriCat emphasize protecting the existing population in Namibia and persuading ranchers to tolerate cheetahs in the wild. Despite their cat-lover orientation, both groups have come to support trophy hunting as one practical way to accomplish this. Hunting, said Marker, "won't make anybody rich, but it's an aspect of management."

I went to visit a young hunting guide named Jochen Hein at his game ranch near Okahandja, where a pet cheetah named Maggie patrolled outside the kitchen door. As we toured his ranch, Hein told me about a trophy cheetah one of his clients had recently shot on a neighboring farm. The neighbor, he said, used to kill cheetahs as pests. Then Hein paid him the cheetah trophy fee, and the farmer's jubilant wife confessed that it was their first income of any kind in six months.

"When we killed the cheetah," Hein recalled, "I said, 'Look, you're getting this money, keep those cheetahs for me. Please forget these damned traps.' A lot of these farmers, they need to see it for themselves. They need a professional hunter who will shoot a cheetah on their property and give them some money."

Hein helped write Namibia's new cheetah hunting compact, which sets the terms for an ethical hunt. More than 250 professional hunters have signed the compact, and only trophies from compact signatories would be eligible for import into the United States. But biologist Sarah Durant doubted that the compact would protect cheetahs. It's too easy, she said, for cheetahs to wander from ranches that observe the compact to neighboring ranches that continue to trap and shoot.

Some hunters also objected to the new rules. Volker Grellmann figured that a visiting hunter who spent 14 days in the field following the new rules would have only a 20 percent chance of even seeing a cheetah, much less getting off a shot. No landowner was likely to get more than one or two cheetah trophy fees a year, and the fees would never equal what the rancher lost from having the cheetah there in the first place. I repeated these criticisms to Hein, who replied that hunters would spend those 14 days taking kudu and other common game (and paying trophy fees on them), drawn on by the elusive prospect of a cheetah.

I said good-bye and headed from Hein's ranch to the nearest gas station, at an empty corner in the middle of the desert, where I happened to find the very farmer to whom Hein had recently paid the cheetah trophy fee. He was a silver-haired, dark-eyed man of about 50 in a leather jacket. When I asked him if cattle ranching paid a decent living these days, he laughed softly. He told me the usual story about losing 20 calves a year to cheetahs. I asked him how he felt about them now that he'd earned his first cheetah trophy fee.

"When I see them," he said, "I shoot them."

Maybe it was just bluster, a rancher saying what his father and grandfather always said. Or maybe old animosities do not vanish in one transaction, or even in one generation. "I can't honestly say we've ever turned around a farmer so that he never shoots a cheetah again," Wayne Hanssen had told me. Then he added, "We've got a lot of farmers thinking twice."

NEAR THE END of my visit in Namibia I went out one morning in search of radio-collared cheetahs with Laurie Marker. We took off from the dirt road outside the CCF farm, with radio-tracking antennas clamped onto both wing struts of a Cessna 206. The pilot's technique for pinpointing an animal's location was to fly figure eights in the vicinity of the radio-collar signal, banking so

Not even a swarm of flies disturbs a cheetah's after-dinner catnap. Most delicate of the big cats, cheetahs choose to flee rather than fight when confronted with danger. "People are their biggest problem," says Laurie Marker. "Whether cheetahs thrive in the wild or are lost in our lifetime is ultimately up to us."

steep and so low that the entire port window was filled with the thorny earth skidding past just beyond the wingtip and the starboard window was all empty blue sky. Then the plane seesawed over, and we did it on the other side. I got the feeling that the hairy love grass and *wag-'n-bietjie,* or wait-a-bit bush, was going to reach out and haul the plane into the undergrowth.

We leveled off just above the ground and cruised past two cheetahs seated alongside a fence. One of them looked at this winged apparition, and his eyes burned with a color like the embers of a banked fire. Then he turned away with magisterial feline indifference. In truth, it was almost contempt.

I contemplated the trade-off: Those eyes replaced with glassy baubles. That head mounted on some trophy room wall, to be admired by cigar-waving partygoers and to become cloyed in time with cobwebs. The idea that such beautiful animals needed to become "part of the utilization process" stuck in my heart. And yet 50 or so such cheetahs turned into trophies each year might just make one or two ranchers think twice. And maybe this was a beginning.

The plane flew on across the desert, and it seemed to me that nature seldom offers easy or reasonable trade-offs. She is content merely to teach us one hard lesson, over and over, and nowhere more vividly than in Africa: All life comes from death. Below us wildebeests angrily tossed their manes, and springbok blithely grazed. Somewhere in the thorny brush a cheetah ambled, doubtless thinking, as we all must, about where it would find its next meal. □

Look for "Cheetah Chase" on National Geographic EXPLORER this month.

Oscar the iguana and his owner, newspaper columnist Eric Larsen, greet cruise-ship passengers at Key West—the "Last Resort." "They stay just six hours," says Larsen, "and they're taking the place of long-term visitors. Still, they're my main source of 'Have Your Picture Taken With a Lizard' income."

The Florida Keys Par

adise

WITH ATTITUDE

BY FRANK DEFORD • PHOTOGRAPHS BY BOB SACHA

Stuck on a sandbar, a skipper gets a tow from Duke Pontin's Spirit Marine boat-rescue service. "I had a feeling he wouldn't pay the bill—and he didn't," says Pontin. "But you can't leave someone in that kind of distress."

Conchs ARE MOSTLY DESCENDED FROM OPPORTUNISTS WHOSE LIVELIHOOD WAS BASED ON THE MISFORTUNE OF OTHERS.

Whereas it is generally accepted that, given the way the world turns, there are sunsets in every place on the face of the Earth, the Florida Keys—Key West, in particular—have presumptuously co-opted sunsets for themselves. Sunset in the Keys is an advertised tourist attraction, the clear implication being that you really can't see the sun go down anywhere else in the world.

But wait. It is not just that sunsets are indigenous only to the Keys. They also possess a special mystique. That is the green flash. Oh, you've never heard about the green flash of a Keys sunset? Well, it is rare. "I've only seen it once," says Sheila Mullins, the mayor of Key West, "but if you've seen it, you know it. If you're watching the sunset, and you say, 'Gee, I *think* I saw the green flash,' you didn't." Maybe the green flash is visible only one out of every couple hundred sunsets. It has to do with the refraction of the rays by the atmosphere on the low horizon of the Gulf of Mexico under just the right conditions. Or maybe it is just a Keysian Loch Ness monster. "Total bull," says Buddy Owen—he the proprietor of B. O.'s Fish Wagon, who has lived in Key West all his life. Or maybe . . . maybe you simply must believe in the green flash to see it.

Anyway, now it is once again nearing the daily climax, and at Mallory Square in Key West, the preferred vantage point, the throngs have assembled again to see the sun go down. Meanwhile, as it nears the end of its day's celestial path, there are more mundane sights in Mallory Square to inspect closer up: a fellow walking on broken glass, or his colleague swallowing a sword, or a strongman holding up a large grocery cart with his teeth. Etc. But, suddenly, all eyes turn away from these sideshow exhibits and look to the horizon, past the lazy ships and the noisy Jet Skis, to where that bright orange disk pauses just above the waterline, and then. . . .

Of course, the Keys have always been contradictory and done things their own way, to the limits—"pushing the envelope," as everyone invariably says proudly. For example, there's a spot of land, with a hideous marker, that is identified as the Southernmost Point in the Continental United States. Except, it's a lie. The genuine southernmost point is a few hundred yards away, but it's inaccessible to tourists with cameras. So Key West just picked a convenient spot. Or take key lime pie, which Craig Claiborne celebrated as "the greatest of all regional American desserts." Alas, as yummy as key limes are, none are commercially grown on the Keys.

But then, where exactly are the Keys themselves? Officially, they are a part of the great state of Florida. But residents of the Keys will have none of it. Key West even, tongue in cheek (maybe), declared itself a republic in 1982. Tony Falcone expresses the prevailing view.

A wet towel and a post-op rest in a wading pool are doctor's orders for a bandaged sea turtle being treated for a now common herpes-like virus at the Turtle Hospital (once a topless club) in Marathon. After a year's recovery, turtles are released.

Like a windblown pennant, the Keys trail nearly 200 miles to the Dry Tortugas. Some 800 islands and 42 bridges are shadowed by the only living barrier reef in the continental U.S.

He runs Fast Buck Freddie's, which sounds like a back-alley junk emporium but is, perversely, upscale and glitzy. "Whenever I have to go to Miami," Falcone explains, "I always say, 'I'm gonna run up to Florida.'"

So instead of Florida, Keys inhabitants prefer to associate themselves with:

1) The tropics, and

2) Paradise.

One claim is wrong, the other infuriating. The Keys cannot be tropical, because even the real southernmost point is still 70 miles north of the Tropic of Cancer, where, officially, the tropics begin. But the Keys like being thought of as exotically Caribbean, just as all the foreign Caribbean islands want you to think that they're really stable and reliable, like the U.S.

Even more audacious is the assertion that the Keys are Paradise—capital P. It's a bit much, but then it's really quite amazing how many residents speak of their introduction to their Paradise in the most genuinely mystical terms. You would not, for example, normally associate the poetic with Rudey, so called, she in leather with her signature handcuff accessories, who presides over the Rude Awakening Radio Extravaganza Ministry mornings on WEOW on your FM dial. Rude Girl earned that sobriquet for her predilection to flatulence *on the air.* But, lyrically, she speaks: "The first time I came here, I sensed that the atmosphere was magical. There's such an incredible lightness to this place." More regularly, others invoke the image of home. For example, says Carol Shaughnessy, who once ran the Hemingway Days festival, "I think Key West will recognize *you* if you're meant to be here. I came here 20 years ago, and I was just walking alone, and suddenly I realized for the first time in my life, I was home."

Best known as a sportswriter, FRANK DEFORD is also a commentator for National Public Radio. He last wrote for the magazine on the cultural roots of sports (July 1996). BOB SACHA won a 1999 Alfred Eisenstaedt Award for Magazine Photography for his February 1998 GEOGRAPHIC article, "Revolutions in Mapping."

Why, that almost sounds like someone describing how she fell in love.

"Yeah," says Shaughnessy ingenuously, "I think you could say that."

Key West is a city of cats—prominently featuring those supposed descendants of Hemingway's six-toed types. They're everywhere, and, says Tony Falcone, patting his own stray, Bones, "The cats choose the people here, not the other way round." Like that, the place and its human denizens seem to find each other. It is an article of faith, regularly expressed, that Key West possesses a different barometric pressure from most every place in the world (Paris and San Francisco excepted). And a green flash at sunset. Sometimes. Maybe.

Key West is extremes. It has been the richest city in the United States and so poor it went bankrupt. Right now, says Ed Swift, a promoter and entrepreneur, perhaps the most controversial man in town, "We have a new contradiction. We're too rich, but we're too poor."

On the other hand, the rest of the Keys—"the outside Keys," as the insiders of Key West dismiss them—have, until very recently, never been much of anything. At the turn of the century less than a thousand people lived in the 110 miles between Key West and the mainland. Even as late as 1960 there were only about 14,000 mavericks and fishermen hunkered down along the chain. Now: upwards of 55,000. Even the Spanish conquistadores, who never saw a virgin piece of land they couldn't find reason to violate, took a pass on the outside Keys—perceiving them (fairly accurately) as 800 flat bits, full of nothing but mosquitoes. The Keys were like a cheap, ugly watch chain, with a magnificent gold piece on the end, ticking to its own time.

Only now, at last, are the chain and the watch in it together. The outside Keys are very much afraid that they are going to become just like Florida, while Key West has an even greater fear. It worries that it is going to suffer the worst fate of all: that it might become ordinary.

Key West has always prided itself on being hospitable to those who might not be accepted elsewhere. Famously now, of course, Key West features a large gay and lesbian population. But, in the past, other folk from without the mainstream have found comfort here. Rumrunners and drug smugglers have been, at times in this century, honored citizens. It is not disputed that back in the 1970s, after the Navy pulled out much of its force, the lower Keys were kept alive by drug traffic. It was cash-and-carry. Everybody winked; marijuana bales were referred to as "square grouper." Before that, in the days when Hemingway drank at the Blind Pig in Key West, it was booze. Wilhelmina Harvey, who was elected county commissioner promoted only as "Wild Willie," recalls, as a girl, seeing mysterious green and red lights out in the ocean. Then she would hear a fire bell ring over on the Gulf side, and as the citizenry rushed off to put out the alleged blaze, the rumrunners (or Scotch runners from Nassau) would take advantage of the diversion and sneak in the contraband. "It was such a precious place," Wild Willie recalls fondly.

Like Australians, heirs of convicts, those born in Key West, who are known as Conchs (pronounced konks), after the large mollusks, are mostly descended from opportunists whose livelihood was based on the misfortune of others. Every year dozens of ships—most sailing the trade route between New York and the Gulf ports—would smash onto the great reef, and when the cry would go up "Wreck ashore!" most every ambulatory male would rush to his boat to see what he might salvage.

There is even the legend of the wily Squire Eagan, a Methodist minister who, from the vantage of his pulpit, saw a ship founder on the reef one Sabbath morning. The good preacher, who doubled as a wrecker (didn't everybody?), promptly began to read from First Corinthians, departing the pulpit, striding down the aisle: "Know ye not that they which run in a race run all, but one receiveth the prize? So run, that ye may obtain." Only then, as he approached the church door, did Squire Eagan cry out "Wreck ashore!" whereupon he rushed to his schooner (appropriately named *The Godspeed*) and, with his head start, reachethed the prize first.

Before Henry Flagler built his railroad to Key West in 1912, many visitors arrived there unintentionally, as human salvage. Wild Willie's own grandmother, a German immigrant bound for New Orleans, was on a ship that hit a reef in 1858. The wrecker who saved her married her. But that was at the end of an era. More modern lighthouses and more controllable steam *(Continued on page 44)*

Privately owned Ohio Key offers an RV resort and marina; Atlantic-side wetlands are protected by county zoning. Elsewhere in the Keys national wildlife refuges encompass 416,000 acres, most of them water.

THREATS

COASTAL DEVELOPMENT: Despite laws designed to protect mangroves, landowners and developers still cut them down to improve waterfront views and make room for docks and marinas.

HURRICANES AND STORMS: Natural hazards occasionally claim small stretches of mangroves.

THREATS

WATER QUALITY: Inadequately treated sewage and storm-water runoff carrying pollutants from developed areas put excess nutrients into the water and create algal blooms, which prevent sunlight from reaching sea grass beds.

PROP SCARRING: In shallow waters rapidly turning propellers can carve grooves that grasses cannot easily repopulate, leading to bottom erosion.

DREDGING AND TRAPPING: Both intentional removal of sand to deepen channels and accidental dragging of anchors uproot sea grasses. Lobster and crab traps pulled across the beds also destroy them.

Mangroves

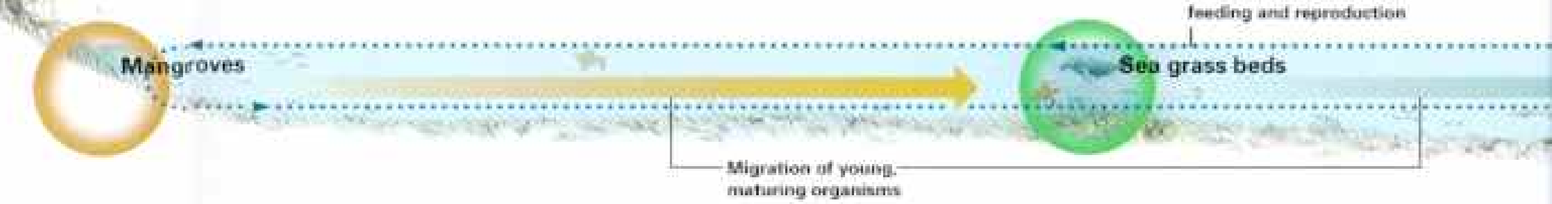
Lining the shores of the Keys, saltwater-tolerant mangroves, with their tangled roots and dense branches, absorb wave action, stabilize coastlines, and prevent erosion of inland soil. Mangroves act as a nursery for fish, mollusks, and crustaceans, collecting nutrients the animals need by trapping organic matter. A major component of this detritus is decaying mangrove leaves themselves, broken down by bacteria and fungi. Above the waterline, key deer forage on mangrove leaves, whose limbs shelter nesting seabirds.

Connected worlds

The coral reef ecosystem of the Florida Keys extends from the shoreline, where mangrove roots nurture newborn fish and other marine life, as do sea grass beds. Several species, such as the spiny lobster, migrate to deeper waters as they grow, and many adults range between habitats to feed and reproduce. Mangrove roots filter pollutants from water to promote healthy sea grasses, which in turn absorb nutrients and trap sediment that would damage coral. Healthy reefs block wave action, protecting grass beds and mangroves.

Sea grass beds

The only flowering plants to live their entire lives in seawater, sea grasses are an important contributor to the coral reef ecosystem. Grasses are a major food source for sea turtles, manatoes, and fish and a nursery for fish, lobsters, shrimps, horseshoe crabs, and mollusks such as conchs. Sea urchins eat algae growing on the grasses; sea cucumbers filter organic debris. Just as mangroves hold the shoreline in place, sea grass roots help stabilize the shallow sandy bottom.



THREATS

WATER QUALITY: Corals require clean, clear water to survive. Algal blooms caused by the excess nutrients that threaten sea grass beds also damage corals. Sunlight cannot penetrate clouded waters to activate photosynthesis in the corals' symbiotic algae. Numerous diseases—whose causes are debated—have spread in recent years.

OVERFISHING: As fish numbers decline, the delicate predator-prey balance is upset.

PHYSICAL DAMAGE: Boat anchors, grounded vessels, and intentional chipping for collections can destroy entire coral colonies.

POLLUTANTS: Leaking petroleum products and antifouling paints applied to boat hulls can be deadly to corals.

Coral reefs

Among the most biologically diverse ecosystems, coral reefs are built up by layers of calcium carbonate, the accumulated skeletons of billions of tiny soft-bodied sea animals called coral polyps. Inside living polyps, algae called zooxanthellae provide oxygen and organic compounds and in turn receive carbon dioxide and nutrients from the polyps. The algae also give corals their color. Reefs are a habitat for an array of sea creatures: jellyfish, sponges, anemones, snails, rays, crabs, lobsters, sea turtles, moray eels, and some of the world's most colorful fish.

ART BY CHRISTOPHER A. KLEIN,
NATIONAL GEOGRAPHIC ARTIST

vessels wrote *finis* to what was called "the jolly and carefree" wrecking life.

At other times Key West prospered on account of the sponges and turtles in the water or the cigar tobacco from Cuba. Indeed, until Castro, that neighbor island always held a powerful influence over Key West. A failed 1868 war against Spain brought large numbers of Cuban expatriates to town, where they were welcomed into the same polyglot society that had embraced Bahamian loyalists, Connecticut sea scavengers, and whatever other scoundrels and pirates and accidental visitors were brought there (in one way or another) by the enchanting reef. A quarter of a century later José Martí came to Key West and gave an inflammatory speech of revolution from a balcony at what is now a gay nightclub called the Treetop Cabaret.

Key West was maintained as a Yankee outpost during the American Civil War, but much of the city's gentry remained largely sympathetic to the Confederacy. However, Key West's slave heritage was ameliorated by its historic tolerance; white and black were buried in the same cemetery, and a black judge was elected barely a decade after Appomattox. "Key West is the freest town in the south," editorialized the *New York Age*, a black newspaper, in 1888. Gays are part of a long tradition.

Yet, in counterpoint to the cosmopolitan openness of the town, Key West retains the most curious devotion to birthright. You must be born on the two-by-four-mile island to be a Conch. Oh, live there long enough and they'll patronize you and call you a "freshwater Conch," but outsiders who marry Conchs and live in Key West for decades forever remain no more than "the stranger" so-and-so married. When Sheila Mullins ran against a Conch in '97, her opponent, Hilario "Charlie" Ramos, dismissed her as "a newcomer." Mayor Mullins has lived in Key West for a quarter of a century.

Soaring housing costs in the Keys have crammed low-wage earners together. Four people make ends meet sharing a floating home on Key West's Houseboat Row (left). For those with bigger checkbooks, new town houses on Duck Key (above) range as high as $400,000.

All the Keys are so geographically skinny—and now so demographically crowded—that as Connie McSorley, a real estate agent who lives on Big Pine Key, says, "It's the longest small town in the world." To Tony Falcone, it's not a town at all but a college campus for grown-ups. Anyway, the Keys always worked, it seems, because even though everybody knew everybody else's business, nobody cared much what business a neighbor was taking care of. Everybody was a Bubba. You have to be born a Conch, but you could be accepted as a Bubba.

For example, Buddy Owen, who is a Welsh-Cuban Conch, grew up with Boog Powell, the great baseball player, who came to Key West as a child. So Boog could never be a Conch, but he was an A-1 Bubba. "Bubba means Brothers United in Building a Better America," Buddy says at his Fish Wagon on Caroline Street, which is a sort of one-man theme park of a restaurant. He and Boog would stay up late, then fish early for their breakfast from the pristine Keys water, where, it is said, some 500 species of fish roam the coral.

Today, though, Bubba has largely become a term of disparagement—a clubhouse pol, a con, a crony, that type. The newcomers don't like Bubbas. "The place has lost its soul," Charlie Ramos moans, even though he's quick to volunteer that he's made a lot of money renting property to the allegedly soulless arrivistes. A lot of other Conchs unloaded their houses and left when the tourist boom accelerated. They moved, many of them, up to Ocala, in Florida, such an emigration that it was like Ireland to America. They have Conch reunions regularly in Ocala. But the displaced Conchs can't afford to move back, even if they wanted to.

Sheila Mullins bought a house for $7,000 in '76. Now that kind of property is worth in the hundreds of thousands. Many old-timers have to pay more in taxes and insurance annually than the whole house cost them. In a service-based tourist economy, there's no place the service people can afford to live—especially as rich vacationers buy up residences as second homes, then rent them out much of the year to other rich vacationers. And, mournfully, at his Fish Wagon, Buddy Owen shakes his head. "The Conchs have changed," he says. "Now, they just work and go home. Basically, you see, most Conchs can't afford to go anywhere in their own town."

The cruise ships pour people in almost every day, and they drink where Hemingway did and buy T-shirts. Very few of them could even

Getting a handle on the ecosystem, two snorkeling students hang from the rail of a boat run by MarineLab of Key Largo's Marine Resources Development Foundation. More than 6,000 students set sail each year to learn about the Keys' coral reefs and marine life.

imagine a green flash. IF IT'S REALLY THE "SEASON," asks a bumper sticker, WHY CAN'T WE SHOOT THEM?

The lesson is that paradise will always be lost wherever it comes up against real estate values.

Key West has never been a beach resort. Indeed, because of the reef there is no surf, and most of the sand has to be imported. It's almost a coincidence that the place happens to lie only 24.5 degrees north of the Equator. Rather, it's always been a destination measured by its people and its ambience. Nobody has ever understood that better than Jimmy Buffett, who, failing to make it in Nashville, created his Margaritaville out of Key West. Carol Shaughnessy, who worked for the live Buffett before she started working for the dead Hemingway, says, "Jimmy was selling a mystique. His songs talk of a life that everybody wishes they could live." She pauses, and says wryly: "Well, maybe a life they *think* they would like to live."

Anyway, Jimmy Buffett has moved to Palm Beach and merely keeps a second home in Key West. Ed Swift says, "I sold Jimmy his first electric guitar. You know, he and Hemingway share something. They both liked this place for the same reason. They both had a lot of money at times when nobody else here had any."

Nevertheless, even if Buffett is gone to Swellville, his Parrot Heads still migrate to his shrine in Key West, next to Fast Buck Freddie's, there to drink the margaritas and drink in the atmosphere. Key West is metaphysical.

The rest of the Keys are more typical in their sunshine attraction. Also, their own battle now is a familiar one: Sleepy little Dixie backwater fights not to get turned into a charmless suburban strip mall. Developers take on environmentalists! Return bout! (The 20th-century version of ranchers vs. sheepmen.) "But this is like Yellowstone!" Dagny Johnson, the president of the Upper Keys Citizens Association, cries out, as she steers her wheelchair around her bayfront house, hell on wheels, rousing her troops against the enemies of nature. "This is one of the longest reefs in the world. We *can't* let them destroy this place."

In particular, here on Key Largo the fight is against widening a highway to make the access to the Keys from Miami easier and allowing a casino boat to continue to operate outside the three-mile limit of the state's jurisdiction. But it's still inside sanctuary waters—flopping about like a leviathan, occasionally banging into the dainty coral reef . . . which starts the process of changing God knows what else in this omniconnected territory. Belowdecks, the gamblers pull slot machines, no more aware of where they might be than if they were in Monte Carlo or on an Indian reservation.

One of Dagny's men-in-arms, Joel Carmel, a bookstore owner, says, "This is all so tacky. What we want to attract is ecotourism, and gambling—a gambling boat on a reef!—is simply not compatible." Surveys have shown, in fact, that what visitors to the Upper Keys most want is diving, fishing, and bird-watching, but Key Largo is already close enough to Miami to be an exurb and, like it or not, is being auditioned for suburban status.

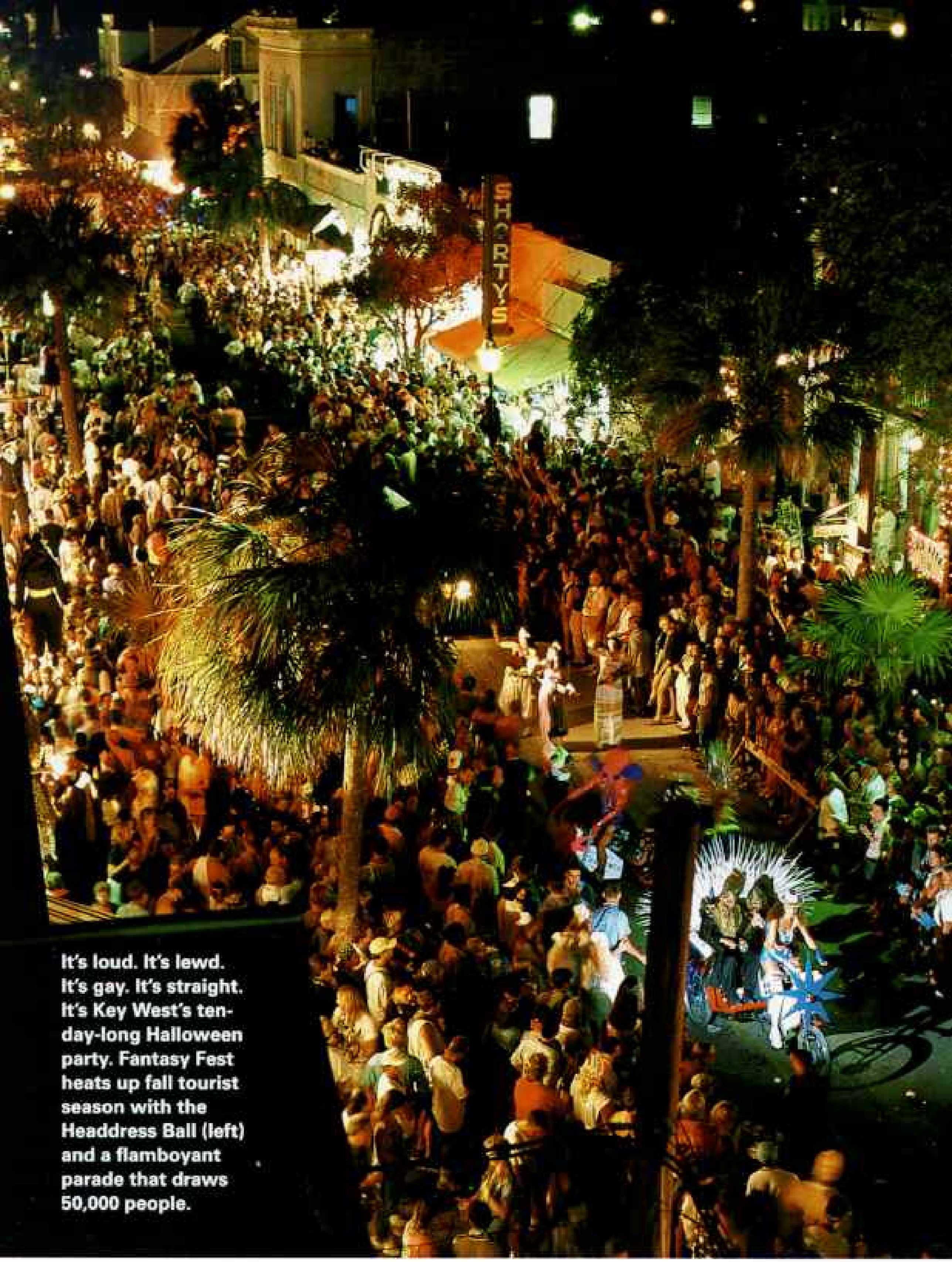
Meanwhile the other major ecological dispute on the Keys takes place near the other end, where Big Pine has much the same relationship to Key West as Key Largo does to Miami. Only on Big Pine the fight is not over the reef but over another living thing: key deer.

Big Pine is sort of the continental divide of the Keys. The islands north of it—called, blandly, just the Middle Keys and the Upper Keys; remember, they were only so many nondescript clumps on the way down to Paradise—are formed, like the mainland, of limestone. But starting at Big Pine, the Lower Keys and Key West itself are overlaid with pockmarked oolitic limestone. Anyway, 15,000 years ago, toward the end of the last ice age, the Keys were still bridged to the mainland, but as the seas rose, Virginia white-tailed deer, which had moved about as far south as they could (just like *Americanus retiredus* today), found they were trapped there when the glaciers melted. The deer adapted to their environment by smalling down and enjoying having Big Pine to themselves; as recently as 1950 fewer than ten humans called it home.

Now the number is approaching 5,000 and would soar well past that if Monroe County,

The Keys

HAVE ALWAYS
DONE THINGS THEIR OWN WAY, TO THE LIMITS—
"PUSHING THE ENVELOPE."



It's loud. It's lewd. It's gay. It's straight. It's Key West's ten-day-long Halloween party. Fantasy Fest heats up fall tourist season with the Headdress Ball (left) and a flamboyant parade that draws 50,000 people.

which encompasses the Keys, didn't limit growth. Barry Stieglitz, the U.S. Fish and Wildlife representative who runs the deer refuge, pulls out an aerial photograph showing how the humans have encroached. Stieglitz is a second-generation conservationist, and he speaks softly but passionately. "The deer were here first," he says, "and they're part of the building blocks of the world."

A lot of the little creatures get hit by cars and killed by big family dogs. Moreover, the key deer are in conflict with the single other attraction that Big Pine is most famous for, which is . . . a flea market. The flea market folk and many residents want an extra lane added to the two existing ones, while Stieglitz and his deer defenders argue that 50 percent more road will mean something like 50 percent more roadkill. Money has already been appropriated for underpasses for the deer.

"It's like being under Hitler down here," says Connie McSorley, the former president of the Federation of Chambers of Commerce for all the Keys. "We're as precious a resource as those deer are, and we *are* environmentally conscious. We just want to share the land we have, but the deer have all the rights. You can't give 'em away, because every zoo knows they're nothing but little Virginia whitetails. Sure, they're cute enough. They're even on our chamber logo. But they're just dwarfs."

So, as ever, the battle lines are drawn, and it is hard to find someone in the middle—such as Richie Moretti of Marathon in the Middle Keys. Moretti owns a tourist business, the Hidden Harbor Motel, but he also owns a turtle hospital. "Isn't it funny?" Moretti observes. "I came down here to relax and kill fish and ended up working to save turtles.

Why did the rooster cross Duval? Maybe he knew that a law protects descendants of Key West's once popular fighting cocks. Such quirky acceptance of the unusual attracts free spirits like Richard Vore (above), who works the graveyard shift at a joint called, simply, The Bar.

"Look," he says, picking up a turtle out of a round tank, "without the environment, there's *no* economy here. The reef dies, my motel dies. And then I can't pay to save the turtles. You see? The fact is, when you see only the animal point of view, there's a backlash, and you hurt the animal. But when you see only the human point of view, you kill the animal."

The environmentalists in the outside Keys are fighting at some disadvantage, though, inasmuch as the battleground isn't particularly pretty, and the part that everybody sees—U.S. Route One—is hopelessly tawdry. It isn't exactly like trying to keep a McDonald's off Mount Rushmore. Most Caribbean islands possess the critical mass to offer some backdrop and variety, but the outside Keys are the

Jersey shore with palm trees; it's no wonder, really, that everybody has been trained to look away, to the sunsets.

The fragile beauty and strength of the Keys is largely unseen, lying underneath the Atlantic Ocean on one side and Florida Bay and the Gulf of Mexico on the other. And down there it's all so . . . fragile. Consider: When Flagler built his incredible railroad line to Key West—"Gateway to the Panama Canal"—engineers found it easier, in many instances, to fill in the shallows between islands rather than build bridges. One tiny little speck among the 800 or so islands is Pigeon Key. Here 400 railroad workers lived for four years, building the Seven Mile Bridge—the longest in the world at that time—and here now is a museum run by a Ph.D. named Dan Gallagher, who identifies himself as a hybrid, an environmentalist-historian. But it's the proper mix here. Gallagher explains how the land bridges that Flagler's men made began to alter the balance of salt water and fresh water in Florida Bay, an estuary. Then decades of canal building in the Everglades significantly lowered the inflow of fresh water. As a consequence, the bay's sea grasses are now mostly limited to turtle grass, accommodating to the saline arrangement that man has created.

Then there's the impact of pollution. "Look," Gallagher says, grabbing for a map that shows how algae periodically blooms in the bay. And now—"Look!"—here and there it has drifted under the bridges, out into the ocean, where sometimes it hovers above the reef. Dark. Oblique. "Coral needs sunlight to live," Gallagher explains. "Algae can block it out, and. . . ." He shrugs.

The reef is the one common ingredient. It matters to everyone, from Key Largo, where the gambling ships lug slot machinists out to the coral, down through the spreading algae

A mirror captures one of the two most popular shows in Key West: the sunset from Mallory Square and the crowds who come to applaud it. Many swear they see the elusive green flash at sunset's end. Key West's own flashy ways never end—they just keep costing more.

to Key West, where the charter boats take out maybe 400 amateur divers every day. They're supposed to have been advised not to touch the coral, but a lot of them aren't educated by the captains, and a lot more don't pay attention anyhow.

As boys, Buddy Owen and Boog Powell used to have the Key West reefs all to themselves, but then Boog went off to Baltimore to hit home runs and become Most Valuable Player, and Buddy kept diving, until, all of a sudden, late in the sixties, he started seeing some kind of green slime by the coral. "It was like a haunted house out on the reef, you know?" he says. And now Buddy reports: "There's not a sign of life left there, on the Gulf side of Key West." After eons, it all happened very quickly.

And if more and more coral continues to be destroyed? "Well," says one resident, "then the Keys become nothing but a land of sunsets and bars."

Highway One

mile marker zero—2,593 miles down from Fort Kent, Maine, at the New Brunswick line—sits at the corner of Whitehead and Fleming, between the Hemingway House and the Little White House, where frequent visitor Harry Truman ran the country by day, while drinking bourbon and

playing poker by night. But a block over from Whitehead is Duval Street (rhymes with "gall"), which has always been the heart of Key West, physically and metaphorically.

The tourist trolleys and trains beeline to Duval. The pedicabs and pink taxis ply the street. All the cruise-ship tourists troll Duval. Margaritaville and Sloppy Joe's, where Hemingway was at home, and Diva's, where the drag queens lip-synch, and Ripley's Odditorium (never mind), and the Oldest House and the tallest building and the grandest church and the Southernmost House all are on Duval (rhymes with "mall"). But also now, the Hard Rock Cafe, Planet Hollywood, Hooters, and a plethora of T-shirt shops line Duval (rhymes with "appall").

In a sense Key West has become the victim of its own runaway success. Out-of-towners speculate in houses, and the rental rates go so high on Duval Street—up to $100 a square foot—that the only shops that can afford to lease there sell generic merchandise and experiences. Wonderful little galleries that made Duval Street special have, too many of them, been squeezed out by the myriad T-shirt shops. Nobody understands how so many of the same downscale bazaars, selling the same vulgar apparel, survive.

Key West is still precious. And it's still contradictory. "They call it Paradise," says Barry Stieglitz up on Big Pine. "Well, soon it's going to just be Paradise for the Super Rich." Or Ed Swift: "This is the Ellis Island of the Caribbean, and it has the lowest incidence of prejudice you'll find anywhere." Certainly the good times have always alternated with the bad. The lighthouses stopped the wrecks, and labor unrest sent the cigars to Tampa; enlightenment ended the business in turtles; Uncle Sam decided it really didn't need its own Gibraltar anymore. But always Key West has come back, and always, too, its soul has been up for sale.

But now it is approaching sunset again, and the people are thronging to Mallory Square. Many of the citizens of Key West still watch the sunset regularly. They are not jaded at all. Tony Falcone rides his bike to a special, quiet place he has found. He used to watch with Bill Conkle, his partner at Fast Buck Freddie's, but he died last year. Bill Conkle is one of the names on the AIDS monument at White Street Pier. The sun pays its last call of the day there too, kissing all those names good-bye.

But most of the sunset spectators are jammed again onto Mallory Square, waiting for the moment. Now the sword swallower and the glass walker pause in their divertissement, because all eyes in Key West have departed them to search the horizon. And there the bright Keys sun offers a final salute, and it begins to dip below the water until, pfffttt, it is gone.

If you were not absolutely, positively sure there was a green flash tonight, then there was none. So, come back tomorrow or the next evening, for the sun always sets, fondly, upon the Keys, at the end of the road, just up from the tropics, on one side or other of paradise. □

Listen to Frank Deford tell tales from the Keys at *www.nationalgeographic.com/keys.*

Deadly conflict in silver and gold leaps from the pitted blade of a bronze dagger found buried at Mycenae. That ancient citadel led Greek armies against Asiatic Troy in Homer's Iliad. *Though Trojans fought like "ravening lions," they lost that fabled Bronze Age war. Modern archaeology hints that Homer's tale may be more than myth in this first of a three-part series on ancient Greece.*

ECHOES *of the* HEROIC AGE

ANCIENT GREECE PART I

By CAROLINE ALEXANDER
Photographs by JAMES L. STANFIELD

"Myth often has a historical truth at its center," says Nikoletta Demopoulou of Athens (above). Central to the tale of Troy was the seduction of "lovely-haired Helen," queen of Sparta. Her abduction to Troy was such an affront that Greece launched more than a thousand ships to avenge the insult. After ten years of siege and brutal carnage, the Greeks devised their famous ruse. A seventh-century B.C. amphora from Mykonos (right) shows the earliest known depiction of the wooden horse that bore "death and doom for the Trojans."

DAGGER: 16TH CENTURY B.C., NATIONAL ARCHAEOLOGICAL MUSEUM, ATHENS (PRECEDING PAGE); MYKONOS ARCHAEOLOGICAL MUSEUM, MYKONOS (RIGHT)

Wrath—sing, goddess, the accursed wrath of Achilles, son of Peleus, / which placed countless sufferings on the Achaeans, / and hurled so many strong souls of heroes to Hades, but made their bodies the spoil of dogs / and all birds; and so the plan of Zeus was accomplished. . . .

For close to 3,000 years these lines have, like a drumroll, announced the beginning of Homer's *Iliad*, one of the most enduring and influential works of art ever created. The epic poem's story line is deceptively simple, being the events of a roughly two-week period in the last year of the famous Trojan War, fought between Greeks and Trojans over Helen, the runaway wife of the king of Sparta. The explosive confrontation in the opening verses between Achilles, the greatest of all the Greek warriors gathered at Troy, and his powerful if often inept commander, Agamemnon, sets the epic in motion. In a blaze of anger Achilles withdraws from the war, with disastrous results for his Greek comrades. Only when his beloved companion Patroklos is killed by the Trojan prince Hector does Achilles return to battle, smoldering for revenge. This he achieves with the brutal death of Hector, and the poem ends with the funeral of the courageous and fated Trojan.

On another level, however, the *Iliad* explores the deepest concerns of mankind—human limitations, the relationships of individuals to their gods and their community, honor, war, mortality, and death. Its meaning is timeless. Some years ago, watching television reports from Somalia, I observed the terrible fate of a U.S. Army Ranger dragged through the streets of Mogadishu and thought how little the world had changed. No *Iliad* reader can forget Achilles' dragging the body of Hector in triumph behind his war chariot, the dead man's "dark hair falling about him."

The *Iliad* gave the Greeks of classical times—as well as us today—the pantheon of Olympian gods and goddesses. As the oldest surviving European poem, the *Iliad* was the model for such later epic poets as Virgil, Dante, Milton, and, more recently, Derek Walcott, the West Indian poet who won the Nobel Prize in 1992. Echoes of Homer abound in popular culture—Patrick O'Brian's best-selling novel *The Wine-Dark Sea* takes its title from a phrase in the *Iliad*. For these reasons, as much as for its compelling action and vivid characters, the *Iliad* remains, as we head into the 21st century, at the bedrock of human experience.

I first encountered the *Iliad* at the age of 14 and have remained in its thrall ever since. But my perceptions have changed with time and age. Once the *Iliad*'s clash of warriors struck me as glamorous and heroic. Now I read with an eye for the tragedy of lost youth. Today I would set it in an inner city, with Greeks and Trojans as two opposing gangs who, governed by private codes of desperate glory, lay waste to each other's cities and young manhood.

A classical scholar and writer, CAROLINE ALEXANDER wrote about Sir Ernest Shackleton in the November 1998 issue. JAMES L. STANFIELD, whose record of GEOGRAPHIC assignments spans 34 years, most recently photographed the two-part Roman Empire series (July and August 1997).

For Greeks of antiquity the *Iliad* related events from their own past; the Trojan War was taken as historical fact. Some believed they were descendants of Homer's heroes; Alexander the Great, who slept with a copy of the *Iliad*, traced his maternal ancestry back to Achilles. But the reality is far more complex. The *Iliad* is not a "true story," nor does it offer a realistic picture of life in Greece's late Bronze Age—about 1600 to 1100 B.C.

Indeed, the *Iliad* was not composed in this period, known to historians as the Mycenaean Age, but is the end result of an inspired oral poetic tradition spanning 500 years. Between the 13th century B.C., the height of the Mycenaean Age, and the age of Homer in the eighth century B.C., lie

Heroic combat caught in stone ennobles a tomb frieze found in Turkey that dates from the fourth century B.C. This scene from the Trojan siege suggests the Iliad*'s final battle, when Troy's "tall Hector of the shining helm" fought "swift-footed brilliant Achilles," hero of the Greeks. "Hector made his swoop, swinging his sharp sword, and Achilles charged," wielding a "bronze-barbed ash spear." Achilles slew Hector before the gates of Troy—and the city's hope perished.*

KUNSTHISTORISCHES MUSEUM, VIENNA

five centuries during which generations of unknown professional poets passed down the epic-in-the-making. Each added something of his own genius, and the taste of the successive audiences who kept the *Iliad* in demand must have been of the same high standard as the skill of the bards themselves. The Greeks credited the final composition of this masterpiece to a poet they called *theios Homeros*—"divine Homer"—and we, as they, know nothing more about this person than his supposed name.

Most archaeologists and scholars study the late Bronze Age for its own sake, not because they seek to shed light on the *Iliad*. "I don't *care* about Homer!" an archaeologist in Greece said to me, exasperated by the popular view that she was searching for the Trojan War. Nonetheless, sophisticated modern studies of this period continue to yield unmistakably Homeric details, proving that the *Iliad*, though not a Bronze Age work, has preserved shards of Bronze Age history. Like the archaeologist, I was not in search of the Trojan War, but I was deeply interested in all those shards of history that give the *Iliad* its rich texture: The land around Troy itself in northwestern Turkey, the giant walls of Mycenae and its fabled gold, warships of the Bronze Age, weaponry and armaments, scraps of Mycenaean, the language of the Greek Bronze Age—these relics were my quest.

In a sense the *Iliad* is a tale of two cities: Troy, or "windy Ilion," the wealthy Asiatic city commanding the Dardanelles, and "Mycenae of much

Massive walls of well-cut stone made ancient Troy impregnable—or so its people vainly hoped. Those walls have emerged from the soils of western Turkey on a hill called Hisarlik, believed to be Homer's "windy Ilion." First unearthed in the 1870s, this site bears remains

of at least nine ancient settlements spanning some 3,500 years. Troy VI (above) and VIIa straddle 1250 to 1150 B.C., the era of Homer's war. Scorch marks, skeletons, and heaps of "sling pellets" appear to be "evidence of a lost war," says archaeologist Manfred Korfmann.

Shepherd Durmus Nayman walks a landscape of ghosts. Behind him rises the Tumulus of Ajax, one of more than 40 mounds on the plain of Troy said to honor fallen heroes of the Trojan War. Farther south on this storied plain Arife Karadeniz picks cotton with friends. Land and flocks

were highly prized by ancient Trojans and Greeks. But such pastoral joys were denied to those engaged in the "grim work" of war. When Homer's armies clashed across this land, "the screaming and the shouts of triumph rose up together of men killing and men killed, and the ground ran blood."

gold," the city leading the united Greek invasion across the Aegean Sea to the gates of Troy. For centuries the wealth of these legendary cities was thought to exist only in the realm of imagination. But between 1870 and 1890 Heinrich Schliemann, an ambitious and ruthless businessman from Germany, put the "lost" cities on the map. Acting on the advice of a local amateur archaeologist (whom he did not bother to credit), Schliemann revealed the ruins of Troy, then found the gold of Mycenae.

The *Iliad*'s every description of Mycenae speaks of its power. And from the base of the rocky acropolis on which Homer's "strong-founded citadel" stands, I looked up to discover that these descriptions still hold true. Even in decay the great fortress remains imperious, still commanding, as it did centuries ago, the mountain-ringed plain of Argos, now a blur of purple-gold in the hazy heat. Making my way up the entrance ramp, I paused before the citadel's famous Lion Gate—posts and a lintel of colossal stone overarched by two weathered heraldic lions.

Later, at the end of the day when the tour buses had left, I stood alone on the empty acropolis, listening to the wind sigh over its massive walls as it has done for well over 3,000 years. Above me bare mountains seemed to stand as protective sentinels over the extinct city. Alert guards would have spotted approaching enemies from miles away.

AS AN EPIC, the *Iliad* is mostly interested in the fate of kings and warriors, not of the common man. And while archaeologists have uncovered traces of the small timber and mud-brick dwellings of humble people, it is the relics of Mycenae's rich and powerful that are most in evidence. The massive walls enclosed a palatial administrative complex—houses, sanctuaries, storerooms, and royal courts with colorful frescoes and sculpted stone. Wandering through the vacant citadel, past walls that had collapsed into rubble, across a floor of beaten earth that had once been decorated with painted stucco and gypsum slabs, I felt a lingering air of regal might.

In the *Iliad* the king of Mycenae, Agamemnon, is also commander in chief of the Greek forces—not on account of any special qualifications but because he has inherited Mycenae's wealth and power from his father, Atreus. The historical Mycenae dominated the Argolid, the important and wealthy region of the northeast Peloponnese that in turn controlled much Aegean trade. Schliemann and later archaeologists have located almost a dozen major Mycenaean centers in addition to Mycenae itself, as well as hundreds of settlements and tombs, all with a shared culture. Midea, Tiryns "of the huge walls," "sacred" Pylos, "thirsty" Argos, Orchomenos "rich in sheep"—the names of many of these centers were known to the *Iliad*.

The story turns mainly on a single application of Mycenae's broad power—that of leading united Greeks into war against the Trojans. Possibly no work ever written can compete with the *Iliad* in its depiction of war. With great subtlety it simultaneously evokes both the glory-seeking bravado of its young heroes and the carnage of their individual deaths.

But Agamemnon stabbed him, as he pressed forward,
straight in the face, with his sharp spear.
Nor did the helmet, bronze heavy, contain it;
but straight through it and the bone the spear passed,
and all his brains inside were spattered. . . .
So Iphidamas falling there went into the brazen slumber,
pitiable one who helping his own people, left his new bride.

FACE-OFF OF BRONZE AGE FOES

"There is much that lies between us, the shadowy mountains and the echoing sea." So spoke Greek hero Achilles, comparing his homeland to Troy. Separated by 250 miles, Troy and Mycenae were prosperous rivals. From the Peloponnese, Mycenae traded throughout the Aegean. Troy commanded the Hellespont, a key link to the Black Sea. Historians speculate that conflict over trade routes, rather than Helen's beauty, may have caused a Trojan war.

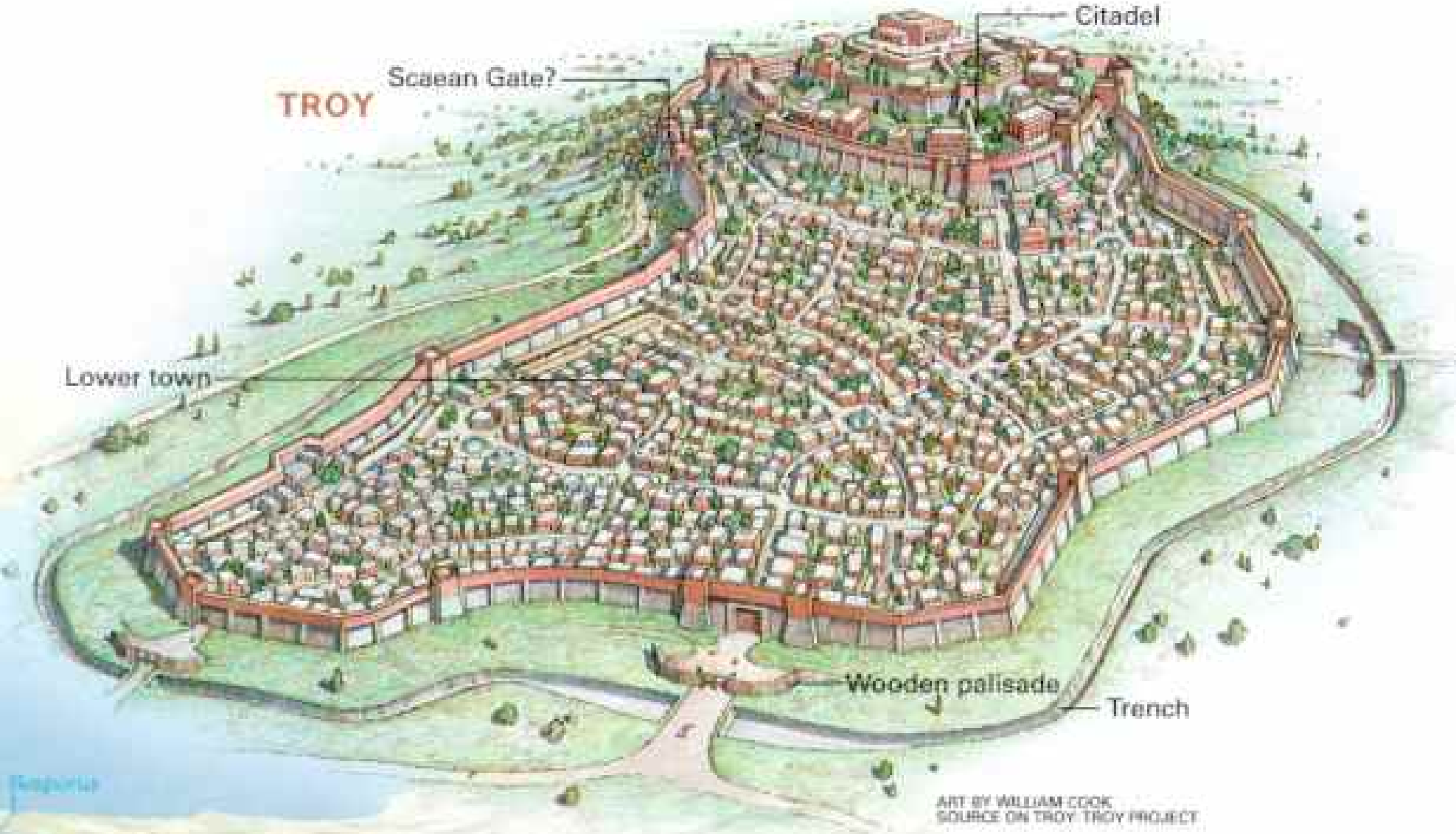
LANDSCAPE OF MYTH AND HISTORY

Time and tides have shifted the fabled terrain of Homer's Troy. Today the city's ruins lie three miles from the strait called the Dardanelles (Homer's Hellespont) across a span of marsh and alluvial plain. But in the late Bronze Age, Troy sat on the edge of a bay that opened directly onto the Hellespont, according to paleogeographers studying the region's soils.

Homer wrote that the Greeks' "hollow ships" were beached on the Hellespont. But because currents and strong northeast winds often prevented sailing up the strait, some modern scholars believe that ancient ships commonly moored at Besik Bay—five miles southwest of Troy—to wait for favorable winds. If so, this explains why the Greeks on their march to attack Troy had to cross the Scamander River, where "much ox-hide armor and helmets were tumbled in the river mud."

To end their siege, the Greeks built a towering wooden horse that concealed soldiers bristling with spears and fury. Leaving it on the beach, the Greeks pretended to sail away, then hid their ships behind Tenedos, an island five miles offshore. Troy took in the horse, a fatal mistake that led to the sack of the city.

"You could see the flames," Trojan hero Aeneas recounts in Virgil's *Aeneid*. "All over the town you saw heartrending agony, panic, and every shape of death."



Mycenae. So powerful and rich was the "strong-founded citadel" that historians refer to Bronze Age Greece as the Mycenaean Age. This reconstruction, based on excavation and speculation, shows Mycenae's fortress in the late 13th century B.C., at the peak of its power. Within those 20-foot-thick cyclopean walls lived Mycenae's royalty and their minions. Visitors to the citadel would pass through the regal Lion Gate and see an ancient grave circle, resting place of earlier rulers. Charred bones on an altar in the cult center indicate animal sacrifice likely made to Zeus, Hera, and other favored gods. The palace presided over a trading empire. Excavation of workshops has revealed fine metalwork, jewelry, even carvings of hippopotamus ivory. Crafted from imported materials, such goods were exported to enrich the king's coffers.

Troy. As gatekeeper of the Hellespont, Troy may have exacted tolls from merchant ships seeking access to Asia, thus gaining wealth—and making bitter enemies. But it was well prepared for defense. In the early 1990s archaeologists discovered several wooden palisades and an extensive ten-foot-wide trench encircling a lower town. The trench, probably used to stop onrushing chariots, increased by almost ten times the known size of Troy, a thriving city of some 6,000 people. Earlier only the hilltop citadel was known, where Homer's King Priam would have ruled during the Greek siege. According to legend this "god-built bastion" had one weakness: a thin section of wall built by a mortal, near Homer's Scaean Gate. Here Hector's parents grieved as they watched their son's corpse dragged by the heels behind Achilles' chariot.

Among the grave goods found by Schliemann at Mycenae on display in the National Archaeological Museum in Athens is a small gold ring dating from the 16th century B.C. Its carved face shows a miniature battle scene with a man taking refuge behind a shield that covers his entire body—the kind of shield Homer describes the Greek hero Ajax carrying before him "like a wall." From later representations we know that this type of shield fell out of use some centuries later, in the 13th century B.C. The *Iliad*'s knowledge of Ajax's "wall-like" shield, therefore, must be a genuine memory preserved from early Mycenaean times.

Similarly, in one dark scene the *Iliad* describes with careful detail a helmet Odysseus wears for a night ambush—a cap with "the shining teeth

Crown of the fertile Argos plain, Mycenae retains its majesty. The grave circle inside its Lion Gate once held golden treasure, sign of the city's early wealth. Here in legend reigned Agamemnon, leader of the Greeks against Troy. Perhaps he viewed the graceful Lady of Mycenae (right), a fresco that survived the mysterious demise of the city about 1200 B.C.—a possible victim of earthquake, famine, trade collapse, or war.

of a white-tusked boar . . . close joined one after another." Archaeologists have unearthed evidence of boar's tusk helmets from several Mycenaean graves, as well as depictions of warriors wearing such helmets on ivory carvings and frescoes. Bronze shin guards, called greaves, have counterparts in the *Iliad*, as do 16th- and 15th-century B.C. swords with silver rivet caps. In this last case Homer's phrase for the "silver-studded sword"—*phasganon arguroelon*—is pure Mycenaean.

In the small museum of Lamia, I knelt before a cabinet to study a prize possession—a sherd of pottery measuring mere inches across. Scrawled like calligraphy across its surface is the crude but evocative image of two stick figures fighting on a ship. Recently discovered at Pyrgos Livanaton, on the east coast of mainland Greece, this modest fragment is one of several depicting Mycenaean warships.

"Until the discovery of these late Mycenaean sherds, Homer was thought to be describing ships of his own time in the eighth century B.C.," Fanouria Dakoronia, director of the Pyrgos Livanaton excavation, which began in 1985, said to me. "Now we know he was describing ships of the Bronze Age." The slender hull and many oars suggest a fast warship rather than the deep, heavy ships that would have been used by merchants. A leather covering may have provided weatherproofing over the prow. The ship's high prow and stern give it the appearance of a half-moon. Surely it is no coincidence that the *Iliad*'s most common adjective for ships is *koronis*—curved.

THE MYCENAEANS themselves were descendants of Greek speakers who appeared on the Greek mainland around 1900 B.C. They eventually consolidated their petty chiefdoms into societies that revolved around a central palace. Heinrich Schliemann's discovery of elaborate gold burial goods showed that as early as the 16th century B.C. the Mycenaean ruling class had amassed a treasure trove of disposable wealth. Guarding both sea and hinterland, Mycenae was strategically placed to control trade in this rich region.

"You must remember, above all else the Mycenaeans were *Greeks!*" I was told by Spiros Iakovidis, the chief excavator of Mycenae and a world authority on Mycenaean culture. "Greeks and shipping have always gone together," he added with a twinkle in his eye.

Foreign markets stretching from the western Mediterranean to Egypt sought Mycenaean goods, especially pottery—painted with distinctive glossy red and black images—for domestic ware, storage jars, and ceremonial vessels. Throughout the Argolid a network of roads and bridges, carefully graded for wagons and chariots, linked the palace to other important centers, which were themselves fortified against raiders by their monumental walls.

The *Iliad* is a story about war in all its devastating detail; yet it takes pains to evoke peaceful, pastoral images, as if to underscore the way of life its young warriors are missing. The clamor of the advancing Greek army is likened to the noisy swarms of "geese, cranes, and long-throated swans in the Asian meadow," its swarming numbers to insects clustering "about the stalls of the sheepfold in spring."

Yet these images are fleeting, and the *Iliad* offers little insight into how peaceable society was run or how kings ruled their cities off the battlefield. This information is found only in the archaeological record. "If you want to appreciate the range of Mycenaean culture, go to Mycenae and to Pylos," Cynthia Shelmerdine, a Bronze Age scholar from the University of Texas, Austin, told me.

While Mycenae bristles with fortifications, Pylos sits naked, without defensive walls, on a bluff looking out onto the plain below and the distant Ionian Sea. Built of soft-hued local limestone, it is a gentle site, offering the promise of civilized amenities: a terra-cotta bathtub painted with colorful patterns, for instance, and smooth benches in the waiting vestibule before a pantry that was found stacked with slender-stemmed clay drinking cups.

It was at Pylos in 1939 that Carl Blegen, an American archaeologist, made one of the most important discoveries in Bronze Age archaeology—the first of some 1,200 tablets inscribed with a mysterious script dubbed Linear B. The tablets had been preserved by accident, baked by the flames of a fire that destroyed the palace around 1200 B.C. For years the language of Linear B baffled scholars and remained undeciphered. Then in 1952 Michael Ventris, a brilliant young British architect, announced in a BBC radio interview that he had cracked the code of the tablets, and that their language was Greek—a clumsy, antiquated Greek, to be sure, but nonetheless indubitably Greek. Before this, no one had known what language the Mycenaeans spoke.

Expectations ran high as to what the tablets would reveal. Scraps of epic poetry, perhaps, written in the *Iliad*'s distinctive hexameter? Such hopes were dashed with the revelation that the tablets contained inventory lists: tallied measures of olives, wine, chariot wheels, tripods, sheep, horses,

ALL FROM NATIONAL ARCHAEOLOGICAL MUSEUM

TREASURES OF MYCENAE "RICH IN GOLD"

Precious metal for a mask of death. Lion's-head vessel for sweetened wine. Shroud of gold for a child mourned. Such was the lavish inventory of Mycenae's famous grave circle, unearthed in 1876 by amateur archaeologist Heinrich Schliemann, who had earlier excavated Troy. In the circle six shaft graves bore remains of 19 elite Mycenaeans of the early 16th century B.C. Unaware that the graves predated the Trojan War by at least 300 years, Schliemann mistakenly claimed he had found "wide-ruling Agamemnon" (above). A few scholars question this mask's provenance, but none dispute that the other buried riches of silver, gold, and ivory prove Mycenae a leader of Bronze Age Greece.

oxen (with breed names like Dusky and Dapple), wheat, barley, spices, and plots of land tilled and taxes collected.

"It is nonetheless remarkable how much these lists *can* tell us," John Chadwick of Cambridge University pointed out. I visited Chadwick, a leading scholar of Mycenaean history and a close colleague of Michael Ventris, shortly before his death in the fall of 1998.

"The tablets represent a kind of freeze-frame of the palace's state of affairs in its last year—perhaps even its last months," Chadwick said. Tablets found at other sites confirmed that the Linear B inventories were characteristic of the complicated systems of trade, industry, and taxation of the Mycenaean palace economies. Each of Pylos's subject regions paid taxes to the palace in the form of such goods as ox hides, fattened hogs, and textiles of wool and linen. Lists of bronze workers and vats of scented oil attest to bronze and perfume industries.

Furrowed brows signal physical pain for Mycenae's early leaders, whose bones bore signs of arthritis. Their skulls, from about 1600 B.C., were used for facial reconstruction by scientists at the University of Manchester in England. Later Mycenaeans were buried in vaulted tholoi, *or beehive tombs, such as the Treasury of Atreus (opposite). Dating from 1250 B.C., it was looted in antiquity.*

MANCHESTER MUSEUM, UNIVERSITY OF MANCHESTER

EXCAVATIONS at Pylos also shed light on another cornerstone of peaceable life—routine religious practice. Scratched on the Linear B tablets are the names of deities familiar from the *Iliad*: Zeus, Hera, Athena, Poseidon, Hermes, and possibly Apollo, under his Homeric name Paieon. But the tablets also cite unknown deities, and names we would expect to find are missing, such as the goddess of love and pleasure, "sweetly laughing Aphrodite."

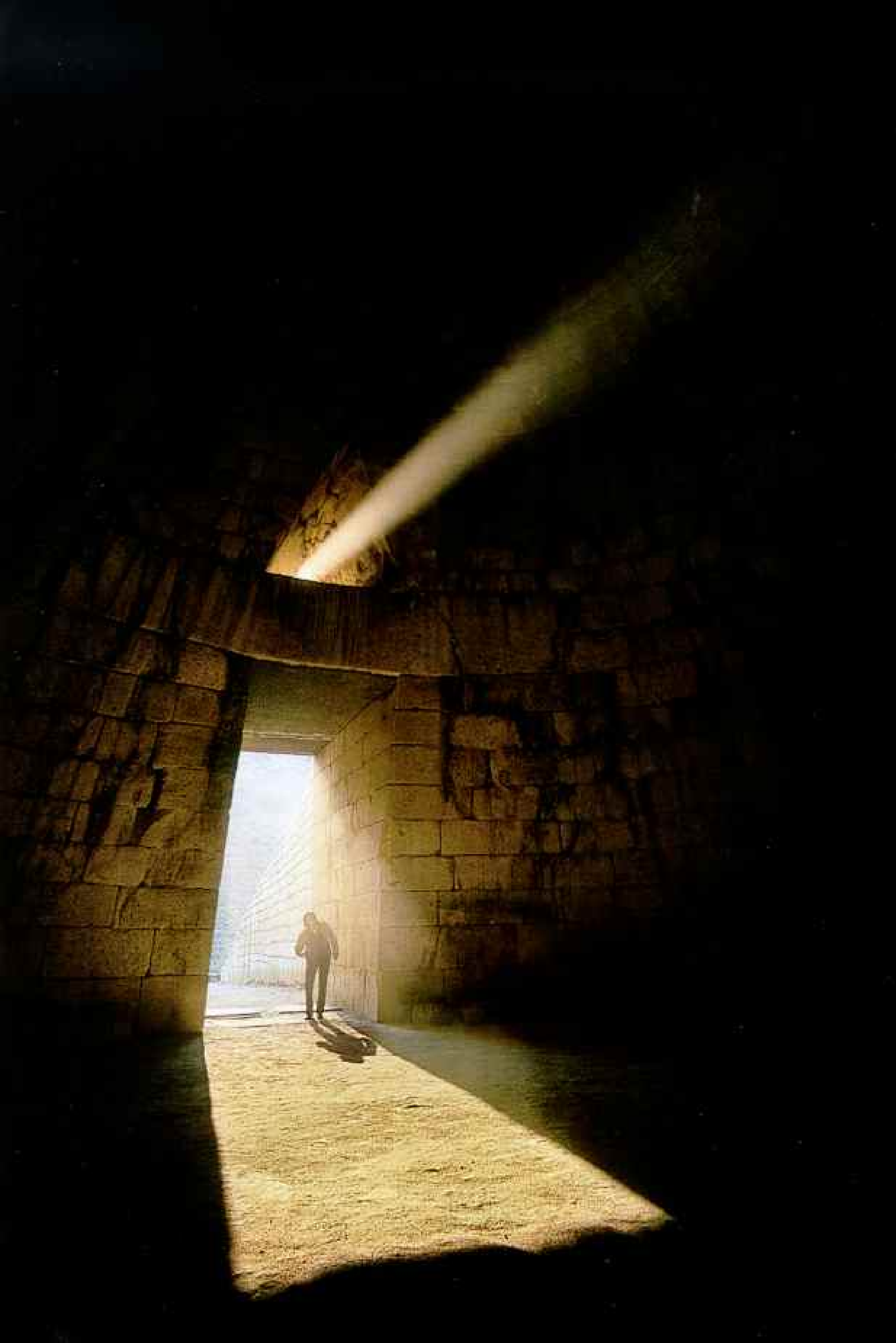
Offerings of animal sacrifice and the pouring of choice liquids, called libations, are the *Iliad*'s standard form of worship—a direct, no-nonsense way of inducing the higher powers to heed one's prayers. The Pylos tablets mention tributes of oxen, goats, sheep, pigs, wine, perfumed oil, wheat—these were the gifts the Mycenaeans gave their gods.

What the Mycenaeans believed happens after death, we do not know. Excavators have discovered a hundred *tholoi*, or dome-shaped tombs, and countless chamber tombs cut into hillsides—usually cheaper vaults for the less wealthy. Tombs were often shared by family members, the older dead moved aside to make way for the new. Intimate personal objects accompany the bodies—toys, babies' bottles, combs, jewelry, weapons, professional tools—perhaps sentimental tokens.

One of these grave objects provides a tantalizing correspondence between Mycenaean archaeology and Homeric text. In the National Archaeological Museum in Athens I gazed at a delicate golden balance scale of a kind archaeologists have found in Mycenaean burials. For me it conjured the unforgettable scene preceding Hector's death at the hands of Achilles:

> *Then Zeus the Father balanced his golden scales,*
> *and in them he placed two fated portions of prostrating death*
> *—that of Achilles, and that of Hector, breaker of horses—*
> *and taking them in the middle, he balanced them; and Hector's*
> *death day sank.*

The *Iliad* recognizes that war destroys more than individual warriors. Its concern is for the collective fate of cities, as well as the lives of noncombatants. Contained in the lists of the Pylos tablets, along with other



commodities, are groups of slave women, classified according to the tasks they perform—corn grinders, spinners, pourers of baths—or the places from which they were captured—"women of Knidos," "women of Miletos," "women of Asia." The lists evoke a famous scene in the *Iliad* where Hector addresses his tearful wife, Andromache, telling her that his own fate weighs less heavily on him than

> *. . . the painful thought of you, when some bronze-armored Achaean leads you off weeping, robbing your day of freedom; and in Argos you weave at the loom of another.*

Eyes on the present, Havva Guler of Kumburun, a village near the Trojan plain, says she's unfamiliar with the tale of Troy's fall. For Trojan women that fall meant certain slavery and heartbreak. The Greek playwright Euripides penned their lament: "The multitudes of our children stand clinging to the gates. . . . And one girl weeps: 'O Mother, the Achaeans take me away lonely from your eyes to the black ship.'"

THE GREEK EPIC is remarkably sympathetic not just to Hector and Andromache but to all the enemy Trojans. Few action adventure stories—for that is what the *Iliad* is—would dare blur the line between good and bad characters, hero and enemy. But the *Iliad* is concerned ultimately with sweeping truths—the universal pity of death, the terror of mortality—not accidents of nationality. Thus the epic presents both Achilles and Hector as sympathetic men with much to live for, then inexorably moves them toward the showdown that will cost both their lives. It is impossible to read the Greek *Iliad* and not care about the city of the Trojans.

Today remains of Troy's walls still stand where Homer described the city, near the Dardanelles, overlooking a plain crossed by two rivers lined with willows, the *Iliad*'s Simois and Scamander. Once at the fallen city I slowly followed the subtle curve of the high sloping walls of Troy VI, one of two excavated levels that overlap the critical "Homeric" 13th-century B.C. level. Fortunately I had timed my visit for late evening, when the setting sun made the walls glow gold and set fire to the Dardanelles, called by Homer the Hellespont, "where fish swarm."

Heinrich Schliemann's excavation of Troy was, by modern standards, impatient and brutal. Sinking deep trenches to bedrock, where he was sure Homer's Ilion must lie, he destroyed intervening layers of history. Today an international team of archaeologists under the direction of Manfred Korfmann of Germany's Tübingen University in partnership with the University of Cincinnati is reexcavating the entire site. The object of their scrutiny is not just Hisarlik, the hill on which the ruins of Troy stand, but also the coastal area and surrounding plain, where according to the *Iliad* the Greeks beached their curved ships and the war was waged. Troy's many levels—nine in all—range from 3000 B.C. to the Roman city of New Ilium in the early sixth century A.D.

According to one version of Greek tradition the Trojans were the descendants of the hero Teucer, who came from Crete, seeking a place to settle. The historical Trojans, however, may have been Luvians, an Anatolian people who became vassals of the Hittites. Animal bones show that the Trojans kept sheep, cattle, pigs, and horses, while carbonized seeds indicate that they cultivated barley in marshy valleys. The city had a thriving wool industry and traded throughout Central Asia, receiving horses from the steppes beyond the Black Sea, tin from Afghanistan. Whether or not Troy ever went to war with Mycenae, there certainly was trading contact between the two peoples. Mycenaean pottery at Troy dates as far back as 1500 B.C.

In the past, visitors to Troy have been struck by the smallness of the site, wondering how so insignificant a place could have entered legend.

But directing me through high grass and cotton fields well beyond Schliemann's citadel, Korfmann pointed out a line of trenches that reveal one of his team's most exciting discoveries—the outer defenses of an entire lower town below the citadel. Here Korfmann's team located evidence of an encircling trench—some ten feet wide and eight feet deep—1,300 feet beyond the citadel walls. Increasing the known area of Troy VI by as much as 50 acres, the reconfigured city is almost ten times as large as Schliemann's citadel, containing a population of at least 6,000.

"Hittite documents refer to Taruisa," Korfmann told me. Taruisa has been identified by scholars with Troy. "*Tara* may be Luvian for 'wooden' —the city's name is perhaps a reference to the wooden houses of the lower town, which would have been conspicuous."

Yet the *Iliad* refers only to Troy's "well built walls" of stone, such as Schliemann found on the citadel itself. These walls—and the damage done to them—have given archaeologists the most reliable key to the fate of the city. Cracks and fire marks indicate that an earthquake destroyed the first Homeric candidate, Troy VI, around 1250 B.C. Soon afterward the same people who fled the earthquake returned to repair their city, creating a second settlement, Troy VIIa. The remains of small, cramped houses indicate that a larger population than before crowded inside the protective walls, while buried storage jars suggest to some scholars preparations for a siege. Flame-damaged walls indicate that about 70 years later a fierce fire destroyed this settlement. Was this the Troy, weakened by earthquake, that the invading Greeks finally sacked? Or had the Greeks attacked but not destroyed Troy VI in the wake of a natural disaster? Or was the fall of Troy entirely unrelated to the Homeric legend?

"We are no longer interested in proving whether the Trojan War took place or not," Korfmann told me sternly. Nonetheless, he has a compelling theory: "Windy" is how the *Iliad* describes Troy, and from antiquity to the present day a prevailing northeasterly wind has blown into the teeth of the city, down the Dardanelles. Bronze Age ships did not have deep keels, and it was difficult for them to sail against the wind. Merchant vessels seeking the valuable trade north of the Dardanelles therefore had to beach at Troy—where they would have been sitting ducks for Trojan tribute collectors—and wait for a favorable breeze.

"We know from later texts that occupants of the region exacted tolls from incoming vessels," said Korfmann. In a nearby sandy cove called Besik Bay, his team discovered burials reflecting different cultural influences. Here the hapless crews of stranded ships could have ended their wait for a following wind. At a crossroads of trade between East and West, Europe and Asia, Troy may have grown rich from tribute—and long been a thorn in the side of merchant entrepreneurs like the Mycenaeans.

"It is possible that Troy experienced several commercial skirmishes, if not one Trojan war," said Korfmann.

Sacrificial revenge adorns a sixth-century B.C. stone sarcophagus from Turkey—and attests to the lure of Trojan themes for ancient artists. Here Achilles' son, Neoptolemos, stabs Polyxena, daughter of the king of Troy. Virgil described Polyxena as the "maiden daughter of Priam . . . who never knew captivity or the bed of a conqueror."

ÇANAKKALE ARCHAEOLOGICAL MUSEUM, ÇANAKKALE, TURKEY

WHETHER OR NOT THEY PLAYED any role in Troy's destruction, the Mycenaeans did not long survive the city's fall. Why the apparently thriving Mycenaean civilization collapsed remains one of the most baffling questions of Bronze Age history. Pylos, Mycenae, Tiryns, Midea—nearly all the great palaces fell sometime around 1200 B.C. Some scholars have sought the cause in natural disasters, citing an earthquake such as destroyed Troy VI or even climatic change. Another theory

has it that the Mycenaean economy, highly centralized and bureaucratic, became overextended and collapsed under its own weight. The downfall of Mycenaean palaces occurs at about the same time as the fall of numerous cities throughout the Aegean and eastern Mediterranean, and although there is no archaeological evidence of foreign invasion, a revolutionary change in fighting tactics may have given barbarian raiders a new advantage. Most scholars suggest there was a protracted decline, a slow trickling away of the population.

Professor Iakovidis, Mycenae's chief excavator, told me that trade was the key to the city's great wealth. And according to him it was likewise the cause of its decline. When the Hittite Empire fell and the great cities of the East were sacked, the intricate network of trade that defined Aegean economics for centuries was unraveled. Deprived of their revenues, the Mycenaean palaces were left with no outlet to do what they did best and no means—or reason—to keep their bureaucracy afloat.

"The Mycenaean world ended, if I may say, 'not with a bang but a whimper,'" said Professor Iakovidis.

The collapse of the Mycenaean world marked the beginning of several centuries traditionally known as the dark age of Greece, a period of shrinking populations, poverty, and cultural decline. Gone were the rich palaces with their colorful frescoes and imported luxuries. All the sophisticated arts of palace civilization were lost—monumental architecture, painting, metalwork, literacy. Yet it is this period of apparent cultural vacuum that transmitted two of the world's literary masterworks: the *Iliad* and the *Odyssey*. And while the *Iliad* bears evidence of its Mycenaean roots, it was the unknown poets of the dark age, centuries removed from the events they described, who fostered the great epic.

It is not difficult to imagine wayfarers from the fallen Mycenaean towns

Paper shields and exuberant smiles are the weapons of mock war between young Trojans and Greeks reenacting the final defeat of Troy at the Moseley Primary School in Birmingham, England. "I was a Trojan," says Lara Owen, center. "The Greeks were my enemies and

I wanted to beat them, but I knew we would die in the end." She knew because Homer's story has never died; it was taught in antiquity and expanded through the works of later literary masters. Yet few wrote with the force of Homer about the "inhuman clamor" of war.

carrying their storytelling traditions with them during the 11th century B.C. As the generations passed, successive storytellers may have transformed a minor trade skirmish in Anatolia—or elsewhere—into an epic clash between Asiatic Troy and a unified force of Greek-speaking warriors, much as Britons wistfully re-created the history of their clashes with invading Anglo-Saxons into the legends of King Arthur.

The close of the eighth century B.C. revealed an entirely new human landscape. Everywhere populations had rebounded. Isolated settlements had given way to small city-states. Perhaps the characterization of the independent-minded hero Achilles and the *Iliad*'s interest in different types of leadership reflect associated political change. Trade had revived and overseas colonization flourished.* Above all, the new era revealed the epic poems attributed to Homer.

Primitive power imbues the Centaur of Lefkandi, crafted during Greece's dark age—the period following the collapse of Mycenaean centers about 1200 to 1100 B.C. During that time fine arts and writing ceased. Through pottery historians trace the recovery of Greece in the eighth century B.C. Art on a funeral vessel (left) shows the intricate geometric patterns and stylized figures that signaled a return of wealth and artistic innovation. Perhaps the greatest artistic achievements of that era were Homer's Iliad *and* Odyssey*—timeless epics of early Greece.*

ERETRIA ARCHAEOLOGICAL MUSEUM, ERETRIA, GREECE (RIGHT): NATIONAL ARCHAEOLOGICAL MUSEUM

The *Iliad* does not end with the victory of Achilles over Hector, the loving husband and good citizen who was his enemy. Overreaching this transitory triumph, the epic adheres to its higher purpose, and Achilles is last seen weeping for the death of his companion, for his aged father who will soon die, for Priam, the father of his enemy, for himself—and the reader feels his own mortality weigh more heavily.

Across the Dardanelles from Troy is Gallipoli, the battlefield that claimed the lives of tens of thousands of young men in World War I. The same strong wind that scourges Troy blows here too, and on occasion I thought I would be swept into the sea. From the memorial monument on the Gallipoli headland one can see the plain of Troy. Inland the war cemeteries contain neat rows of graves of the fallen. Reading their tombstones, I found myself thinking, yet once again, how little the world has changed. Repeatedly throughout the *Iliad* the heroes speak of their desire for glory, their hope that their names will be remembered by generations to come.

Let me at least not die without a struggle, inglorious,
but having done some big thing first, for men to come to know of.

So said Hector, bracing himself for his final battle with Achilles.

"Their name liveth for evermore," read gravestones at Gallipoli. "Their glory shall not be blotted out." □

*See "When the Greeks Went West," NATIONAL GEOGRAPHIC, November 1994.

Is the spirit of ancient Greece alive or dead? Reflect online at *www.nationalgeographic.com/ngm/9912*.

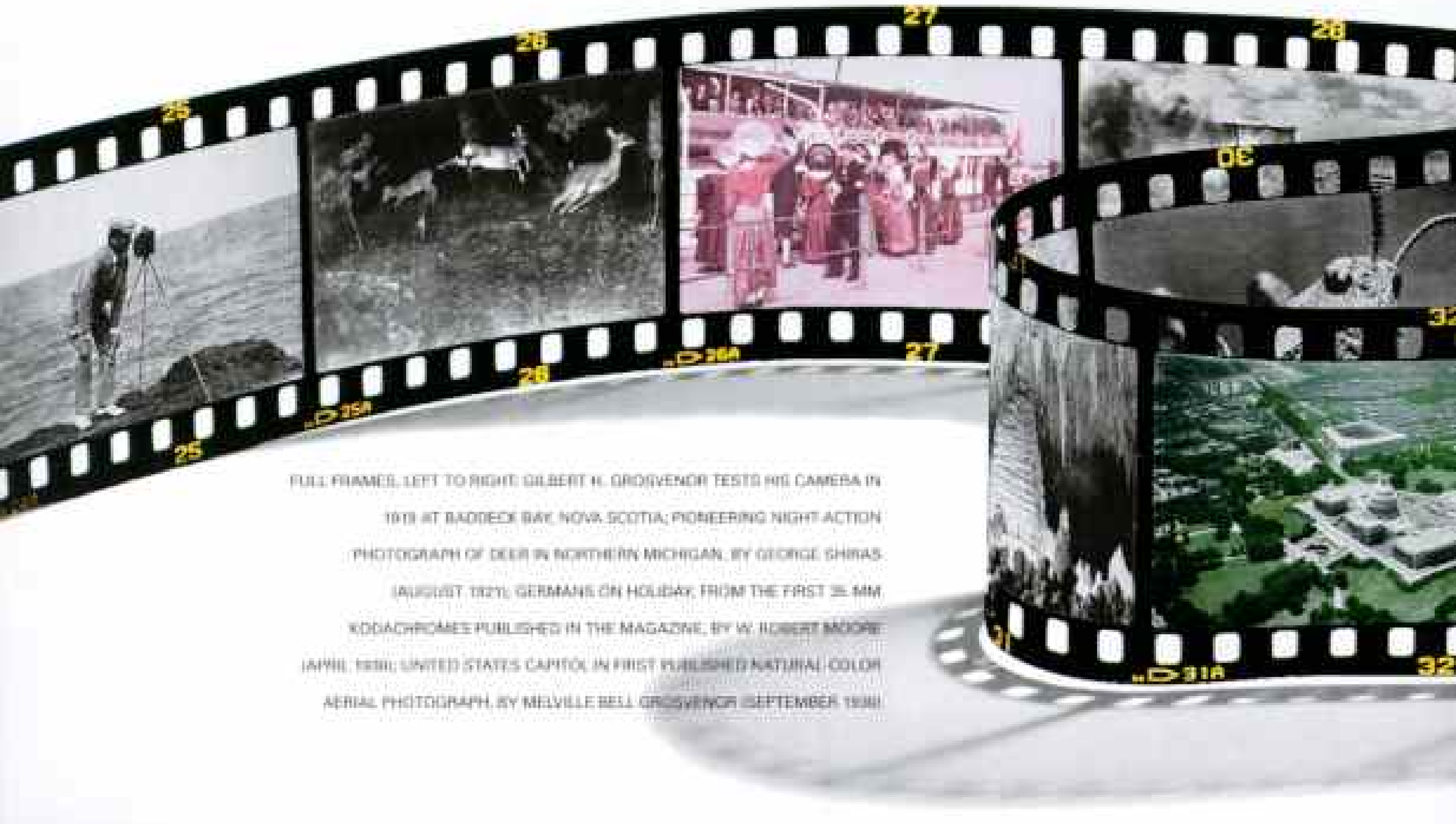
GEOGRAPHIC

Expanding Human Vision

Light is life, in a very real sense, and this is what makes photography so vital. More than a century ago, when we learned to fix light's splendid variations on glass plates, celluloid, and paper pages, we thought that we had captured some elusive moments of life itself.

Since the 1890s National Geographic photographers have captured light where members could not go themselves: where it was too far, too deep, too cold, too dangerous. To mountaintops and Arctic shores, ocean bottoms and outer space. To places beyond human sight, freezing the flicker of a hummingbird's wings, penetrating solid objects, distant galaxies, and the mysteries of our own bodies.

In the 1910s the Society hired wizards of optics and chemistry like Charles Martin and Edwin "Buddy" Wisherd, technical men who not only took pictures but also established at the Geographic one of the nation's finest color laboratories. In the 1930s came Renaissance men like Luis Marden, who combined writing, photography, and intellectual vigor. Marden pioneered the use of Kodachrome, a fast, nearly grainless color film that enabled Geographic photography to soar. He also worked closely with Jacques-Yves Cousteau in the 1950s to develop



FULL FRAMES, LEFT TO RIGHT: GILBERT H. GROSVENOR TESTS HIS CAMERA IN 1919 AT BADDECK BAY, NOVA SCOTIA; PIONEERING NIGHT ACTION PHOTOGRAPH OF DEER IN NORTHERN MICHIGAN, BY GEORGE SHIRAS (AUGUST 1921); GERMANS ON HOLIDAY, FROM THE FIRST 35 MM KODACHROMES PUBLISHED IN THE MAGAZINE, BY W. ROBERT MOORE (APRIL 1938); UNITED STATES CAPITOL IN FIRST PUBLISHED NATURAL-COLOR AERIAL PHOTOGRAPH, BY MELVILLE BELL GROSVENOR (SEPTEMBER 1939)

CENTURY

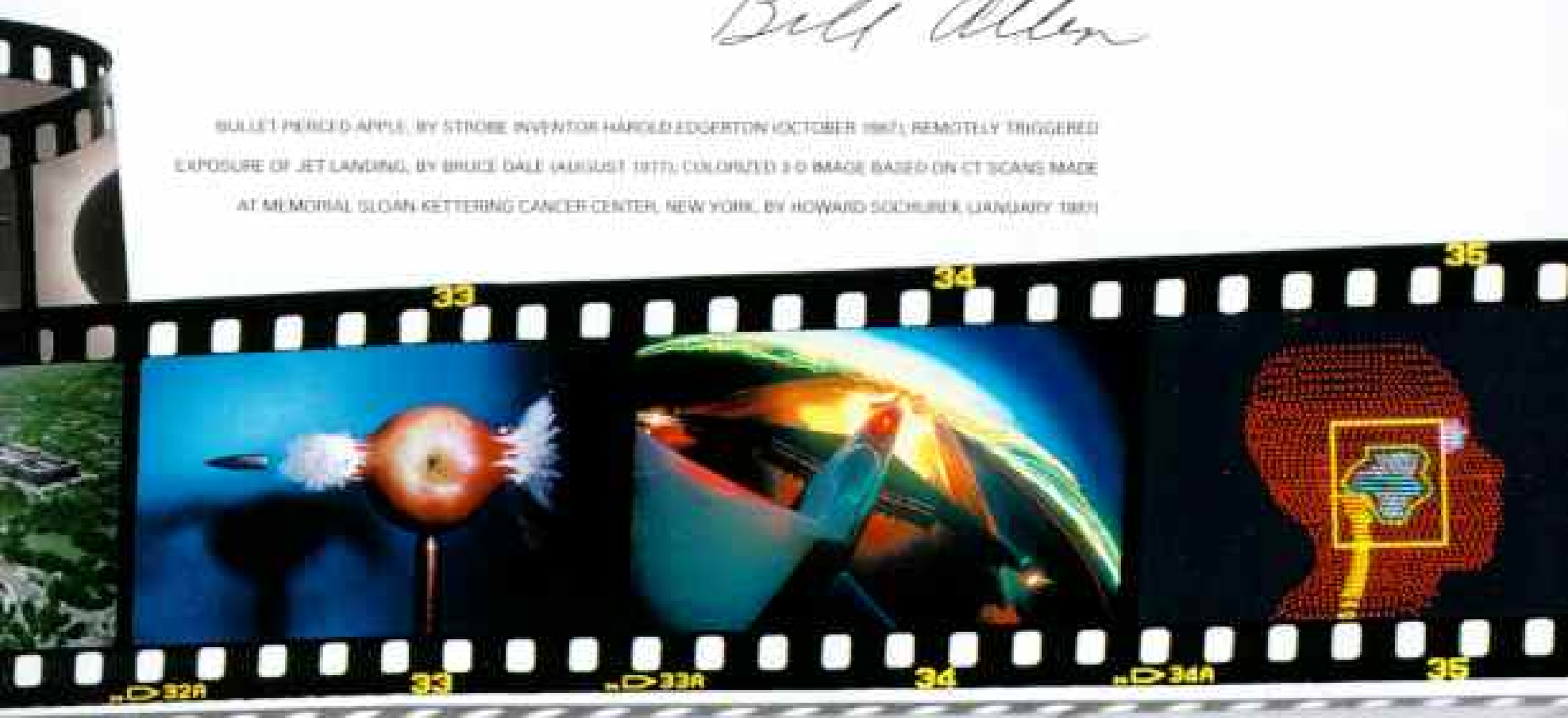
waterproof camera housings that, along with scuba gear, gave underwater photographers the freedom of fish.

Staff photographer Emory Kristof took us much deeper starting in the 1970s, pushing the Society to invest in lighting and remotely operated vehicles. He photographed new life-forms swirling around hydrothermal vents and, diving with explorer Robert Ballard in 1985, made the first photographs of the sunken *Titanic*, two and a half miles down.

Stopping motion was the specialty of Harold Edgerton, a professor at MIT, who developed a high-speed electronic flash in 1931 and perfected it with the help of Society grants. Using xenon-gas-filled quartz tubes, Edgerton illuminated what was invisible to the naked eye.

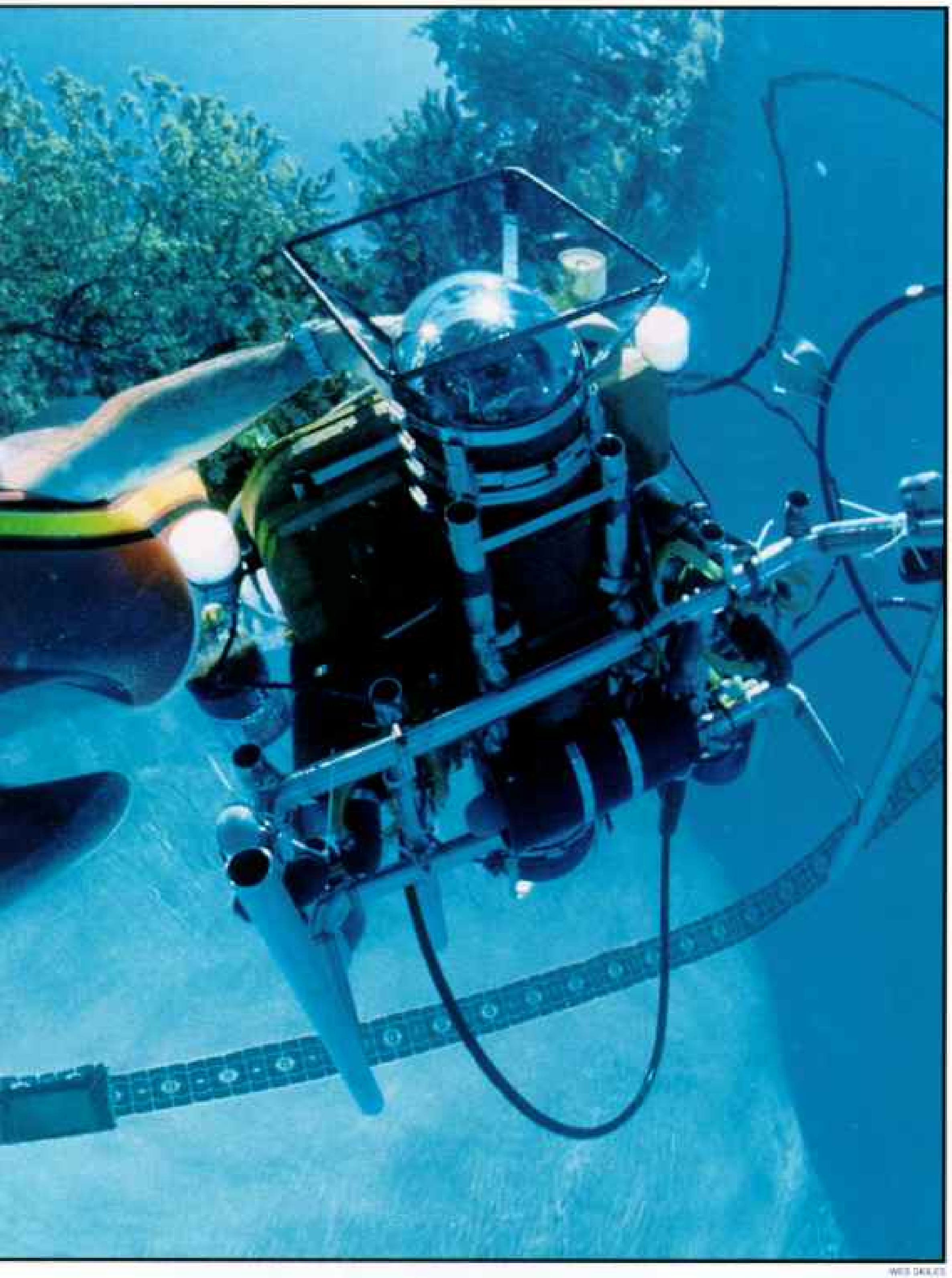
These innovations were usually joint efforts. Field photographers were artists at heart and relied on technicians like Al Chandler, a self-taught design engineer. Chandler, who once played guitar for country singer Patsy Cline, built ingenious electronic camera systems and underwater "suns" of light in our photoengineering division. Its credo: You dream it; we build it. New dreams await in the new century. We will follow life and light where they lead us.

"The world and all that is in it is our theme," proclaimed the Society's second president, inventor Alexander Graham Bell. A century-long commitment to exploring that grand theme through the universal language of photography has carried readers from the deep ocean to the stars on a flood tide of artistic and technical innovation.



BULLET PIERCED APPLE, BY STROBE INVENTOR HAROLD EDGERTON (OCTOBER 1964); REMOTELY TRIGGERED EXPOSURE OF JET LANDING, BY BRUCE DALE (AUGUST 1977); COLORIZED 3-D IMAGE BASED ON CT SCANS MADE AT MEMORIAL SLOAN-KETTERING CANCER CENTER, NEW YORK, BY HOWARD SCHREIER (JANUARY 1987)

Photographer Emory Kristof takes a backyard dip with two ROVs—remotely operated vehicles (January 1998). They let him send lights and cameras into waters too deep or too treacherous for human divers. The ROVs have been rebuilt and refined many times in the Society's own wizards'



WES DAKUS

workshop, Photo Engineering. "Emory pushed the Geographic to invest in new technologies, new vision—like Luis Marden did with 35-mm cameras and Kodachrome film in the '30s," says special projects editor Bill Douthitt. "The status quo has never been good enough."

CREATUR

"The simple pressing of a button

Geographic nature photography took off in 1906, when Editor Gilbert H. Grosvenor published 32 flashlit wildlife images by George Shiras (above) in a single issue. Two Society board members resigned, protesting that "wandering off into nature is not geography." Undaunted, Grosvenor printed another Shiras portfolio (below) in 1921. For an April 1975 story on Tanzania, Emory Kristof replaced his camera's shutter with two strips of black tape. Exposing film through the resulting slit, he made pictures that drew viewers *into* the frame—to gallop alongside the zebra as the land blurred past.

captured . . . the hunted quarry." —GEORGE SHIRAS, 1906

EMORY KRISTOF (ABOVE); GEORGE SHIRAS

"Every creature has a right to be portrayed

Through his 12-foot-long camera David Fairchild (above) met familiar bugs head-on at 20 times life-size and called them "The Monsters of Our Back Yards" (May 1913). Mark Moffett's regal portrait of a long-horned beetle (right, March 1998) recalls Fairchild's bug's-eye view. To record a jumping spider's mighty one-inch leap from twig to twig (below, September 1991), Moffett needed an ultra-high-speed strobe and days in the studio watching for the merest hint of takeoff. "By the time Mark got the shot," says chief photoengineer Larry Maurer, "he knew that spider personally."

from its own level." —DAVID FAIRCHILD, 1914

DAVID FAIRCHILD (TOP LEFT); MARK W. MOFFETT

UNDERWA

"I seemed to hang . . . in the heart

Water eats light—and its appetite grows with depth. To make the first underwater color photographs ever published, Charles Martin and W. H. Longley set off huge charges of flash powder at the surface (above, January 1927). A pioneering proponent of mixing scuba gear with small, nimble cameras and handheld flash, Luis Marden explored the Indian Ocean from Cousteau's *Calypso* (below, February 1956). Working two and a half miles deep, Emory Kristof made his haunting *Titanic* portrait with a pair of submersibles carrying nearly 10,000 watts of high-intensity lighting.

of an enormous liquid sapphire." —LUIS MARDEN, 1956

CHARLES MARTIN (TOP LEFT); PIERRE COULPIL (BOTTOM LEFT); EMORY KRISTOF

Sharks churn the Pacific near Bikini Atoll (June 1992). Photoengineer Joe Stancampiano rigged Bill Curtsinger's camera to a boat-towed housing that rode below the surface. Using a remote shutter trigger, Curtsinger photographed the predators without getting wet—or bitten. "Joe also put a video

BILL CURTSINGER WITH JOSEPH S. STANCAMPIANO, NGS STAFF

camera in the housing," says Larry Maurer. "A monitor on the boat let Bill see when he had a shot worth taking." Any wishes the photoengineers can't fulfill? "Some laws of physics we can't break," grins Maurer, "but when a photographer comes to us with an idea, we never say it can't be done."

EARTH

"These events . . . have

When Mount St. Helens blew in May 1980, 27-year-old Reid Blackburn was taking photographs for the GEOGRAPHIC eight miles from the summit. He perished. Freelance photographer Robert Landsburg also died in the cataclysm, but his pictures survived to illustrate staff writer Rowe Findley's January 1981 article, along with the work of 20 other photographers, including this movie-like series by Gary Rosenquist (above and right), shot before he fled the onrushing ash cloud.

cut a deep track in my mind." —ROWE FINDLEY, 1981

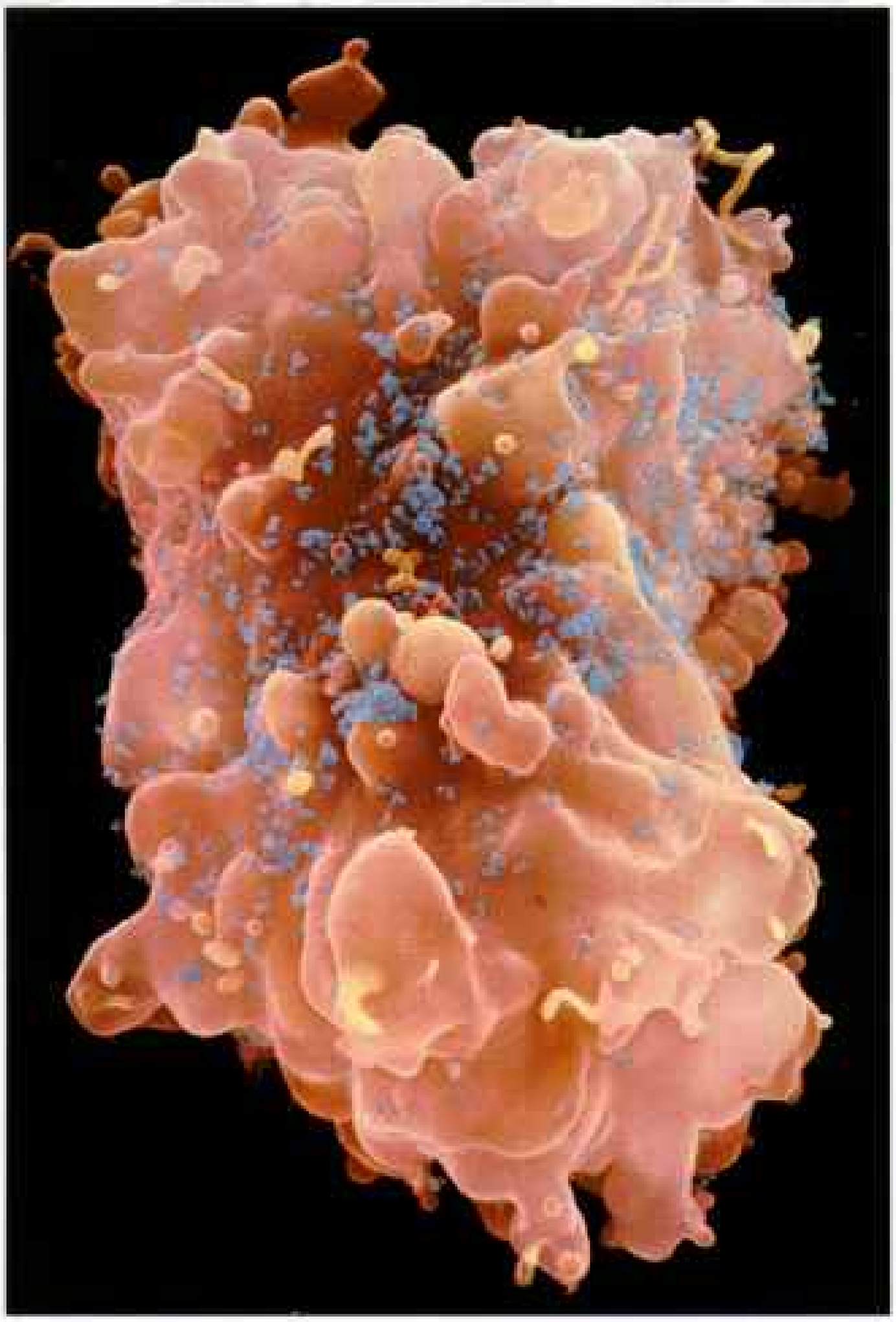
ALL BY GARY ROSENQUIST, EARTH MAGIC

A third of a mile deep in the Earth, blackness is complete. For months photographer Michael Nichols and as many as seven assistants slipped through the narrow entrance of New Mexico's Lechuguilla Cave carrying high-voltage flash units and thousands of flashbulbs to push back the

NATIONAL GEOGRAPHIC PHOTOGRAPHER MICHAEL NICHOLS

dark (March 1991). Crawling among the fantastical—and fragile—limestone formations with battery packs as big as cigar boxes required great care. "The technology itself was not complicated," says photoengineer Kenji Yamaguchi, "but it took weeks of physical labor to create a single image."

"Because of the . . . tools of machine



Medical imaging has evolved dramatically since 1895, when physicist Wilhelm Konrad Röntgen made his wife's hand (above) the subject of the first x-ray photograph. Chronicling this exploration of inner space, the magazine has helped readers understand diagnostic tools like MRI, magnetic resonance imaging (right, January 1987), which draws a blank on bones but provides detailed images of soft tissue. Scientists first identified HIV, the virus that causes AIDS, in 1983. In June 1986 Lennart Nilsson's scanning electron micrograph showed the deadly virus (above right, in blue) emerging from a major component of the human immune system—a helper T cell magnified 30,000 times.

National Geographic Photographs: The Milestones, new from the Society's Book Division, illustrates the Geographic's impact on photography. To see "Stories of the Century," go to *www.nationalgeographic.com/century*.

vision . . . lives will be saved." —Howard Sochurek, 1987

(DEUTSCHES MUSEUM, MUNICH (FAR LEFT); BOEHRINGER INGELHEIM INTERNATIONAL (LEFT); UNIVERSITY OF KANSAS MEDICAL CENTER

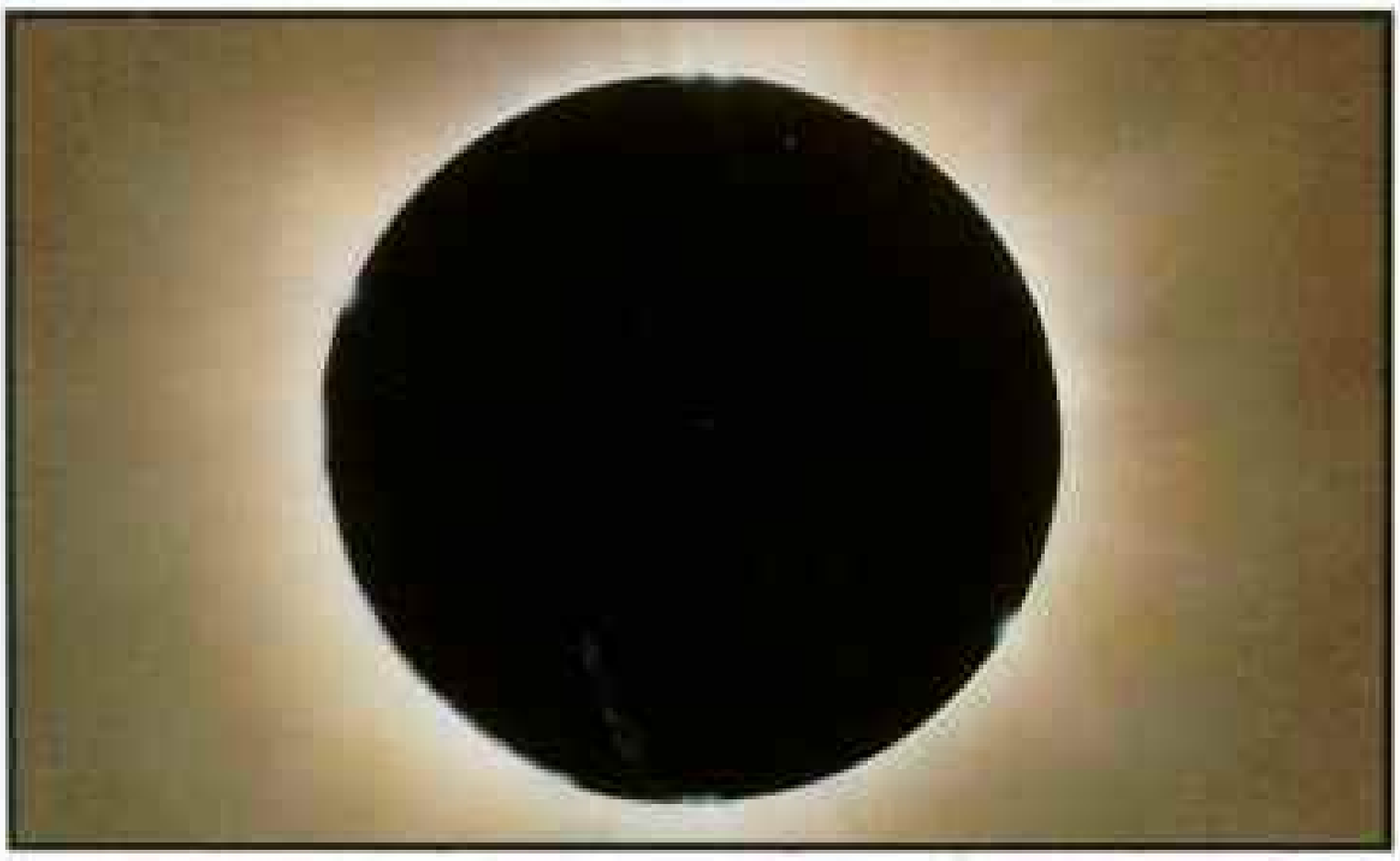
As the jet neared touchdown at Palmdale, California, photographer Bruce Dale triggered a remotely operated camera mounted on its tail fin: Airport and runway lights blurred into streams of color. This time exposure opened an August 1977 feature on air-traffic safety. Official approval for

BRUCE DALE

the unorthodox camera installation was tough to get, and airline engineers scrutinized every step. "But the point wasn't to make a gimmicky photograph," says Director of Photography Kent Kobersteen. "The point was a visually arresting image, to capture people who didn't expect to be interested."

"The impelling motive is . . . an intelligent

In 1936 Irvine and Merriel Gardner traveled across Russia with a 14-foot-long telescope (above) to make the first color photograph of a solar eclipse (below, February 1937). The eclipse lasted only 117 seconds. To catch the faintest colors of starlight from a mountaintop observatory in Chile (right, May 1988), Roger Ressmeyer synchronized his camera's track with the Earth's rotation for a 20-minute exposure. Such efforts bring the inaccessible and the unfamiliar close to readers "so they can see and understand," says photographer Michael Nichols. "That is what the Geographic does." □



and justifiable curiosity." —IRVINE C. GARDNER, 1937

MORRIS M. GARDNER (TOP LEFT); IRVINE C. GARDNER (BOTTOM LEFT); ROGER H. REISNER (R

Guardians of the Fairy Tale

The Brothers Grimm

In the early 1800s brothers Jacob and Wilhelm Grimm published a book of fairy tales, largely gathered from storytellers in central Germany. Echoes of the world-famous tales still resound, from castles to deep, dark forests.

BY THOMAS O'NEILL
NATIONAL GEOGRAPHIC SENIOR WRITER

PHOTOGRAPHS BY GERD LUDWIG

"Oh, you dear children, who has

food was set before them, milk and pancakes,

with sugar.... —HANSEL AND GRETEL

brought you here? Do come in, and stay with me. No harm shall happen to you.' So she took them both by the hand, and led them into her little house. Then good

And envy and pride grew higher and higher in her heart like a weed, so that she had no peace day or night. She called a huntsman, and said: "Take the child away into the forest; I will no longer have her in my sight." —THE STORY OF SNOW-WHITE

nce upon a time

there lived in Germany two brothers who loved a good story—one with magic and danger, royalty and rogues. As boys they played and studied together, tight as a knot,

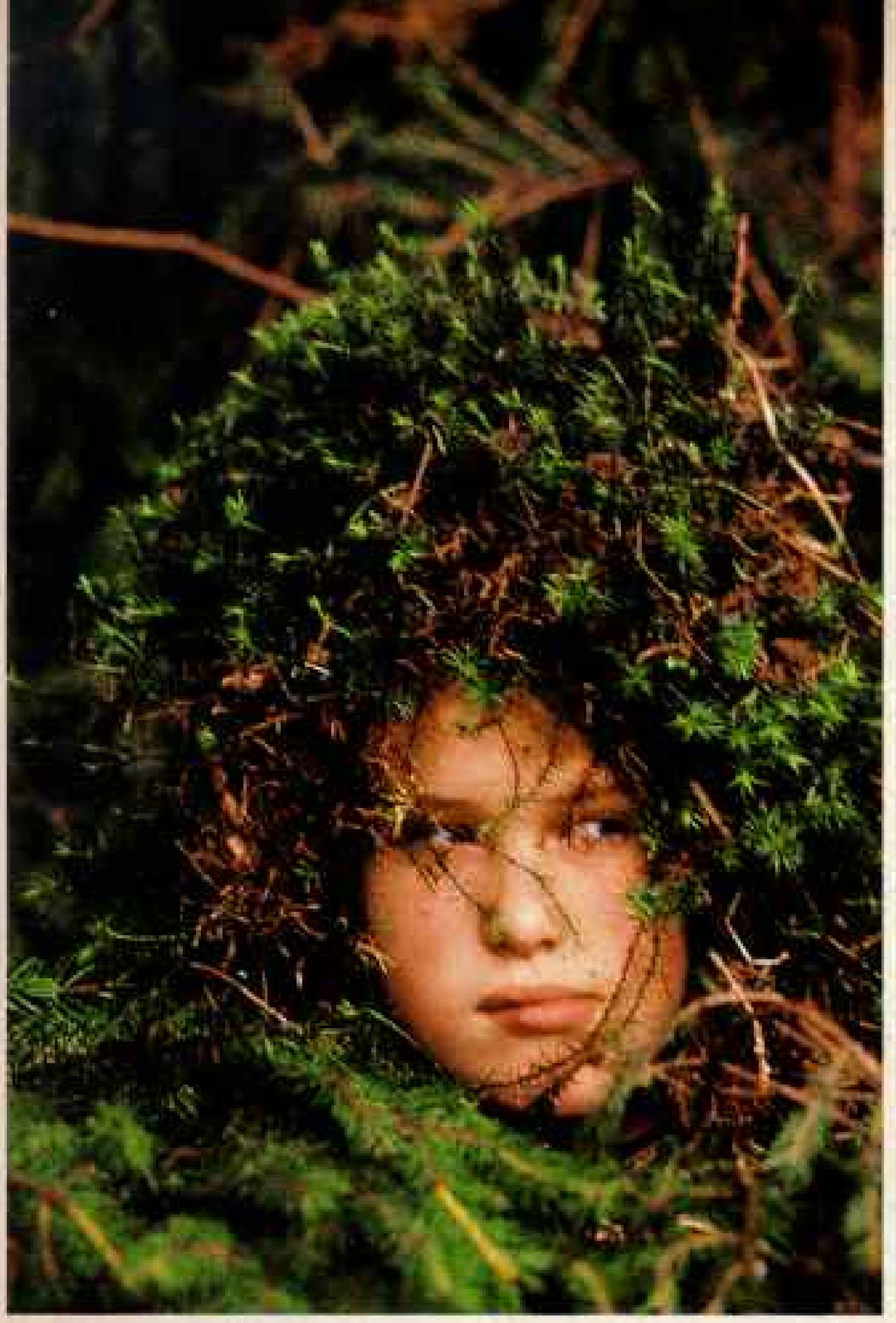
savoring their childhood in a small town. But their father died unexpectedly, and the family grew poor. One brother became sickly; the other, serious beyond his years. At school they met a wise man who led them to a treasure—a library of old books with tales more seductive than any they had ever heard. Inspired, the brothers began collecting their own stories, folktales told to them mostly by women, young and old. Soon the brothers brought forth their own treasure—a book of fairy tales that would enchant millions in far-away places for generations to come.

The Brothers Grimm, Jacob and Wilhelm, named their story collection *Children's and Household Tales* and published the first of its seven editions in Germany in 1812. The table of contents reads like an A-list of fairy-tale celebrities; Cinderella, Sleeping Beauty, Snow White, Little Red Riding Hood, Rapunzel, Rumpelstiltskin, Hansel and Gretel, the Frog King. Dozens of other characters—a carousel of witches, servant girls, soldiers, stepmothers, dwarfs, giants, wolves, devils—spin through the pages. Drawn mostly from oral narratives, the 210 stories in the Grimms' collection represent an anthology of fairy tales, animal fables, rustic farces, and religious allegories that remains unrivaled to this day.

Grimms' Fairy Tales, as the English-language version is usually called, pervades world culture. So far the collection has been translated into more than 160 languages, from Inupiat in the Arctic to Swahili in Africa. In the United States book buyers have their choice of 120 editions. As a publishing phenomenon the Grimms' opus competes with the Bible. And the stories and their star characters continue to leap from the pages into virtually every media: theater, opera, comic books, movies, paintings, rock music, advertising, fashion. The Japanese, perhaps the most ravenous of all the Grimms' fans, have built two theme parks devoted to the tales. In the United States the Grimms' collection furnished much of the raw material that helped launch Disney as a media giant. Cinderella and Snow White easily hold their own with the new kids on the block, whether Big Bird or Bart Simpson.

As for the brothers, they are recognized as pioneers in the field of folklore research. Their crystalline fairy-tale style—the Grimms extensively edited and rewrote drafts of the narratives—has influenced generations of children's writers and paved the way for other masters of the genre, from Hans Christian Andersen to Maurice Sendak. But the Grimms' stories do not speak only to the young. "The age for hearing these fairy tales is three years to death," says Elfriede Kleinhans, a professional storyteller in Germany. "Our world can seem so technical and cold. All of us need these stories to warm our souls."

A player in Kassel's pre-Lenten festivities waits for a mirror to declare her fairest in the land. Preceding pages: A villager peers into the fiery mouth of the communal oven in Rollshausen.



"As I have lost my way in the forest I should like to

SUCH LASTING FAME would have shocked the humble Grimms. During their lifetimes the collection sold modestly in Germany, at first only a few hundred copies a year. The early editions were not even aimed at children. The brothers initially refused to consider illustrations, and scholarly footnotes took up almost as much space as the tales themselves.

Jacob and Wilhelm viewed themselves as patriotic folklorists, not as entertainers of children. They began their work at a time when Germany, a messy patchwork of fiefdoms and principalities, had been overrun by the French under Napoleon. The new rulers were intent on suppressing local culture. As young, workaholic scholars, single and sharing a cramped flat, the Brothers Grimm undertook the fairy-tale collection with the goal of saving the endangered oral tradition of Germany.

For much of the 19th century teachers, parents, and religious figures, particularly in the United States, deplored the Grimms' collection for its raw, uncivilized content. An American educator in 1885 railed: "The folktales mirror all too loyally the entire medieval worldview and culture with all its stark prejudice, its crudeness and barbarities." Offended adults objected to the gruesome punishments inflicted on the stories' villains. In the original "Snow White" the evil stepmother is forced to dance in red-hot iron shoes until she falls down dead. In "The Goose Maid" a treacherous servant is stripped, thrown into a barrel studded with sharp nails, and dragged through the streets.

Photographer GERD LUDWIG grew up in Germany's Hesse region, home of the Brothers Grimm.

Quotations from *The Complete Grimm's Fairy Tales* by Jacob and Wilhelm Grimm, translated by Margaret Hunt and James Stern. © 1944 Pantheon Books, Inc., renewed 1972 by Random House, Inc.

stay here over night." —THE DEVIL WITH THE THREE GOLDEN HAIRS

Even today some protective parents shy from the Grimms' tales because of their reputation for violence.

Despite its sometimes rocky reception, *Children's and Household Tales* gradually took root with the public. The brothers had not foreseen that the appearance of their work would coincide with a great flowering of children's literature in Europe. English publishers led the way, issuing high-quality picture books such as *Jack and the Beanstalk* and handsome folktale collections, all to satisfy a newly literate audience seeking virtuous material for the nursery. Once the Brothers Grimm sighted this new public, they set about refining and softening their tales, which had originated centuries earlier as earthy peasant fare. In the Grimms' hands, cruel mothers became nasty stepmothers, unmarried lovers were made chaste, and the incestuous father was recast as the devil.

Friend or foe? Fairy-tale heroes were never sure which awaited them when they spied a light in the woods, like one from a lonely cabin in the Reinhardswald. Beneath the moss may hide a gnome—or a boy keeping dry.

In the 20th century the Grimms' fairy tales have come to rule the bookshelves of children's bedrooms. And why not? The stories read like dreams come true: Handsome lads and beautiful damsels, armed with magic, triumph over giants and witches and wild beasts. They outwit mean, selfish adults. Inevitably the boy and girl fall in love and live happily ever after. *Read me another one, please.*

And parents keep reading because they approve of the finger-wagging lessons inserted into the stories: Keep your promises, don't talk to strangers, work hard, obey your parents. According to the Grimms, the collection served as "a manual of manners."

A Family Tale

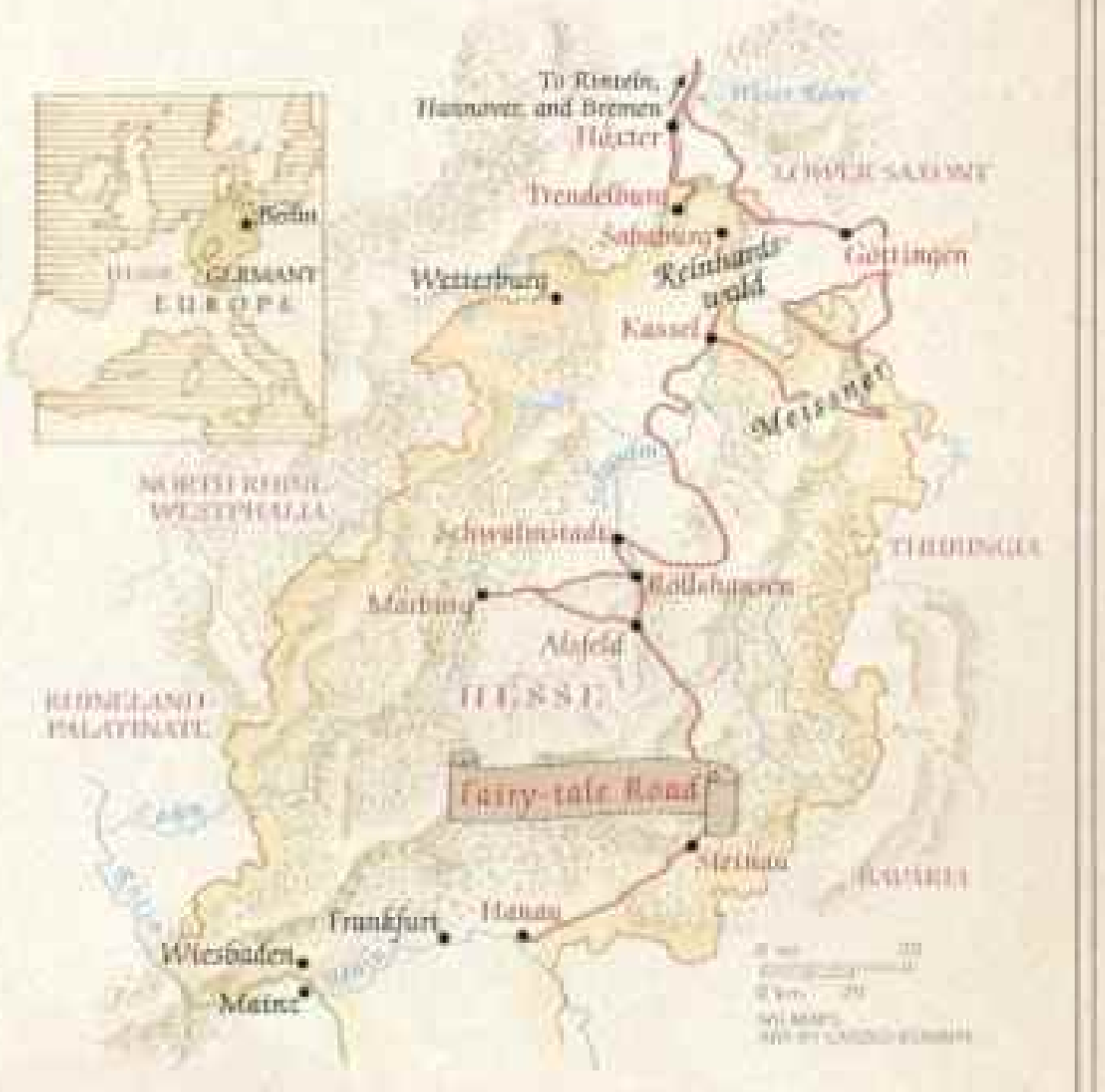
Serious scholars of medieval literature, the Brothers Grimm began collecting fairy tales as a favor for a friend. Indignant at French rule in their home region of Hesse, the brothers saw in tales like "Hansel and Gretel" and "Rumpelstiltskin" a way to save German culture.

Subjects of an early daguerreotype in 1847, Jacob, standing,

BOTH FROM THE MUSEUM OF THE BROTHERS GRIMM, KASSEL

and Wilhelm produced seven editions of Children's and Household Tales, *the first in 1812. For illustrations they employed their brother Ludwig, who also drew fantasy figures for the family children (above).*

Many of the 210 stories began life as adult tales in medieval Europe. The brothers recast the narratives in simple, evocative prose, creating classics read today in over 160 languages.



"What a tender young creature! what a nice plump mouthful—

Americans fell in love with the Grimms' tales when Walt Disney in 1937 released his animated film *Snow White and the Seven Dwarfs*, the first of three wildly popular Disney adaptations. In converting a short story into an 80-minute musical, the Disney studio sweetened the material, giving the dwarfs names like Sneezy and Happy. In *Cinderella* (1950) Disney frosted the plot by adding a carriage that turns into a pumpkin at the stroke of midnight.

THE GRIMMS' TEXTS have undergone so many adaptations and translations, often with the intent of censoring objectionable material such as the violence meted out to villains or of making the themes more relevant to contemporary tastes, that most of us know them only in their sanitized versions. The dust-jacket copy of a recent translation plaintively wonders if all the retellings don't "greatly reduce the tales' power to touch our emotions and intrigue our imaginations."

In a fourth-grade classroom in Steinau, Germany, the town where the Grimms spent part of their childhood, I listened as the storyteller Elfriede Kleinhans, an opponent of prim retellings, asked the boys and girls how the princess managed to turn a frog into a prince at the climax of the "The Frog King," the first tale in the Grimms' collection. "She kissed it," the children sang out. "No," said Kleinhans. "She threw the ugly frog at the wall as hard as she could, and it awoke as a prince. That's what the real story says." The children looked as if they didn't believe her.

Scholars and psychiatrists have thrown a

she will be better to eat than the old woman." —LITTLE RED-CAP

camouflaging net over the stories with their relentless, albeit fascinating, question of "What does it mean?" Did the tossing of the frog symbolize the princess's sexual awakening, as Freudian psychologist Bruno Bettelheim asserted, or does the princess provide a feminist role model, as Lutz Röhrich, a German folklorist, wondered, by defying the patriarchal authority of her father, the king? Or—maybe—a frog is just a frog.

The tales have also fallen prey to ideologues and propagandists. Theorists of the Third Reich in Germany turned Little Red Riding Hood into a symbol of the German people, saved from the evil Jewish wolf. At the end of World War II, Allied commanders banned the publication of the Grimm tales in Germany in the belief that they had contributed to Nazi savagery.

Costumed in the old ways of the Schwalm area, a girl plays as Little Red Riding Hood, heedless of danger.

On campuses across Europe and the United States during the 1970s, the Grimms' tales were scorned for promoting a sexist, authority-ridden worldview. "Madness Comes From Fairy Tales" was scrawled on walls in Germany. Some of the stories were rewritten to accommodate certain political tastes. A revision of "Cinderella," for example, has the heroine organizing a union of local maids, prompting the king to arrest her, after which she emigrates to the U.S. to escape the tyranny of kings and queens.

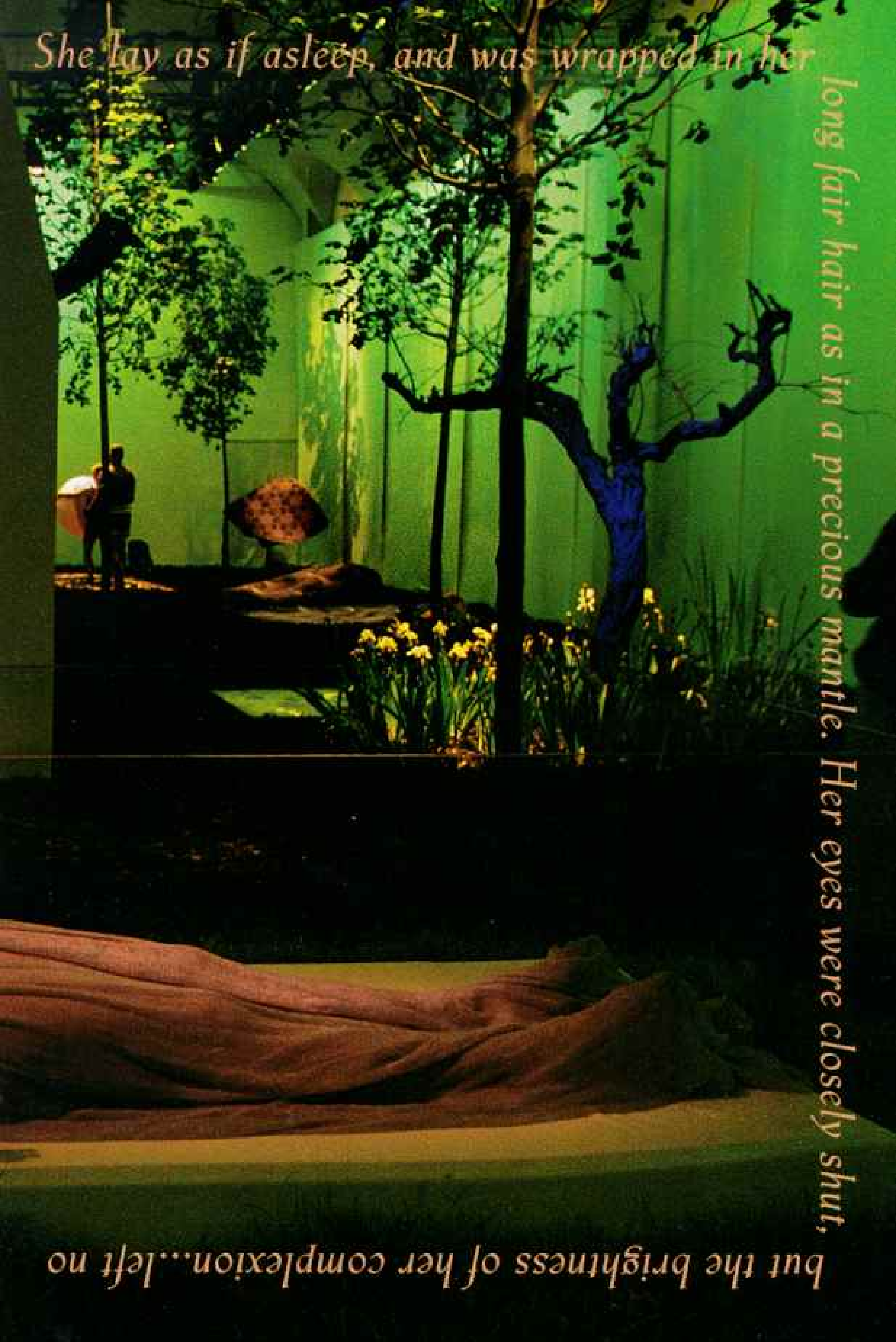
Asked about this landslide of commentary by shrinks and scholars and ideologues, Bernhard Lauer, director and curator of the Museum of the Brothers Grimm in Kassel, Germany, looked sadly at me and protested, "The tales are literary masterpieces! They are not recipes for everyday life."

ENTHRALLED SINCE CHILDHOOD by the geography of the Grimms' tales—the ominous forests, the brooding castles, the firelit cottages and clamorous village streets—I traveled to Germany to see if I could trace the contours of my imaginary map and possibly discover who these Brothers Grimm really were and how they became the preeminent cartographers of make-believe. My plan was to visit towns in Hesse where the brothers lived and worked to find out who told them the stories and how much the Grimms doctored what they heard. And I would roam the back roads to see if landscapes evoked by the fairy tales still lingered in the Hessian countryside.

Snow streaked the ground in brushstrokes as I drove east from Frankfurt and its glass skyscrapers into Grimm country. Except for their final years in Berlin, Jacob and Wilhelm spent most of their lives in the small towns and provincial cities of today's state of Hesse in the German midsection, close to what—once upon a time—was the border with East Germany. Except for the autobahn's ribbon of concrete and roadside clusters of metal silos, the Hessian countryside today might look remarkably familiar to the Grimms. Red-roofed villages nestle in the folds of hills and along river

doubt that she was alive.—THE GLASS COFFIN

He saw therein a maiden of the greatest beauty!


She lay as if asleep, and was wrapped in her long fair hair as in a precious mantle. Her eyes were closed, but the brightness of her complexion... left no

valleys. Stone castles rise from nearby heights, sprouting towers and battlements. Fields that will later ripen with corn and beets roll toward thick forests that frame the horizon like the borders of a woodcut.

The oldest of six children, Jacob and Wilhelm were born a year apart in the mid-1780s in Hanau, a market town less than a day's carriage ride from Frankfurt. Their father, Philipp, the son of a clergyman, was educated in law and served as Hanau's town clerk, a solid middle-class vocation. Father Grimm preached a life of faith, zealous work, and family loyalty. Their mother, Dorothea, gave the boys freedom to wander the countryside where, as Wilhelm later noted, their "collector's spirit" was born as they chased down butterflies and bugs.

Nothing remains of the Grimms' birthplace in Hanau. Like most of the houses they occupied, it was destroyed by aerial bombing during World War II. A bronze statue of the brothers sits in front of the *Rathaus*, or city hall. It features two long-haired men in frock coats absorbed in reading a book, their greatest joy. Tourists regularly gather at its base, their own noses stuck in books, usually travel guides. The statue marks the beginning of the Deutsche Märchenstrasse, or German Fairy-tale Road, a 370-mile route that meanders through central Germany to sites associated with the Grimms or to picturesque places that simply put the traveler in a fairy-tale mood.

By 1791 the family had moved northeast to Steinau, another small trade center, where the father took the position of district magistrate. The Grimms lived well in a large turreted stone house that doubled as the local courthouse. It survives today as a museum of Grimm manuscripts and memorabilia, with revolving exhibits of contemporary fairy-tale illustrators.

At the center of Steinau stands a gaunt 16th-century castle ringed by a grassy moat. Wandering one night through the tiny town, the kind of quiet, uneventful town "where the fox

"If by to-morrow morning early you have not spun this straw into gold during the night, you must die."

—RUMPELSTILTSKIN

The alchemy of dawn turns barley into gold. At a masked ball in Frankfurt, a guest looks for his Cinderella. Preceding pages: Sleeping Beauty awaits a prince's kiss in an art show.

and hare say good night to each other," as the Germans say, I entered the moon-shadowed courtyard of the castle and listened to my boots ringing on the cobblestones. In so many of the Grimms' tales an aspiring commoner is ushered into just such a royal space, challenged to make a princess laugh or to bring back three golden hairs from the devil's head. Success meant riches and a royal bride. When the Grimms wrote of castles in their tales, perhaps they remembered this boyhood place.

The Steinau years marked the end of ease and innocence for Jacob and Wilhelm. In 1796 their father died at the age of 44. Dorothea was forced to move her family of six children out of the government residence.

With financial help from Dorothea's sister, a lady-in-waiting for a Hessian princess, Jacob and Wilhelm, at 13 and 12, were sent north to the city of Kassel to attend the Lyzeum, an upper-crust high school. Sharing the same room and bed, the boys coped with loneliness and social slights by studying for ten hours a day. They proved themselves brilliant students, graduating at the top of their classes. The physical effort took its toll on Wilhelm, however. Already of delicate health, he suffered a serious asthma attack at school. Weak lungs and recurring illnesses would vex him the rest of his life.

Like fairy-tale heroes, the Grimm brothers were tested with hard luck and formidable obstacles before it was time for them to meet the wise man who would lead them out of the dark. The meeting took place in the university city of Marburg where Jacob in 1802 and Wilhelm a year later pursued degrees in law. To pick up their trail, I enlisted the help of Rotraut Fischer, a scholar of the German Romantic

No one heard this because of the noise of the chopping-knife.

movement. Cloaked in black wool and hoisting a book bag over her shoulder, Fischer led me along steep narrow streets crowded with students. We turned onto Barfüsser Street, passing the half-timbered building where the brothers roomed as poor law students, and started to climb toward the heights of Marburg.

"We know from his letters that Jacob walked this route many times," Fischer said. "In one he complained that there are more steps on the streets than stairs in the houses." We continued past a spiky Gothic church, an organ booming inside, to a three-story stone house just below the town castle. It was here that a young aristocratic law professor, Friedrich Carl von Savigny, impressed by Jacob's appetite for learning, opened his private library to the older Grimm brother. That changed Jacob's life. He spent hours poring over Savigny's collection of rare manuscripts of medieval epics and hero's tales. The experience awoke in Jacob a passion for deciphering and saving ancient German literature and folktales, a cause that his younger brother would also embrace.

Jacob did not look and act the part of a fiery activist. Short and sturdy, he was by temperament an introvert, his whole being dedicated to bookish research. At Marburg he would decline invitations to stroll the countryside, saying he preferred "a walk in literature." Fellow students called him "the old one." Wilhelm, a determined scholar like his brother, was more outgoing. "Wilhelm had an eye for women, and women had an eye for him," Heinz Rölleke, a Grimm scholar at the University of Wuppertal, told me. Fervent letters passed between Wilhelm and Jenny von Droste-Hülshoff, a wealthy young woman whom he met in a storytelling circle.

Class differences foiled any chance of marriage. Wilhelm at the age of 39 would marry a childhood friend, Dortchen Wild, daughter of a pharmacist and herself a prominent source of fairy tales for the collection. Jacob, a lifelong bachelor, was by far the dominant partner intellectually, initiating most of their projects. Yet the brothers worked well together, signing their joint undertakings simply "Brothers Grimm."

Curiosity and fear duel in a child's expression as a butcher slices a pig in half in a farmyard near Alsfeld.

CHILDREN'S AND HOUSEHOLD TALES, their great collaboration, began in an almost offhand fashion. Immersed in editing and translating medieval manuscripts, the brothers started to gather fairy tales as a favor for a friend planning a collection of German folk literature. After several years the Grimms had assembled 49 tales, taking a few from old books, the rest from acquaintances in Kassel. But when the friend failed to produce the collection, the brothers decided to expand their efforts and publish their own volume.

Collecting fairy tales must have provided Jacob and Wilhelm a welcome distraction from their living circumstances. Their mother had died in 1808. Money grew scarcer. Employed as a librarian for the detested resident French

ruler, Jacob could barely support his five siblings. Wilhelm was sick from asthma and a weak heart and was unable to work. In 1812, the year the fairy tales were first published, the Grimms were surviving on a single meal a day—a hardship that could explain why so many of the characters in their book suffer from hunger.

Though new editions of the fairy tales continued to appear until 1857, two years before Wilhelm's death, collection of almost all the oral tales took place when the brothers were in their impressionable 20s.

Altogether some 40 persons delivered tales to the Grimms. Many of the storytellers came to the Grimms' house in Kassel. The brothers particularly welcomed the visits of Dorothea Viehmann, a widow who walked to town to sell produce from her garden. An innkeeper's daughter, Viehmann had grown up listening to stories from travelers on the road to Frankfurt. Among her treasures was "Aschenputtel"—Cinderella.

With the exception of Viehmann, the brothers rarely identified their correspondents. Their names and the tales credited to them were learned in most cases only after careful study of the margin notes in the brothers' personal copies of the *Tales*.

The true identity of one of the most important informants—a certain "Marie"—came to light only in the mid-1970s. Marie was credited in the notes with narrating many of the most famous tales: "Rotkäppchen" (Little Red Riding Hood), "Schneewittchen" (Snow White), and "Dornröschen" (Sleeping Beauty).

In a moment, numbers of little

laid in heaps." —THE TWO KINGS' CHILDREN

earth-men came forth, and asked what the

King's daughter commanded. Then she: "In three hours' time the

great forest must be cut down, and all the wood

Then he came to a house which seemed very small, for

Herman Grimm, the oldest son of Wilhelm and guardian of the Grimms' legacy after the brothers' deaths, contended for many years that the Marie in question was the old housekeeper of Wilhelm's in-laws.

It took a close reading of the annotations by Heinz Rölleke of the University of Wuppertal to reveal that the storytelling Marie was in fact Marie Hassenpflug, a 20-year-old friend of their sister, Charlotte, from a well-bred, French-speaking family.

I ENCOUNTERED A LIKENESS of Marie on a wall in Wolfgang Hassenpflug's house in Rinteln. Herr Hassenpflug, a retired engineer with a poet's head of unruly white hair, is the great-great-grandson of Charlotte Grimm, known as Lotte in family circles. In 1822, he explained, 29-year-old Lotte left the household of her five brothers and married a longtime family friend, Ludwig Hassenpflug, a brother of Marie. Because the direct lines of Jacob and Wilhelm appear to have died out with the death of Wilhelm's daughter in 1919, Wolfgang Hassenpflug now finds himself the inheritor of many Grimm family treasures, as well as mementos from the Hassenpflug lineage.

The walls of Hassenpflug's elegant stone house are hung with original portraits of the Grimm brothers and of their sister and her family—copperplate prints all etched by a third brother Grimm, Ludwig. Marie looks out with large soulful eyes, her thin face framed by dark curls.

For my visit Hassenpflug's wife, Gerda, dressed a table for lunch with one of Lotte's original damask tablecloths, with "LG" stitched in one corner. Wolfgang told the story of Marie's "rediscovery" and explained how the family's French-Huguenot background

in front of it a great giant was standing. — THE RAVEN

A steadfast knight in Trendelburg shows how to defeat witches and dragons. Old half-timbered buildings cluster in Alsfeld. Preceding pages: Industrious as fairy-tale dwarfs, schoolchildren clear a wet forest trail.

influenced her storytelling ability. "Like the Grimms she grew up in Hanau, which at the time was a very French town," Hassenpflug said. "Her nursemaids naturally told French stories. The Grimms may at first have thought Marie's tales all came from Hesse, but the famous ones we now know came from France and the book by Charles Perrault."

Marie's wonderful stories blended motifs from the oral tradition and from Perrault's influential 1697 book, *Tales of My Mother Goose*, which contained elaborate versions of "Little Red Riding Hood," "Snow White," and "Sleeping Beauty," among others. Many of these had been adapted from earlier Italian fairy tales. In the second edition of their own collection the Grimms acknowledged the deep international roots of many of their tales. Included in their notes are references to variants from many other cultures, including Russian, Finnish, Japanese, Irish, and Slavic.

Long before the Grimms' time, storytelling thrived in the milieu of roadhouses, barns, and, perhaps most energetically, in the *Spinnstuben*, the spinning chambers of peasant women. During winter nights women softened the long hours of spinning flax into yarn by entertaining themselves with tales spiced with adventure, romance, and magic. The Grimm tales feature many spinners, most famously in "Rumpelstiltskin," in which a poor miller's daughter, ordered by a king to spin straw into gold—failure means death, success a royal marriage—enlists the aid of a devilish little man, Rumpelstiltskin.

over it. This lasted for many years.... — IRON HANS

From that time forth, no

and it lay there in deep stillness and solitude, and nothing was seen

of it, but sometimes an eagle or a hawk flying

one would longer venture into the forest,

The smell of the delicious dishes which were being taken in and out reached her, and now and then the servants threw her a few morsels....

—KING THRUSHBEARD

Patrons feast at a medieval banquet in Wetterburg Castle. Avoiding the poisonous red ones, foragers pick wild mushrooms. Preceding pages: An ancient beech haunts a gloomy forest.

GIVEN THAT THE ORIGINS of many of the Grimm fairy tales reach throughout Europe and into the Middle East and Orient, the question must be asked: How German are the Grimm tales? Very, says scholar Heinz Rölleke. Love of the underdog, rustic simplicity, sexual modesty—these are Teutonic traits.

The coarse texture of life during medieval times in Germany, when many of the tales entered the oral tradition, also colored the narratives. Throughout Europe children were often neglected and abandoned, like Hansel and Gretel. Accused witches were burned at the stake, like the evil mother-in-law in "The Six Swans." "The cruelty in the stories was not the Grimms' fantasy," Rölleke points out. "It reflected the law-and-order system of the old times."

Possibly the most German touch of all is the omnipresence of the forest, the place where fairy-tale heroes confront their enemies and triumph over fear and injustice. Rural German society traditionally depended on the *Wald*. The forest was where farmers grazed their pigs on acorns, royals hunted deer, and woodcutters selected logs for the massive beams still seen in the half-timbered barns and houses of Hessian towns.

Storytellers knew that to place characters in a dark trackless woods would stir up associations of danger and suspense. "The forest was not seen as a safe place. Townspeople would avoid it," forester Hermann-Josef Rapp told me as we drove wet logging roads through the Reinhardswald, a large forest in the hills of northern Hesse. "There were outlaws and

illegal hunters. And Germans have always been afraid of wolves."

Nowadays the Reinhardswald is thick with beech and introduced spruce, serving local sawmills. But to behold those mighty oaks that were the preferred species in most Grimm fairy tales, one has to visit a remnant forest near Sababurg Castle. Rapp, a trunk of a man in a green oilskin jacket, led me into that forest one day in a pouring rain. Here massive, arthritic-looking oaks, some of them 400 years old or more, loomed like Gothic ruins. I spooked myself staring at the thick, grasping limbs, the wild hairlike mosses, the knobby eyes, the holes that gaped like mouths. How could Little Red Riding Hood's mother ever have let that sweet little girl go into such woods as these?

Despite the strong Germanic flavoring of the tales, the first edition sold poorly. At the Grimms museum in Kassel, director Bernhard Lauer placed the brothers' personal copy of the first edition in front of me, handling it as if it were a Fabergé egg. "It's the most valuable thing in the museum," he said, "Only a few of the original 900 copies still exist. The paper quality was very poor."

Mild commercial success did not come until 1825, when the Grimms published the *Small Edition*, a condensed collection of 50 stories with illustrations by their brother Ludwig. The 1825 volume, of which 1,500 copies were printed, is even rarer than the 1812; only four or five copies survive in libraries. With the debut of the cheaply priced *Small Edition*, the Grimms had at last figured out who their true audience was: children.

By the second edition in 1819 Wilhelm had taken over the lead responsibility for the fairy tales, Jacob having turned his attentions to

a scholarly exegesis on German grammar. Wilhelm proved an inspired editor. By streamlining plots to emphasize action, weaving into the narrative old proverbs and folk poems, and using poetic language to set scenes, Wilhelm created a style that remains a model for fairy-tale writing.

Abandoned for a hundred years, Sahaburg Castle has awakened as a hotel fit for make-believe.

Wilhelm continued to polish and reshape the tales up to the final edition of 1857. Comparisons of the various editions reveal that in his effort to make the stories more acceptable to children and their middle-class parents, Wilhelm removed any hint of sexual activity, such as the premarital couplings of Rapunzel and the prince who climbed into her tower. He also added Christian motifs, accented the child-rearing lessons of the tales, and emphasized gender roles. Though the brothers implied that they were mere recorders of tales, such literary and moral restylings of oral narratives were apparently crucial to bring the tales into the mainstream. "Yet despite all Wilhelm's additions," Rölleke said, "the cores of the stories were left untouched."

The editorial fingerprints left by the Grimms betray the specific values of 19th-century Christian, bourgeois German society. But that has not stopped the tales from being embraced by almost every culture and nationality in the world. What accounts for this widespread, enduring popularity? Bernhard Lauer points to the "universal style" of the writing. "You have no concrete descriptions of the land, or the clothes, or the forest, or the castles. It makes the stories timeless and placeless."

The tales allow us to express "our utopian longings," says Jack Zipes of the University of Minnesota, whose 1987 translation of the complete fairy tales captures the rustic vigor of the original text. "They show a striving for happiness that none of us knows but that we sense is possible. We can identify with the heroes of the tales and become in our mind the masters and mistresses of our own destinies."

Fairy tales provide a workout for the unconscious, psychoanalysts maintain. Bruno Bettelheim famously promoted the therapeutic value of the Grimms' stories, calling fairy tales the "great comforters." By confronting fears and phobias, symbolized by witches, heartless stepmothers, and hungry wolves, children find they can master their anxieties. Bettelheim's theory continues to be hotly debated. But most young readers aren't interested in exercising their unconscious. My 11-year-old daughter, Lucy, thinks it's cool that witches cast spells and that heroines always seem to get their man. Boys I know go for stuff like the cloak that makes a hero invisible and a rifle that never misses.

The Grimm tales in fact please in an infinite number of ways. Something about them seems to mirror whatever moods or interests we bring to our reading of them. This flexibility of interpretation suits them for almost any time and any culture.

Jacob and Wilhelm moved on from their

jobs as librarians in Kassel to teach at universities in Göttingen and Berlin. Between them they published more than 35 books. The brothers also made a name for themselves as patriots, risking their livelihoods by speaking out in favor of democratic reform. But in their last years they retreated from politics and teaching to concentrate on writing the *German Dictionary*, one of the most ambitious scholarly projects of 19th-century Europe.

The brothers did not live to finish the dictionary or to see the fulfillment of their abiding dream: the founding in 1871 of the German nation. Wilhelm died of an infection in 1859 at the age of 73. Jacob in his eulogy bestowed upon his beloved Wilhelm the name *Märchenbruder*, the "fairy-tale brother." Jacob died four years later. He had just finished writing the dictionary definition for *Frucht*, or fruit, a fitting end to a fertile life.

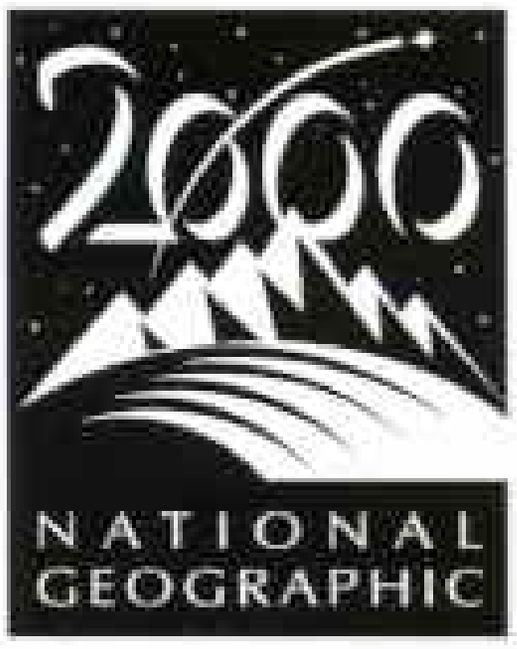
The Brothers Grimm, for the final fairy tale in their collection, chose a short, parable-like tale called "The Golden Key." A poor boy goes out into a wintry forest to collect wood on a sled. In the snow he finds a tiny key and near it an iron box. The boy inserts the key. He turns it. He lifts the lid.

That is where the story ends. For once the brothers avoid a tidy ending. Instead, they have issued a golden invitation, since accepted by countless readers, to open the brothers' books with the key of the imagination. Only then can readers discover what wonderful things await them. □

Read tales from the Brothers Grimm and more at *www.nationalgeographic.com/grimm*.

SURVEY

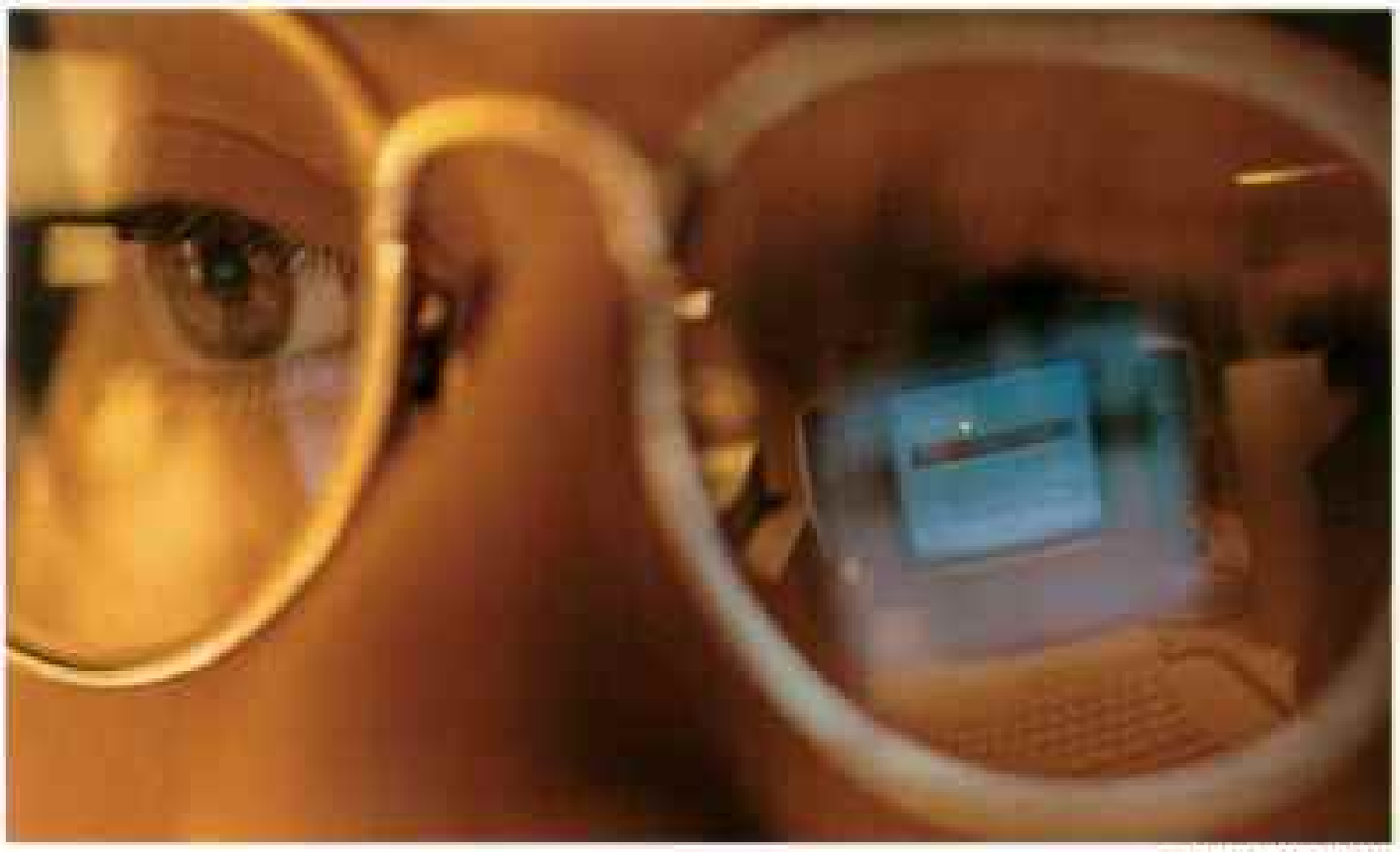
Charting Communities and Change



By Valerie A. May

ARE PEOPLE KIND? Do they feel close to their community? What do they like to eat, read, listen to? Survey 2000 sought to answer these questions and more in a pioneering effort to use the World Wide Web to collect information on geographic mobility, cultural identity, Internet use, and other patterns in contemporary life. In partnership with Northwestern University, and with the assistance of a dozen scholars and social scientists, the National Geographic Society offered everyone with access to our website, *nationalgeographic.com*, the opportunity to help take a snapshot of the way we live and think about ourselves on the eve of a new millennium. ■ Why a Web-based survey? The explosive expansion of the Internet has transformed the way we communicate, do business, teach, and entertain ourselves—but the potential for learning about ourselves has barely been tapped. Would information gathered from responses to an Internet questionnaire be useful? We concluded that it would if the survey met several criteria, among them a large and diverse group of Web respondents. The final tally: More than 80,000 people from 178 countries and territories logged on to Survey 2000. ■ Schools, libraries, and community centers cooperated by hosting "map the global village" sessions that offered computer and survey access to the public. Newspapers and magazines published articles that generated interest. Then for ten weeks in the fall of 1998 survey takers collectively spent more than two million minutes online at *nationalgeographic.com*. Each participant answered one of three questionnaires: for U.S. and Canadian adults, for adults from other countries, or for children. Questionnaires were computer customized, generating questions based on a participant's previous answers. ■ More than 50,000 people from 5 to 96 years old completed the survey, spending an average—and amazing—44 minutes doing so. Here are some early findings from U.S. respondents: The adult population is indeed transient. Sixty percent no longer live in the state they were born in. Of those who do, Washington staters come in first, but folks from the Middle Atlantic region are more likely to stay within 30 miles of

2000



PENNY DE LOS SANTOS

Questions on a computer screen from Survey 2000 are reflected in the glasses of 14-year-old Kelsey Lutz, one of 14,334 children (with 65,678 adults) to log on to the survey—a groundbreaking effort to use the Internet for social science research.

where they were born. Native Dakotans and people from Montana and Wyoming are most likely to move out of state. ■ Mobility does not necessarily lead to a breakdown in positive feelings about community: More than 80 percent believe that "people are kind"; 90 percent believe that they have something positive to contribute to society. ■ On a less serious note: Pizza was voted the most popular food; french fries and hamburgers tied for second place; buttermilk pie and Indian pudding are at the bottom. The most recognized authors: Mark Twain, Ernest Hemingway, and John Steinbeck. Stephen King was sixth, Danielle Steel 27th. In music, oldies/classic rock topped the charts, followed by classical. Dead bottom: heavy metal and rap/hip-hop. ■ About 7,000 U.S. children told us about themselves. Nearly 85 percent of those 13 to 15 years old worry about the environment. About 60 percent of those disagree with the statement: "All in all the world population will be better off in the next 100 years." Most would accept cuts in their standard of living to conserve global resources. ■ These findings are preliminary—the tip of a data iceberg. Researchers continue to study the information gathered and expect to find it a valuable resource for years to come. To view results of the questionnaires, go online to *http://survey2000.nationalgeographic.com.*

VALERIE MAY is director of news and editorial programming for the Geographic website.

SURVEY 2000

Snapshot of Society

■ **THE LARGEST INTERNET-BASED SURVEY** of its kind drew 80,012 participants from around the world, including 697 who had never used the Net before. The charts at right profile the 40,612 U.S. adults who logged on. Their demographic profiles are compared with those of the General Social Survey (GSS), a prominent biennial study that queries 3,000 representative Americans. Participants in Survey 2000 were self-selected and needed computer access, but the detailed information they provided, coupled with the large sample size, offers scientists valuable data that can't be found anywhere else.

40,612 U.S. adults provided data.

Mobility and Cultural Identity

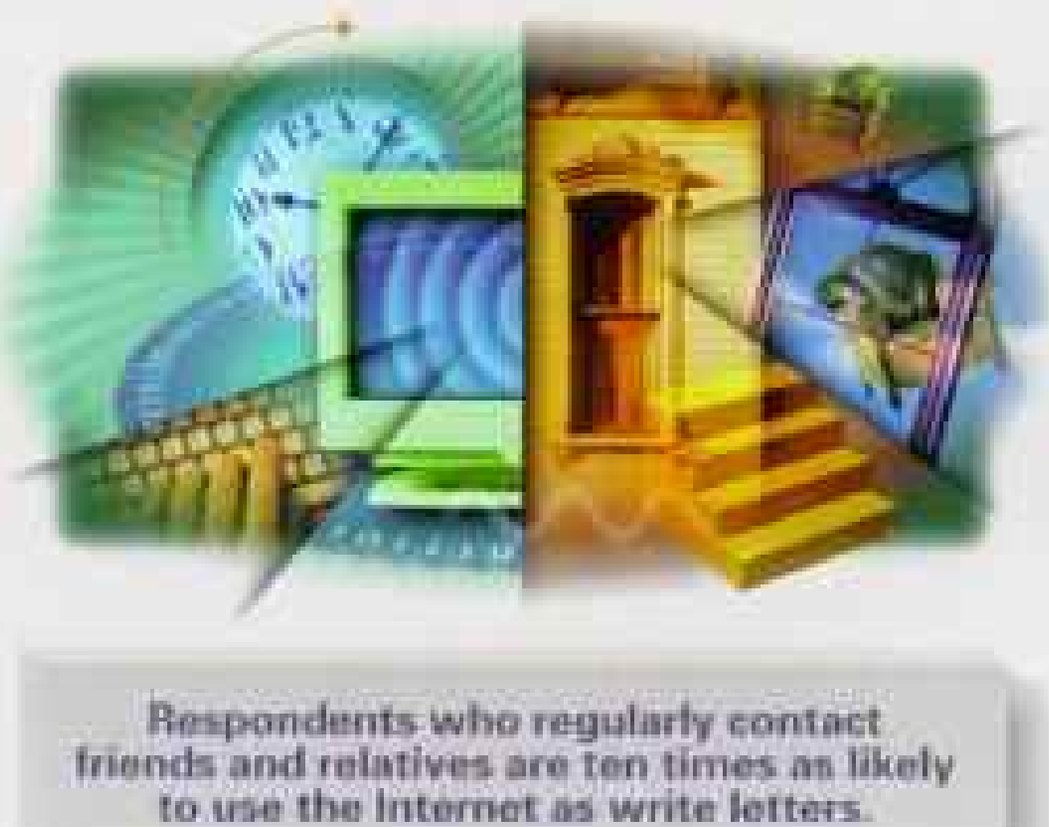
■ **WITH CHAINS** such as Starbucks, Wal-Mart, and Taco Bell spread across the country, the lines between regional cultures seem to blur. Is this mobile society—Americans move their residences once every five years on average—becoming one vast McCulture? Survey 2000 results indicate that regional variety is far from extinct. "It is clear, for instance, that the prairie states [West North Central region] have a strong area literature," says sociologist Wendy Griswold. Respondents from these states consistently recognized Garrison Keillor and Sinclair Lewis (Minnesota), Jane Smiley (Iowa), Laura Ingalls Wilder (South Dakota), and Willa Cather (Nebraska). Outsiders also know these writers, suggesting that modern, mobile life has not stilled regional voices. Further, Griswold found that people who had moved into some regions knew its literature better than the natives did. She thinks that newcomers may have a stronger need to discover the essence of their adopted home.

"Joining behavior also seems to fall into regional patterns," says sociologist James Witte. Survey takers from the West North Central, East South Central, and West South Central regions were most likely to belong to school, farm, and religious groups—and least likely to belong to ethnic-based organizations or book clubs. New Englanders and those from the Pacific region favored environmental and social-advocacy groups—and were least likely to join religious organizations.

15.9% have always lived within 30 miles of their current address.

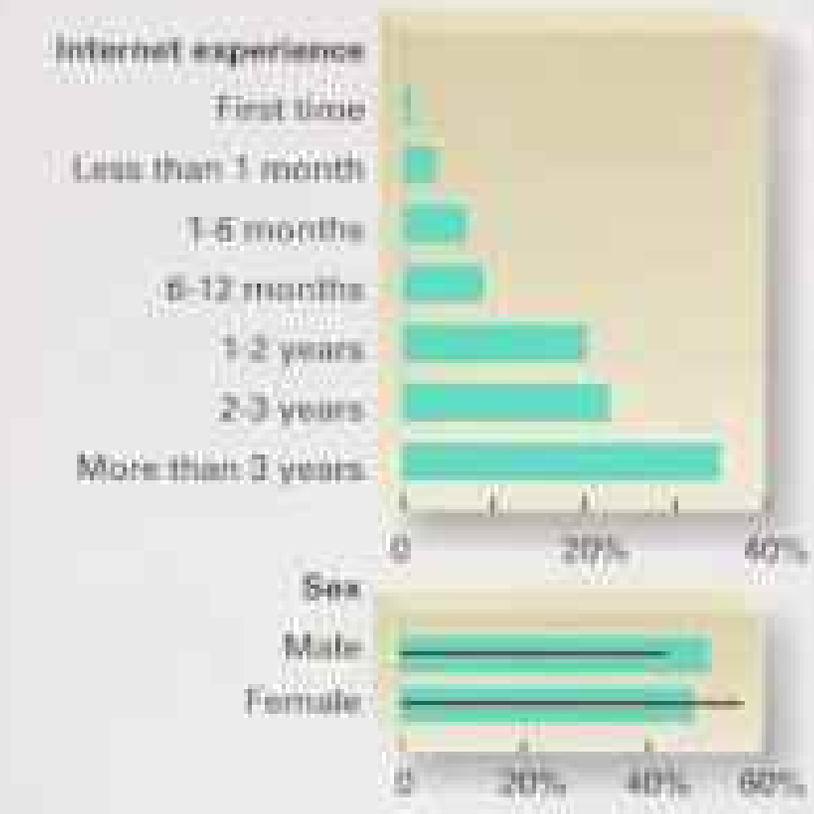
Charting Digital Communities

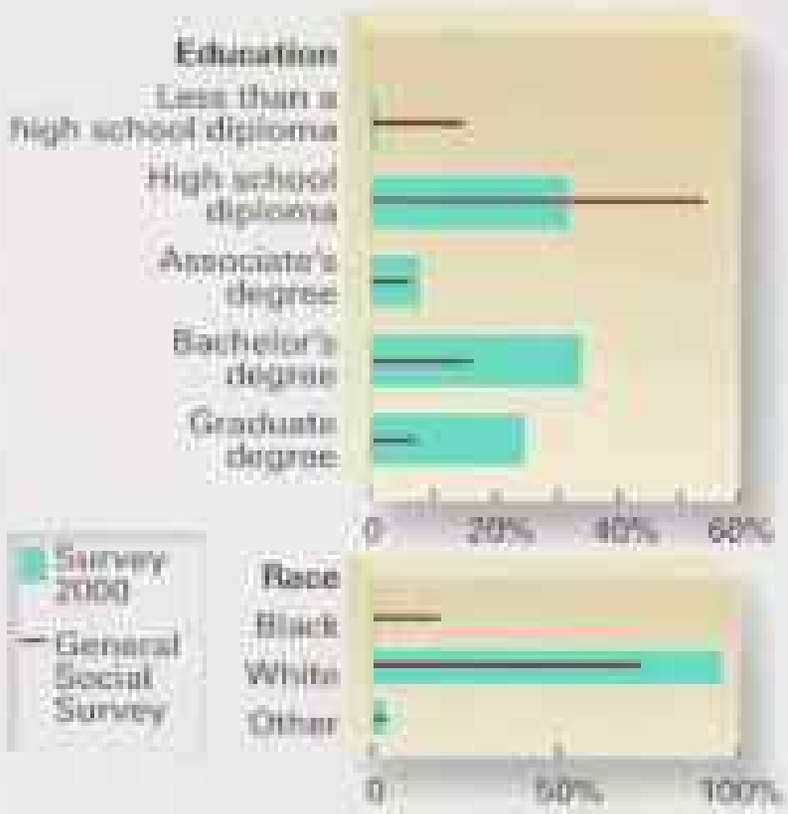
■ **INTERNET USERS** are becoming a more diverse group. Compared with longtime users, survey participants who were new to the Net were three times as likely to have a high school diploma or less and were twice as likely to be African Americans. Today's Internet community more closely mirrors the general population. Overall, Netters use the medium to enhance their daily lives. The computer screen does not replace books though. Netters are readers. They also use the Net for social contact: They're more than twice as likely to e-mail long-distance friends as to telephone them. "But it's not a substitute for personal contact," cautions communication researcher Malcolm Parks. "Those who used the Net more also made more visits, wrote more letters, and made more phone calls."



Respondents who regularly contact friends and relatives are ten times as likely to use the Internet as write letters.

ART BY TOM WHITE. GRAPHS BY DAVID FEINSTEIN AND TOM WHITE.
U.S. DATA COMPILED BY JOE GRIMIOSKA, LISA AMORUSO, PHILIP HOWARD, NATHAN WRIGHT, AND LORI KORNILOW-JONES.





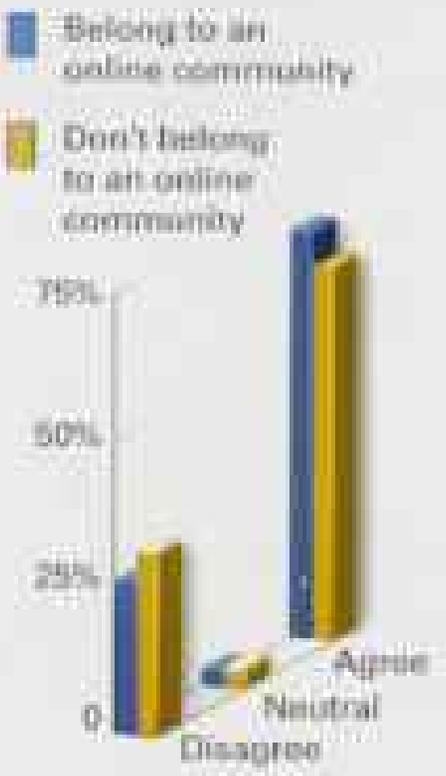
SOURCE: RICHARD PETERSON

■ **CLASSICAL VS. COUNTRY** Are you more likely to enjoy Garth Brooks if you live in Texas than in New Jersey? Absolutely. Chances of being a Vivaldi fan in Florida? Not nearly as great as if you lived in California. According to our survey, musical taste reflects residence and mobility. Movers like classical more than stayers do. In the South and Southwest movers and stayers like country and western, more so than their counterparts elsewhere.

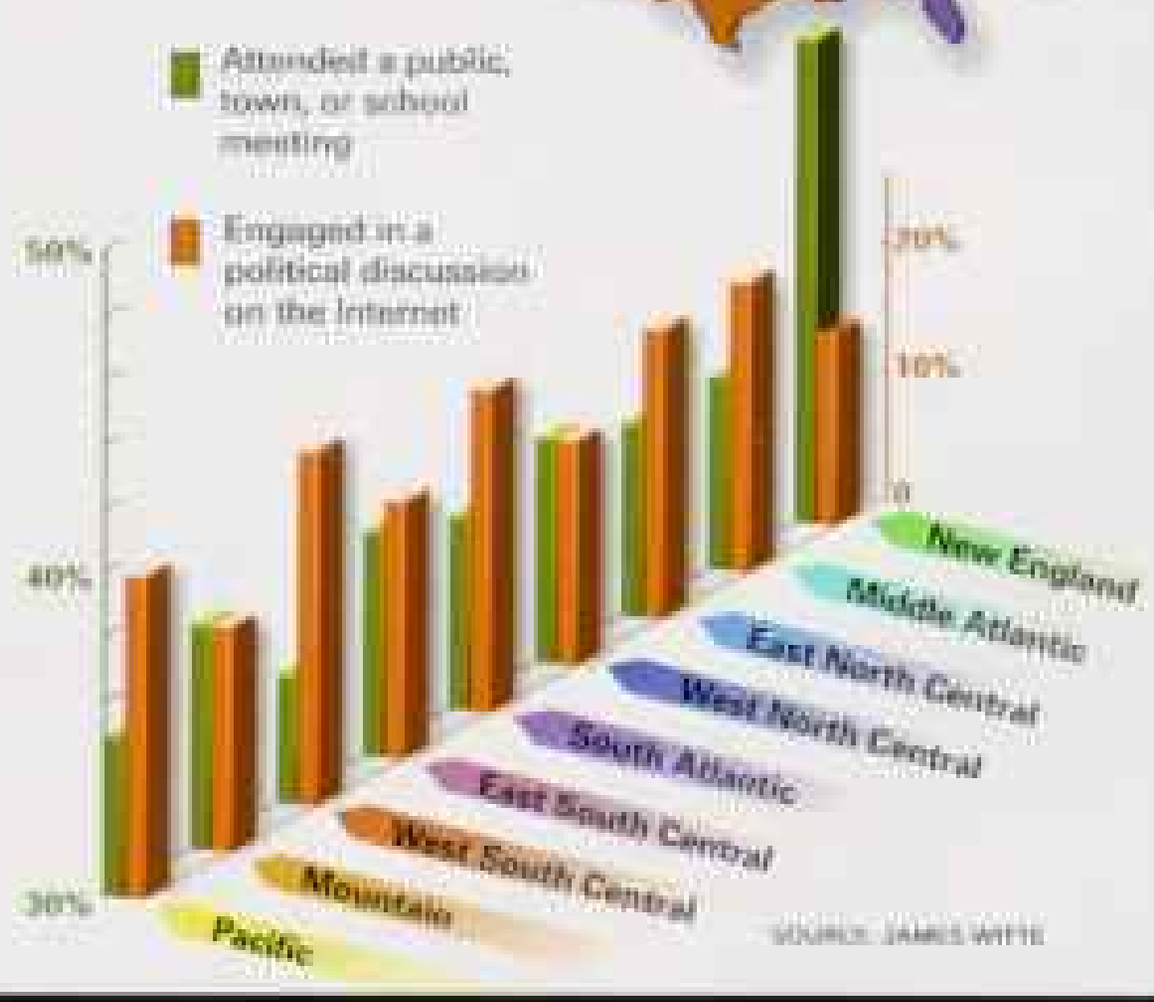
■ **STAYING VS. BELONGING** Conventional wisdom—and a substantial body of research—suggests that increased mobility undercuts a sense of community. But do stayers feel community spirit? People from New York, New Jersey, and Pennsylvania tend to remain within 30 miles of their birthplace more than others elsewhere in the country. Yet respondents from those states were among the least likely to regard their community as a source of comfort.

SOURCE: JAMES WITTE

■ **VIRTUAL VS. REAL** Internet users who belong to an online community (e.g., chat group) report a strong sense of geographic community (graph at right). New Englanders, who are most likely to attend public meetings, turned to the Net the least to talk politics (far right). Conversely, in regions where participation in public meetings is lowest, political discourse via the Net is highest. □



SOURCE: MALCOLM PARKS



SOURCE: JAMES WITTE

From the top left by row: XR®400R, Accord EX V-6 Sedan, portable generator, Honda Harmony™ lawnmower, BF100 outboard, FourTrax® Foreman® ES, Acura NSX, string trimmer, snowblower, Gold Wing® SE, Honda Matters™ lawn tractor. ©1999 American Honda Motor Co., Inc. www.honda.com

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NATIONAL GEOGRAPHIC

DECEMBER 1999

The Millennium Series/Geographic Century

Departments

The Cover

Cheetah cubs in northern Botswana's Okavango Delta face threats from both man and nature in their struggle to reach adulthood. Photograph by Chris Johns

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NATIONAL GEOGRAPHIC

On Assignment

W. ALLEN ROYCE; NOS. (BELOW) O. LOUIS MAZZATENTA

■ GEOGRAPHIC CENTURY

Shooting Stars

The people behind the people behind the cameras make some of the GEOGRAPHIC's most spectacular pictures possible, helping photography go places no one thought it could. Braving problems from high humidity to low altitude, they're usually successful: Waterproof lights and camera housings the photoengineering team designed helped get dramatic shots of the sunken *Titanic*. But the plane-cam "Albatross" (above) was a bust. It flew well, and the nose-cone camera worked fine, but the buzz of its engine frightened away the migrating geese it was supposed to photograph. The team includes, left to right, Joe Stancampiano, Kenji Yamaguchi, Roger Helmandollar, Phil Leonhardi, David Mathews, Walter Boggs, and Larry Maurer; not shown are Keith Moorehead and Edward Samuel. We also depend on our electronics shop to lend assignments some spark. Electronics technicians Ted Johnson (left, adjusting camera from below) and Anthony Peritore made regular trips to the Kennedy Space Center for the space shuttle launches with Illustrations Editor Jon Schneeberger, far left, and NASA's Richard Miller. "Early on we designed a sound trigger to start the camera's motor drive at a certain decibel level," says Ted. "The roaring rocket engines were supposed to set it off, but at first we got great pictures of a turkey vulture with a really loud squawk."

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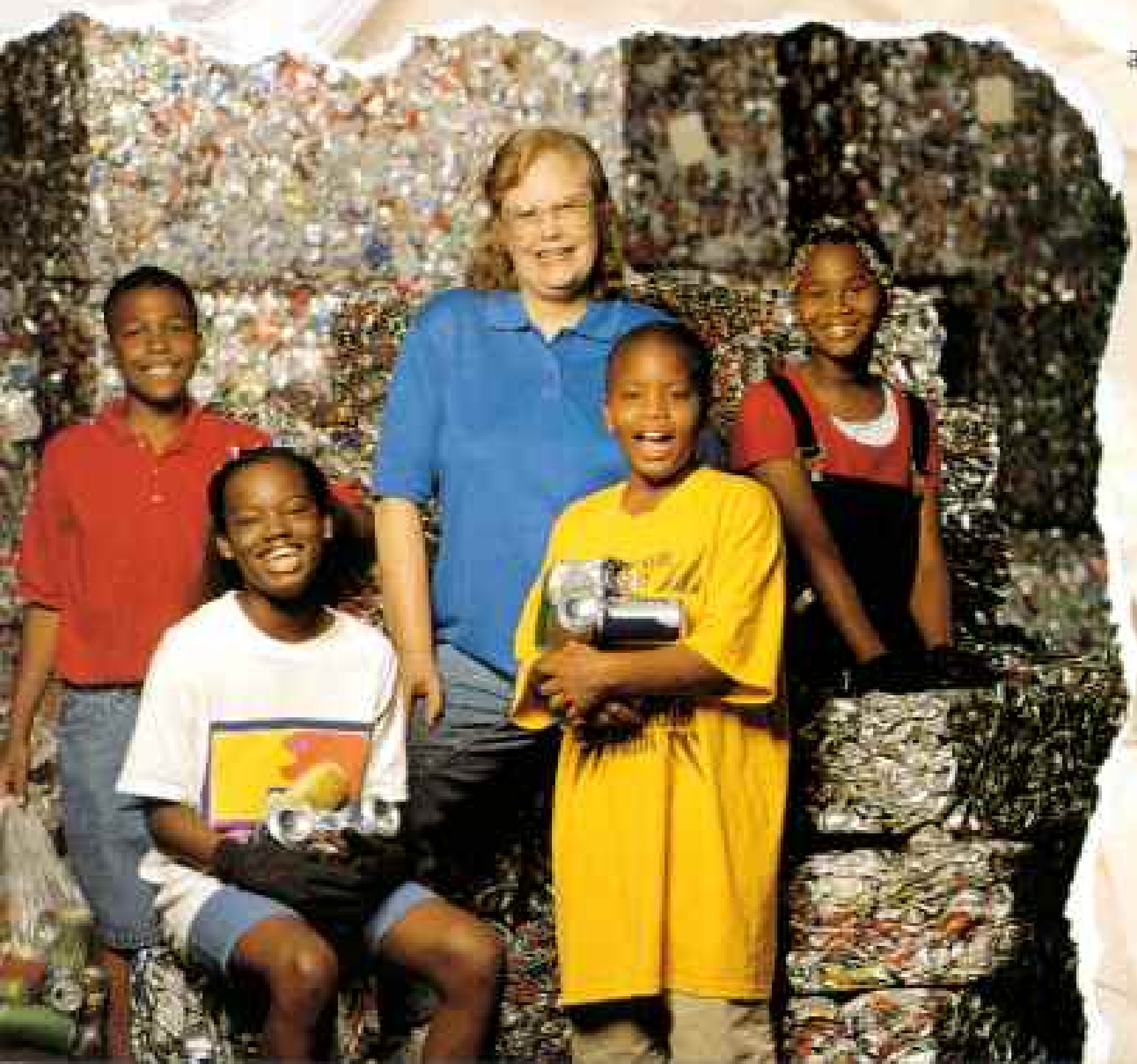
Why Ms. Chance got her kids talking trash.

As part of her lesson plan for Earth Month, Gale Chance taught her special education students to respect their planet by cleaning up trash and collecting aluminum cans for recycling. Word of their conservation efforts spread and soon other students, and even parents, were bringing in cans. Within a few weeks, $1,000 was raised which was used to beautify the school grounds. But Ms. Chance's class picked up a lot more than just litter. Keeping track of their cans and recycling money improved their math skills.

Ms. Chance also introduced students to the principles of personal finance by teaching them how to make purchases, deposits to and withdrawals from their class bank. More importantly, Ms. Chance's students picked up a wealth of self-esteem. Kids who were once on the sidelines because they were treated differently now led a project involving mainstream students.

For turning aluminum into gold. State Farm is pleased to present Gale Chance of Cussetta Road Elementary in Columbus, Georgia with our Good Neighbor Award® and to donate $5,000 to her school.

It's amazing what kids pick up when given a chance.



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The Good Neighbor Award was developed in cooperation with The Council for Exceptional Children.

NATIONAL GEOGRAPHIC'S

Millennium Moments

Notes From Yon and Hither

"Oh, you work at National Geographic magazine. Do you travel a lot?"

Well . . . yes.

"It must be very exciting."

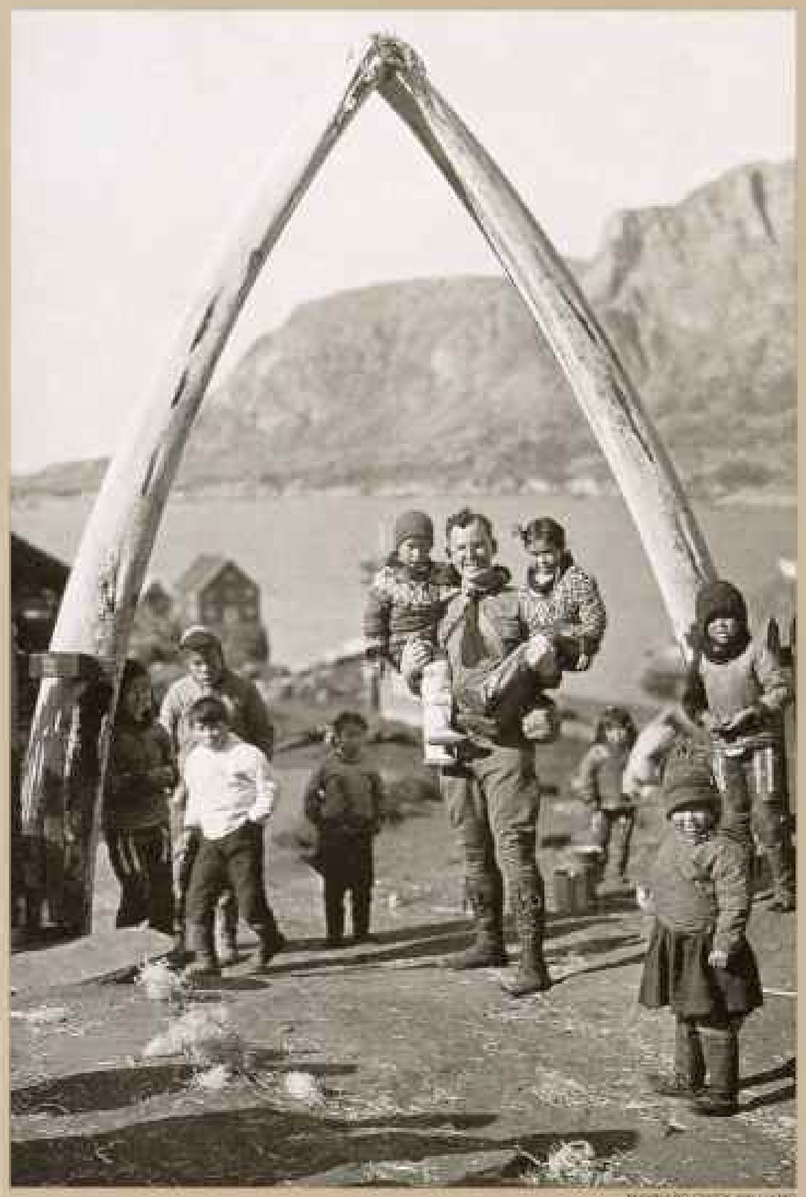
Well. . . . For more than 110 years, the National Geographic Society has sent writers, photographers, researchers, and explorers out into the world to report on the unusual, the noteworthy, and the memorable for members who couldn't make the journey themselves. If, unlike *Star Trek*'s Captain Kirk and the crew of the *Enterprise*, they have not boldly gone where no man has gone before, they have nevertheless gone readily to places where most men and women don't usually go. And it hasn't always been easy.

Consider this photograph from the March 1922 issue of the magazine. Members of the Society's Chaco Canyon expedition were exploring the ruins at Pueblo Bonito, in New Mexico, when their car became mired in quicksand.

An Indian runner went for help. It took ten men, a team of horses, a truck, and six hours of strenuous labor to extricate the vehicle from its sticky predicament.

As the new millennium nears, it is fitting to take a few moments to look at how those who went to the planet's nooks and crannies weathered the unexpected and the near impossible, devised strategies to cope, and extended themselves above and beyond the normal demands of travel to bring our members vivid images in words and pictures.

O. E. HAVENS



MAYNARD OWEN WILLIAMS

ADVENTURES IN THE FAR NORTH

Correspondent Maynard Owen Williams was cooling his heels in Holsteinsborg on the west coast of Greenland in 1925, awaiting the return of an Arctic aerial exploratory expedition co-sponsored by the Society. To while away the time, he decided to photograph local children beneath a gateway of whale jawbones. But one little girl was afraid of the camera, so Williams calmed her by joining the youngsters in the photograph (left).

Little is known about the image below. Taken by Carl J. Lomen, it shows the season's first steamers arriving in Nome, Alaska, in the spring of 1914. Lomen wrote an article about reindeer for the December 1919 issue of the magazine, with illustrations credited to "Lomen Brothers." If the photographer perched precariously on the cake of ice is indeed a Lomen brother, he must have completed his work and reached safety before his tiny platform melted away.

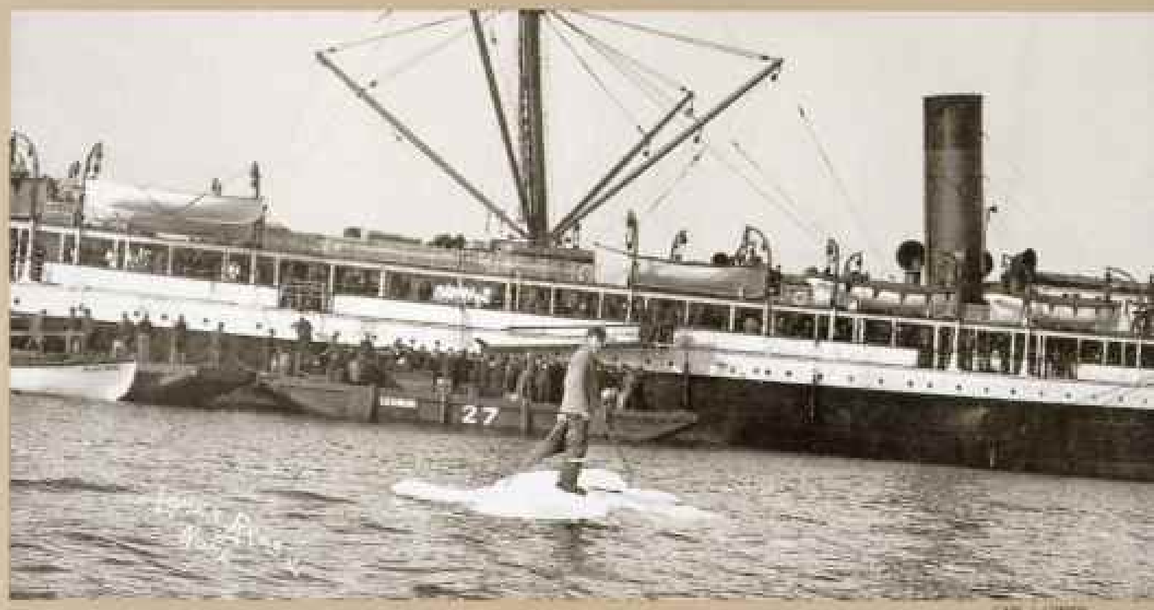
CAPT. ALBERT W. STEVENS

FLYING HIGH OVER THE ANDES: AN ORDEAL AND A THRILL

The "hump" of the Andes is "aviation's hardest run," Capt. Albert W. Stevens of the U.S. Army Air Corps commented in the May 1931 Geographic. The aviator and balloonist, at left, wrote from experience. Today's readers may not realize the hazards of flying in an unpressurized plane at altitudes up to 23,600 feet—and taking photographs of the glaciers and ice fields between Argentina and Chile from a windy cockpit all the while.

"I shoot negatives as fast as I can," wrote Stevens. "I must pull the camera in each time, lower it, wind it, and raise it to the window again. The work of handling the heavy camera at this altitude seems tremendous. . . . I reach for the oxygen again, but nothing comes from the tube. My container, of small capacity, is empty. . . . My head begins to ache; I am shaken by waves of nausea; my breath comes in painful gasps."

Yet Stevens continued to fly. In 1935 he and Capt. Orvil A. Anderson soared to a then record altitude of 72,395 feet in the *Explorer II* balloon.



CARL J. LOMEN

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2000 NATIONAL GEOGRAPHIC

DEVON JACKSON

CHRIS KUSEK-TRAMS

BLENDING IN, STANDING OUT

Suits and ties used to be mandatory, or at least expected, at the Society's Washington, D.C., headquarters. But when staffers went out in the field, all bets were off. Robert W. Madden (above) "went native" to avoid attention while photographing a story on Brooklyn that appeared in the May 1983 issue. In 1968 photographer—and later Editor—Wilbur E. Garrett (top right) couldn't help standing out while working on an article about the Mekong Delta during the Vietnam War. "By stripping away romantic notions and exposing war as a horrible, futile depravity, we might help temper, at least for one generation of readers, the fascination, the excitement, and the glory too often associated with war," he later wrote.

Senior Assistant Editor Mary G. Smith (center) needed no extra effort to make an impression on Koko, the subject of sign-language studies by Francine "Penny" Patterson. The gorilla's photographic self-portrait made the cover of the October 1978 issue. Smith's work with Patterson and other recipients of Society research grants led to dozens of memorable articles.

Photographer George Mobley was his own model for this serene portrait (right) made while canoeing on Alaska's Lake Schrader for the Society's 1988 book *America's Hidden Wilderness*. But Mobley recalls another, less idyllic, Alaska trip: He was trapped for ten days on an island in the Bering Strait, with little to do but eat seal meat and photograph everything in the village—over and over again. When a walrus swam by, its capture provided a refreshing change in diet.

KENNEDY COHN

GEORGE F. MOBLEY

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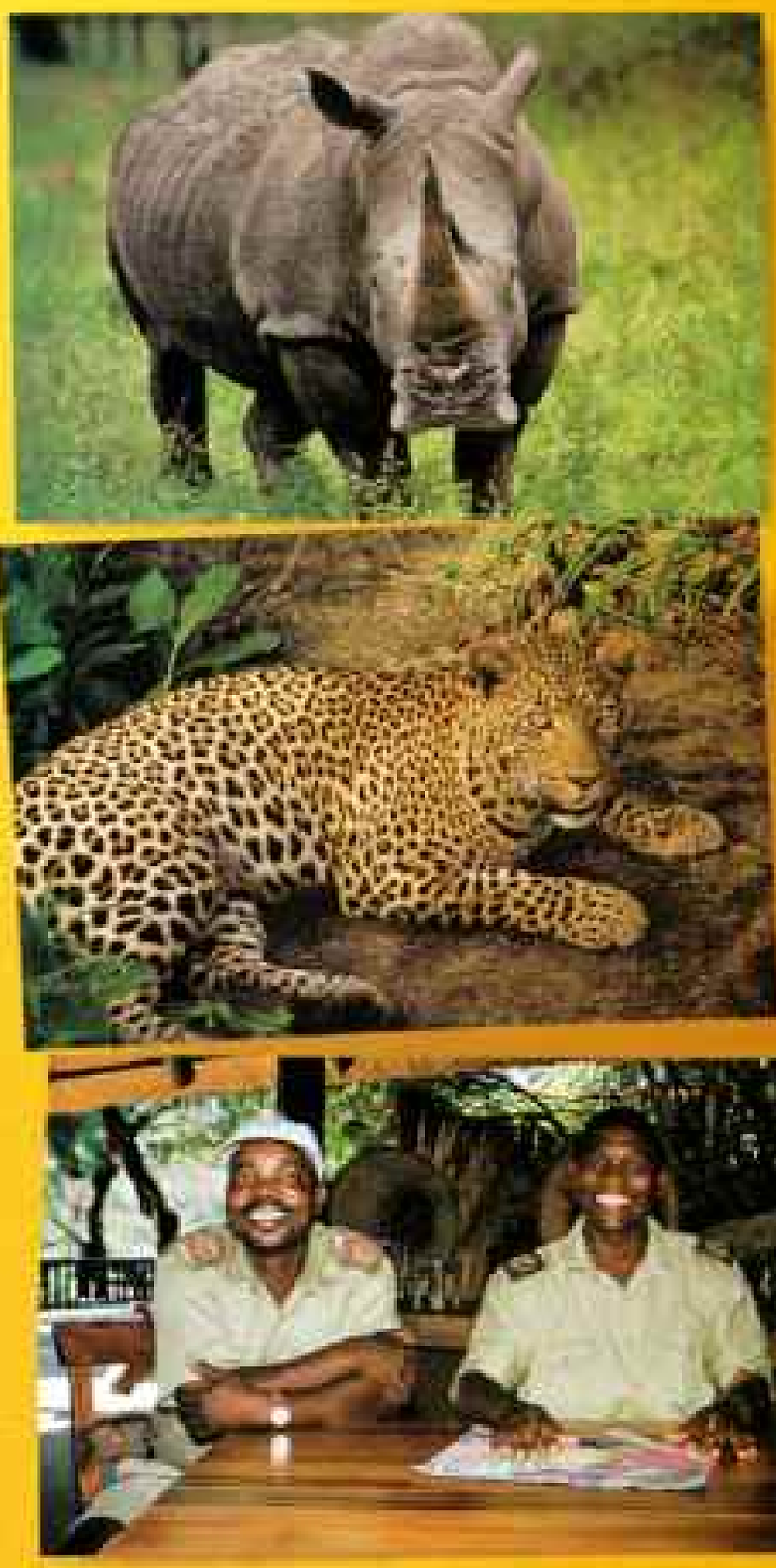

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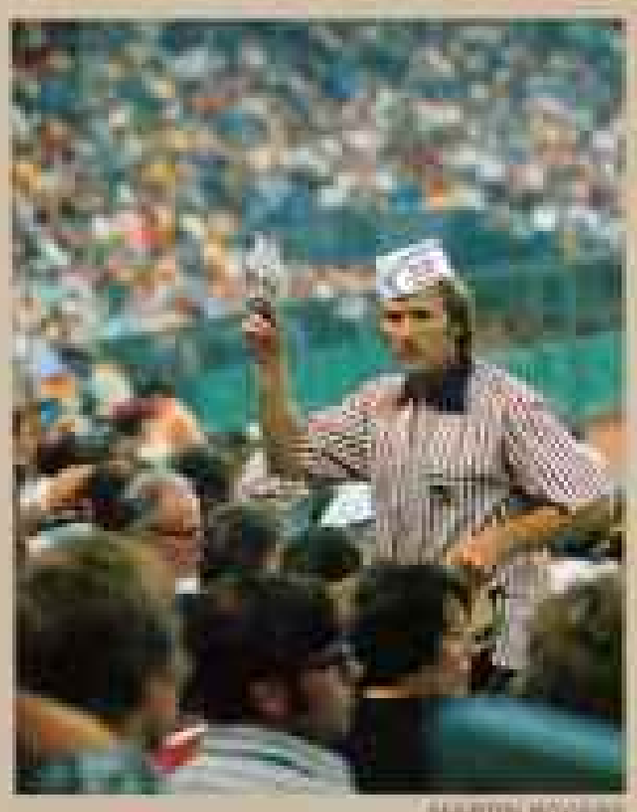


MARTIN ROGERS

PETE SOUZA

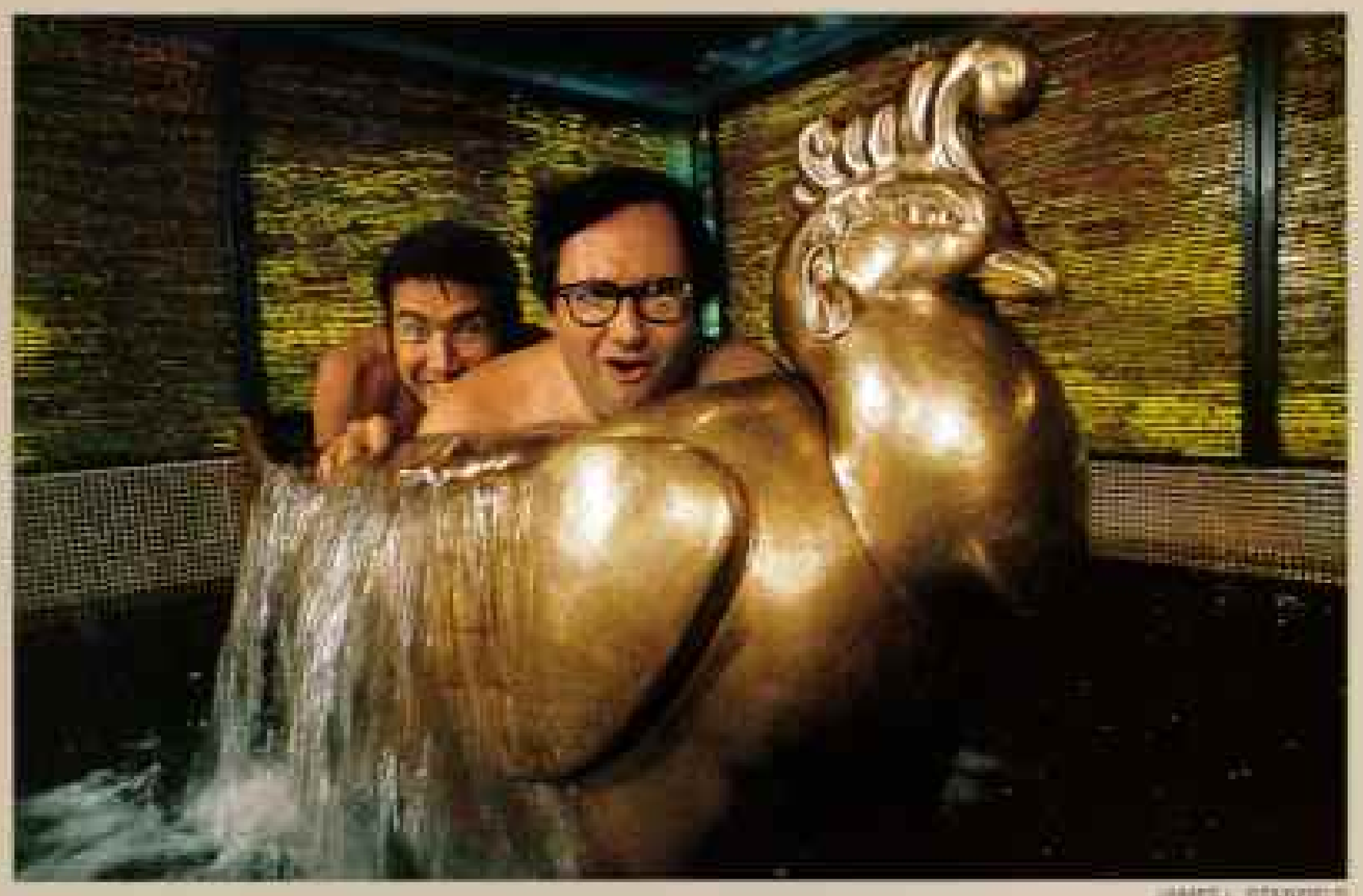
ALL WORK (AND A LITTLE PLAY)

Writer Cathy Newman normally enters her car through the door, not the window as she did during a lesson at Richard Petty's driving school at Charlotte Motor Speedway (above). Newman took the wheel and followed an instructor on an unnerving spin around the track for a March 1985 article on North Carolina's Piedmont.

Fresh off an assignment in the Middle East, Thomas J. Abercrombie found himself on his way to Antarctica to photograph Operation Deep Freeze III, when humans first wintered at the South Pole. Abercrombie was scheduled to stay only briefly at the Pole, though he begged for more time. But his one-hour stay stretched into three weeks after his plane back to McMurdo Sound blew an oil gasket. His labors for the April 1958 issue left him looking like the abominable iceman (top left).

Most staffers throw themselves into their assignments. Writer Thomas Y. Canby displayed the work of a group of Philippine rat catchers (left), then sat down with photographer James L. Stanfield to a meal of deep-fried rat. "Surprising ourselves by enjoying three apiece," he told July 1977 readers. "Jim and I agreed they had the pleasing gaminess of squirrel or rabbit." Scrubbed and gowned in a Birmingham hospital, writer Howard Lu Fay watched open-heart surgery for an October 1975 article on Alabama. Writer Priit Vesilind sold peanuts at Cincinnati's Riverfront Stadium for a February 1977 article on the Ohio River.

But it's not all hard work. For a January 1974 article on gold, Stanfield spent an entire day photographing businessmen wallowing in a solid-gold tub in a Japanese hotel. At day's end, however, Stanfield and writer Peter White—still wearing his glasses—leaped into the tub for a wallow of their own (below).



JAMES L. STANFIELD

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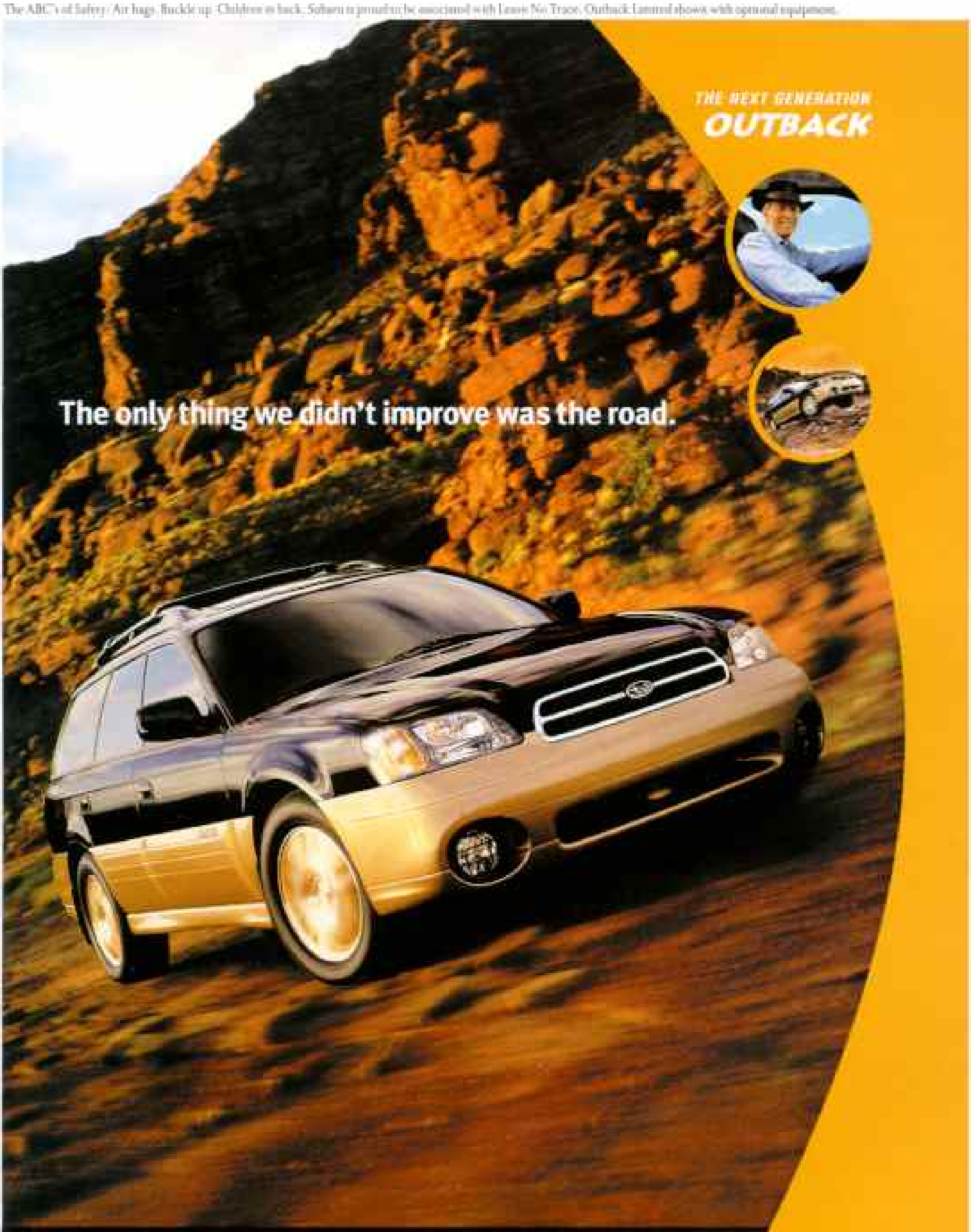

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NATIONAL GEOGRAPHIC
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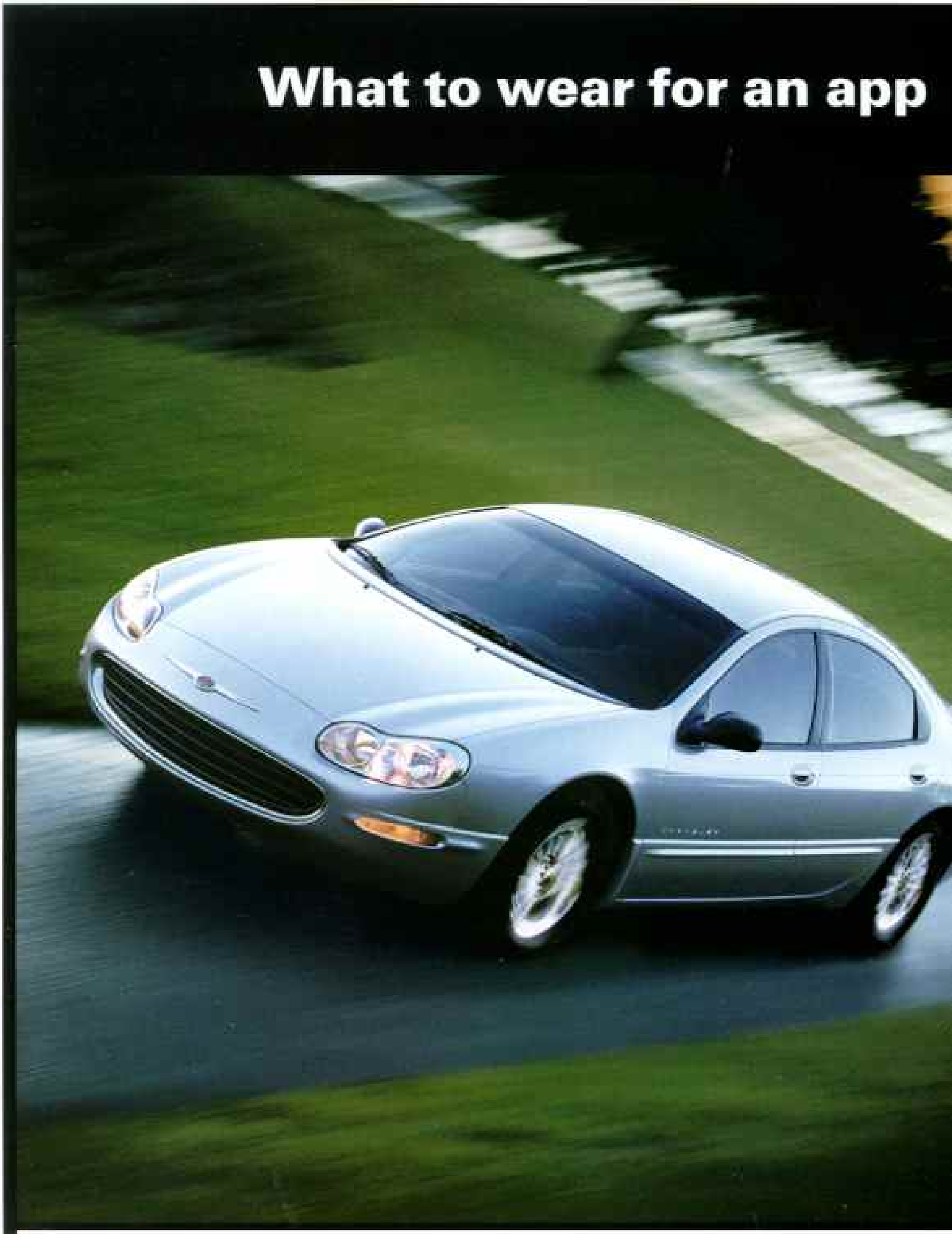
Relishing the Radish

Think of a radish: small, round, red, and used to spice up a salad. Now consider the radish first imported by Spanish colonists and still grown in the rich soil around the Mexican city of Oaxaca: It grows in bizarre shapes up to a foot and a half long and four to five inches in diameter. In colonial times artisans began carving radish figures, first with religious themes, more recently into fanciful shapes like this dancer (right). Since 1897 Oaxaca has held a "Night of the Radishes" on December 23, when carvers put forth their best creative efforts to compete for honor and small cash prizes. Most are men, though women do join in. "From the first day after the contest, we begin to think about the next year," says Delfino García Esperanza, a frequent prizewinner. His brother Juan Manuel took first place for 18 straight years before retiring.

A Vintage Year for the Bubbly

Pop the cork on a bottle of champagne this very special New Year's Eve and you'll have lots of company. Experts expect revelers on December 31 to down 50 million bottles of the sparkling wine, produced from especially bountiful 1995 to 1997 grape harvests in France's 85,000-acre Champagne region. That's far more than last New Year's Eve —a mere 30 million bottles.

RICHARD THOMPSON (LEFT); ARIEL MENDOZA RAÑOS



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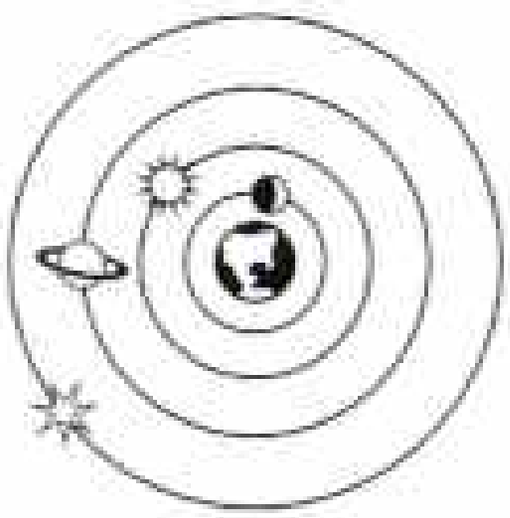
The most effective deterrent to drug use among kids **isn't the police, or prisons, or politicians.** One of the most effective deterrents to drug use among kids is their parents. Kids who learn about the risks of drugs from their parents are **36% less likely to smoke marijuana** than kids who learn nothing from them. They are 50% less likely to use inhalants. 56% less likely to use cocaine. 65% less likely to use LSD. So if you're a parent, talk to your kids about drugs. Research also shows that 74% of all fourth graders **wish their parents would talk to them about drugs.** If you don't know what to say, visit www.theantidrug.com or call 800-788-2800. We can help you.



The Geocentric System

Five hundred years ago, the sun was thought to revolve around the earth. People did not know then what we know now. Truths change. We now know smoking marijuana is harmful. The younger you are, the more harmful it may be. Research has shown that people who smoke marijuana before the age of 15 were over 7 times more likely to use other drugs than people who have never smoked marijuana.

Illegal drugs are estimated to cost America over $110 billion each year in treatment, enforcement, incarceration and social damage. **But what else could you buy for $110 billion?** Well, you could build 1,692 new hospitals. Or operate 632 universities. Or 3,667 national parks. You could hire 2,955,956 new high school teachers. Or you could put 758,620 new buses on the road. This message is brought to you by the Office of National Drug Control Policy/Partnership for a Drug-Free America®

Shining Light on Ancient Rock Art

FRED R. CAMPBELL

Midday in central Texas on the winter solstice: A spot of sunlight appears from between two boulders, then elongates into a dagger that travels across a pre-Columbian pictograph of a shield. As the sun reaches its zenith, the dagger pierces the center of the shield (above middle).

Ranchers at Paint Rock, 30 miles east of San Angelo, noticed the moving shaft of light and called R. Robert Robbins, a University of Texas astronomer, to investigate. What he saw was "a magnificent display of Indian rock art." A second sun dagger makes an appearance 150 feet to the west on the summer solstice. Oral history says the paintings were created by five Native American tribes that met annually, perhaps on a solstice, to divide up hunting territory.

More Fossils by a Dam Site

Kathleen Springer can barely contain herself as she lists the fossils found at the site southwest of Palm Springs where the Metropolitan Water District of Southern California is building its Eastside Reservoir.

"There are mammoths, mastodons, bison, camels, horses, saber-toothed cats, giant ground sloths, North American lions, black bears, wolves, and small animals like badgers, weasels, rabbits, turtles, mice, frogs, and birds," says the San Bernardino County Museum paleontologist. The list goes on and on: 20,000 fossils from 13,400 to 43,000 years old, many of animals never before seen in inland California.

Fossils such as this huge femur from a Columbian mammoth (right) began turning up in 1993 when construction began. "Bones started popping up out of the ground," says Springer. "We're still frantically collecting."

JIM BARNES, METROPOLITAN WATER DISTRICT (ABOVE); DAVID PAUL MORRIS

Country Music Rocks Japan

On Charlie Nagatani's 20th birthday a friend took the Japanese student to hear a country music band. "That night 43 years ago changed my whole life," says Nagatani (left). The music appealed to him so much that he quit college, became a singer, and formed a band. A decade ago he created an annual festival, Country Gold, at the foot of Mount Aso in Kumamoto, Japan. The one-day event, featuring U.S. stars and Nagatani's own band, Charlie's Cannon Balls, draws 25,000 visitors, an example of culture's globalization (GEOGRAPHIC, August 1999). "I wanted to introduce this wonderful music, and true American culture, to the Japanese people," Nagatani says. Most of those who attend the festival don't understand English, but their numbers have been increasing annually—old and young alike, he adds.

TEXT BY BORIS WEINTRAUB

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Forum

The cover of our August Millennium issue on global culture sparked disparate reactions. One reader criticized it for being "sexually provocative" and "in poor taste," but Rev. Roger Wootton of Malden, Massachusetts, who wrote about the issue in his parish newsletter, remarked: "I don't believe you could possibly have found a better photograph to draw us into this marvelous article."

A World Together

Your story made me think of several encounters I have had this year as an amateur genealogist. I met an African-American man at the New England Historic Genealogical Society, and we shared information about our *Mayflower* ancestors. I helped an Asian woman look up an American Civil War ancestor while looking up my own great-great-grandfather's regimental history. At a genealogy class I met a man with an Irish name and a priestly collar who was related to one of New England's first Puritan ministers, who was also my ancestor. Your article reminds me that we really are all cousins, more related by blood than by cultural symbols such as clothing, music, and CNN.

HEATHER WILKINSON ROIO
Londonderry, New Hampshire

Joe McNally's photograph showing a shoeless woman and a poster of an actress (pages 14-15) grabbed my attention. The casual inequality of life in our country can be a sobering, sometimes heartbreaking reality. At 80, I've had many years to observe man's inhumanity to man but have never learned to be complacent about it.

BETTY NORMAN
Globe, Arizona

I have found during travels in 147 countries that Arabs in Yemen's desert, villagers in Laos, and potato farmers on Tristan da Cunha know a great deal about the United States. But most Americans know little about how anyone else lives. Your article was badly needed.

WESLEY M. WILSON
Olympia, Washington

Culture Map

Your projection of a population of 24 million in Lagos, Nigeria, by the year 2015—doubling that of today—is horrifying to contemplate. That is but tomorrow in the context of planning and financing essential services, which are already inadequate. I foresee a mass of humanity living for the most part

in abject poverty with social problems ranging from undernourishment and disease to crime and the inability to cope with a major fire or like disaster. I hope I am wrong but fear I am not.

IAN ALLAN
Simon's Town, South Africa

Your chart of the ten top languages in the world leaves out Arabic, one of the six official languages of the United Nations and spoken by well over 135 million people.

M. H. KUBBA
Cham, Switzerland

Some linguists argue that many varieties of spoken Arabic are not mutually intelligible and should thus be considered separate languages. Our source—the Summer Institute of Linguistics in Dallas, Texas—listed Egyptian Arabic, spoken by 42.5 million people, as 25th in the world's top 100 languages. Other scholars conclude that Arabic is a single language with many dialects. In that view Arabic, with roughly 200 million native speakers, would rank high on our map's language list.

I was very surprised when I saw in your "Voices of the World" map that Transylvanians speak mostly Hungarian. I lived in Transylvania for more than 30 years, and while it is undeniable that there is an active Hungarian minority in that region, the vast majority of the population speaks Romanian. East Europeans still maintain a fragile ethnic balance that can be easily overturned, creating havoc, as in Bosnia or Kosovo. I hope NATIONAL GEOGRAPHIC will review the accuracy of this information in light of the ever sensitive issue of ethnicity.

RADU OPREA
New York, New York

While there are pockets of Hungarian speakers in Transylvania, our map does give the false impression that the entire area speaks Hungarian.

Tale of Three Cities

The artwork on pages 42-4 has a subtle message. In A.D. 1 we see several people interacting and working together. In A.D. 1000 we see a teacher and his students learning together. In A.D. 2000 we see a lone individual surrounded by meaningless things and technology but without any human companionship or personal interaction. This is progress?

JOHN SCHAEFER
Toms River, New Jersey

Vanishing Cultures

Your article includes a photograph of a "newly circumcised bride" (page 80). Female genital mutilation results in lifelong pain, both physical and psychological. This barbaric practice involves millions of women and girls in Africa and other continents. It must not be glossed over.

CHERYL KOHR
Redondo Beach, California

Italy's Endangered Art

I agree that Italy itself is like a museum. I live in a village 30 kilometers from Milan. We have a 12th-century church and an 18th-century villa cataloged as among the biggest and most sumptuous in Italy. I advise tourists to visit those parts of the country that are less famous but equally beautiful. Italy is something more than Venice, Rome, Naples, and Pompeii.

GABRIELE VISCONTI
Vaprio d'Adda, Italy

The road to preservation of the country's endangered art treasures cannot be paved only with good intentions, new ideas, or the labor of Italian citizens and scientists. The volume of treasures to be preserved is simply too large for the Italians to fund by themselves. If we in the United States want our children to enjoy the world's cultural heritage, we should designate a significant fraction of our expected tax surplus to start a fund for the preservation of such treasures.

DIETER HEYMANN
Houston, Texas

The Power of Writing

You stated that most Chinese written characters have remained essentially unchanged for more than 2,000 years. This is partly true because Taiwan, Hong Kong, and overseas Chinese communities still use the traditional characters. Under Mao, however, mainland China's writing was changed to a simplified form that destroyed the lineage, integrity, and beauty of the characters. To me, this is the saddest thing to happen to China's cultural heritage.

JESSE LEE
San Francisco, California

Cary Wolinsky's rebus was a delight, but I offer that by tying unruly stalks in the creation of his beautiful montage, Mr. Wolinsky has added a ninth image that reverses the meaning of his simple declarative. It now reads, "I believe I can (k)not read Plato."

JANET THATCHER
Joliet, Illinois

Sequoyah, the great Cherokee leader of the early 19th century, was not mentioned in your article. He created a system of writing called "talking leaves," which communicated all 85 sounds of the Cherokee language. Following his invention, the Cherokee people, both east and west of the Mississippi, experienced a cultural renaissance that saw cabins grow to mansions and garden plots to plantations. Sequoyah died in 1843, trying to bring home a lost band of Cherokee from Mexico. His grave has never been found. There is probably no nation that has been so profoundly changed by the work of one man and the power of writing.

DAVID CORNSILK
Tahlequah, Oklahoma

Whether it be through the perfectly formed writing of a scribe or the beautiful and shaky letters of a little girl, the profoundness of writing was splendidly presented by Joel Swerdlow's words and Cary Wolinsky's pictures.

DARREN MACKINNON
Riverview, New Brunswick

Flashback

The photograph evoked enduring recollections. As a student at Berlin's Friedrich-Wilhelm [now Humboldt] University I was present that night, standing behind the iron enclosure, agitatedly watching the man who shouted the authors and titles of the burning books. The change from the traditional democratic atmosphere to fascist despotism developed rapidly during the 1933 summer term. Approved by Goebbels, the dirty spectacle was organized by Graf von Helldorf, chief of the Berlin SA (storm troopers), whose masses consisted of middle-class employees, unemployed people, "converted" communists, political fanatics, adventurers, criminals, and maybe a few broke undergraduates.

KURT PATZWALL
Berlin, Germany

Millennium Moments

I believe the prevailing scholarly opinion is that Jesus of Nazareth was born sometime in the years 6 to 4 B.C., not A.D. He was born while Herod the Great was still reigning as king over the region of Judaea, and Herod died in 4 B.C.

JIM PROCTOR
South Royalton, Vermont

You are correct. We were so concerned about which year to use that we missed the more significant error.

Why are no women mentioned in the "Cultural Milestones" time line? I would think that Cleopatra, Joan of Arc, or Elizabeth I would have occurred to the listmakers.

JANET CHANIOT
Potter Valley, California

You forgot the invention of the computer. No other thing has influenced and will further influence more the development and spreading of culture, knowledge, and art.

JENS SCHULTZ
Herford, Germany

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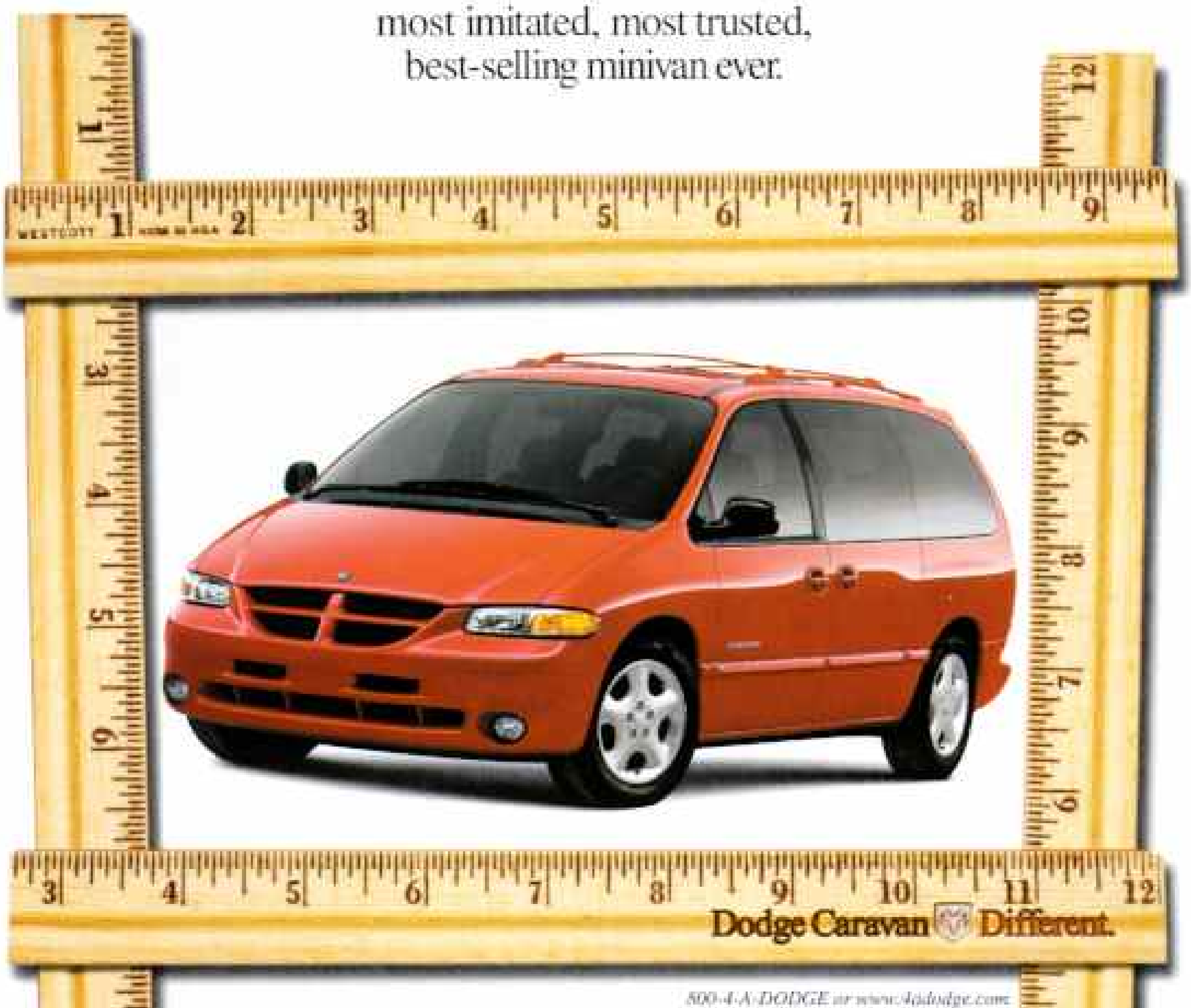

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Priming the Panda Pump

A month old and adorable from the start, a female panda cub rests in an incubator at China's Chengdu Giant Panda Breeding Research Base. A male gets cow's milk (right) to supplement that of his mother, at right. Both youngsters were conceived at the base by artificial insemination, a vital technique since pandas reproduce poorly in captivity. Only a few dozen such cubs have survived since 1963.

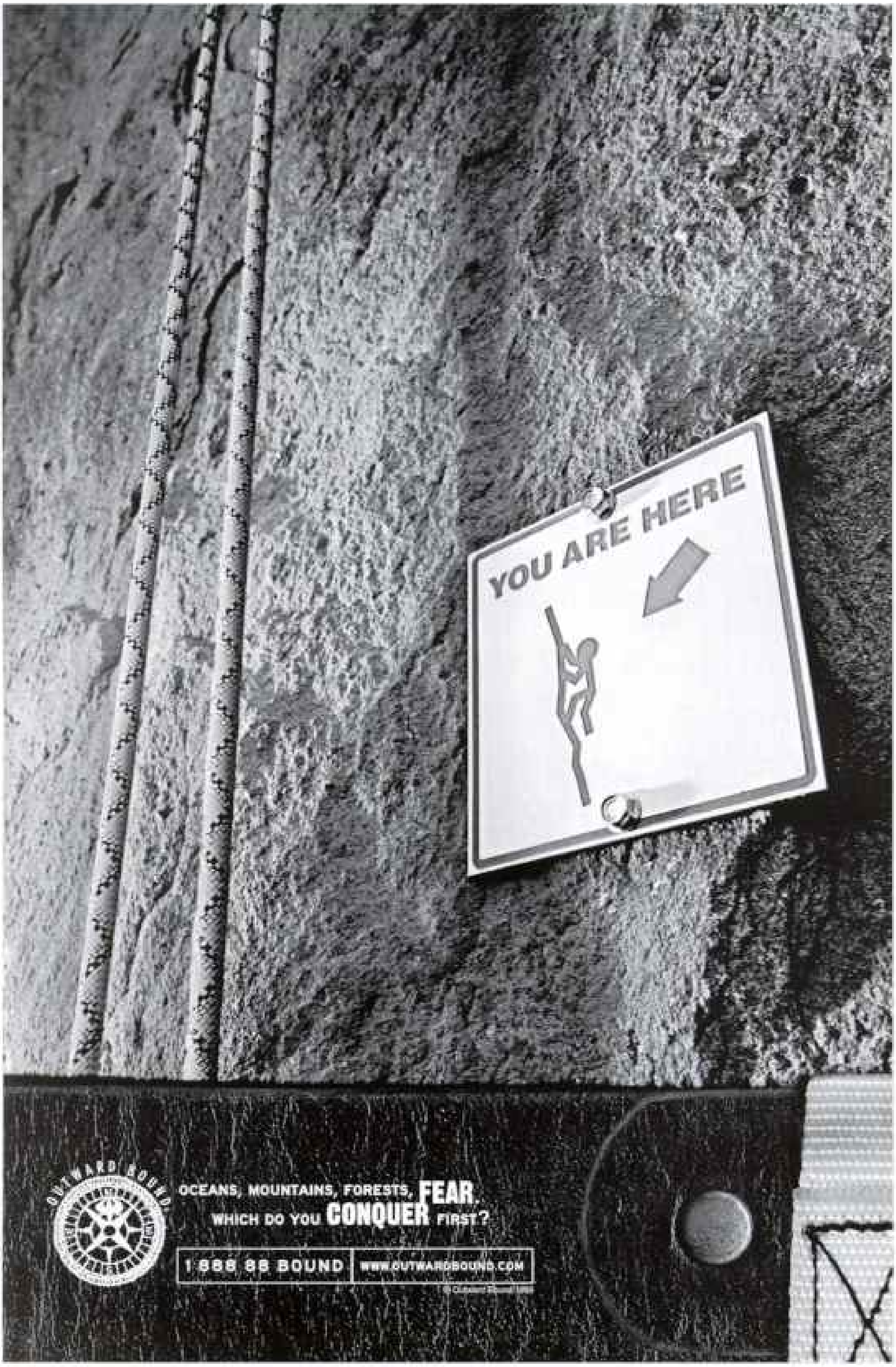
The female above and another young male will be leased to Zoo Atlanta for at least ten years. To comply with new federal rules, the zoo will contribute one million dollars a year for panda conservation and research in China.

BOTH BY JUSTIN JIN

ANIMALS, ANIMALS/OXFORD SCIENTIFIC FILMS

Woodworking Wasps Use Metal Tools

To provide their young with all the comforts of home while growing up, ichneumon wasps lay their eggs in or on the bodies of host grubs. But there's a catch: The grubs are sometimes those of wood-boring insects hidden deep within tree trunks. How to reach them? Ichneumons' abdomens come equipped with an egg-laying structure, or ovipositor, hardened with ionized manganese or zinc. "Some can drill as much as three inches into solid wood," says Donald Quicke of Britain's Imperial College. When the wasps hatch, they chew their way out with mouthparts also hardened with minerals from the grubs they ate.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Roadkill Resurrection for Terrapins

In June female northern diamondback terrapins leave their marsh homes to lay their eggs in sand dunes. But in New Jersey many dunes have been leveled for development. Drawn instead to embankments along coastal causeways, many females climb them and wind up on the road. "Between 650 and 750 a year get run over," says Roger Wood of the Wetlands Institute in Stone Harbor. In 1989 Wood discovered that many eggs inside the victims are still viable.

RON FRICKE, PHILADELPHIA ZOO (LEFT); MICHAEL WILKINSON

So he recruited volunteers to collect the eggs and hatch them in incubators at Richard Stockton College. For ten months the hatchlings are cared for at the college and at the Philadelphia Zoo, where junior zoologists (left) prepare the terrapins for release to the wild; by then they are three inches long (above) and too large a mouthful for gulls or raccoons. "We have a 35 to 40 percent successful hatch rate," Wood says, "with about 250 eggs a year hatching." He cautions that only one of every two or three released hatchlings survives to adulthood.

■ NGS RESEARCH GRANT

Managing Elephants' Voracious Appetites

Although many African elephant populations are declining, in northern Botswana elephant numbers have soared to some 80,000, the continent's largest herd. Their destructive feeding habits—like shaking camel thorn trees for their seedpods (below)—have been cited as the cause of habitat loss. But Israeli zoologist Raphael Ben-Shahar has studied the ecosystem in and around Chobe National Park since 1991 and says that such appearances can be deceiving. He argues that the elephants usually cause no permanent damage and that other factors may have a substantial impact.

RAPHAEL BEN-SHAHAR

"Many of the thorn trees that visitors see with elephants nearby have been killed by flooding, which thorns cannot tolerate," Ben-Shahar says of the Savuti Marsh in the heart of the park. "And in the north many trees are killed by wildfires that start outside the park." His work is helping managers assess the health of habitats. Ultimately, he says, "if a habitat is undesirably changed by elephants, then their removal should be considered—even by culling."

MICHAEL J. TERRIO

Tiny Owl vs. Arizona

With a name nearly as long as its seven-inch height, the cactus ferruginous pygmy-owl is at an impasse with Tucson developers. A new high school has been stalled since 1997 because the site was too close to nesting pygmy-owls. Ranging from Mexico to the U.S. desert, the owls have lost their homes to land clearing. In Arizona only 30 birds can be found. Last July the U.S. Fish and Wildlife Service designated 731,712 acres—one percent of the state—critical habitat for the owls.

TEXT BY JOHN L. ELIOT

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HELMUT LANG

cotton-satin suit and black t-shirt

silk-canvas evening dress with shoulder wrap and silk-canvas armbag

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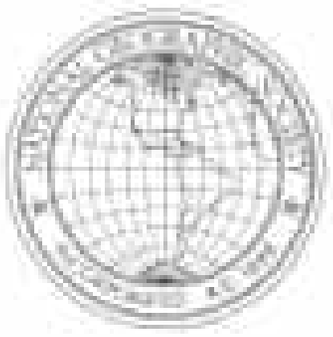

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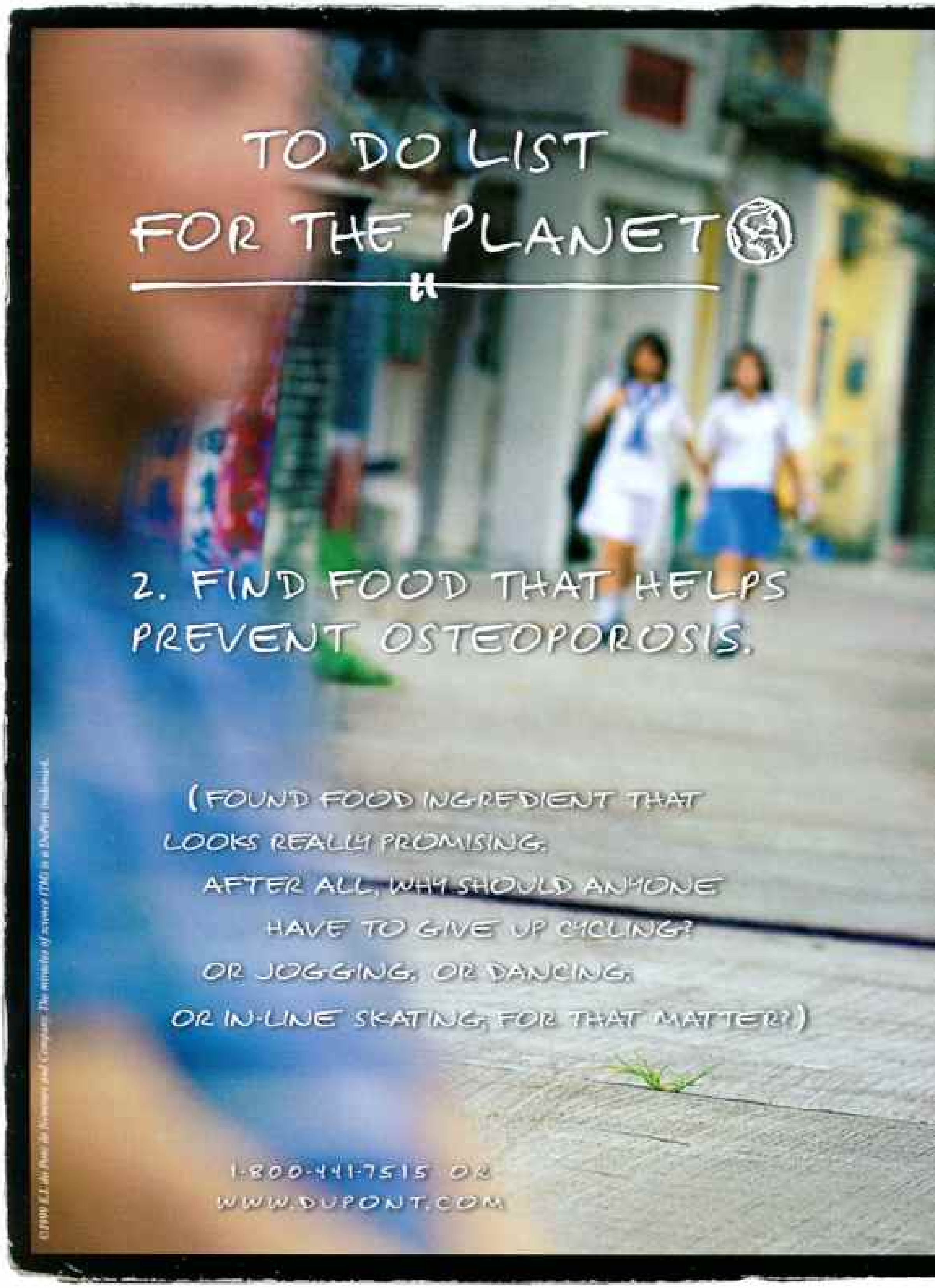
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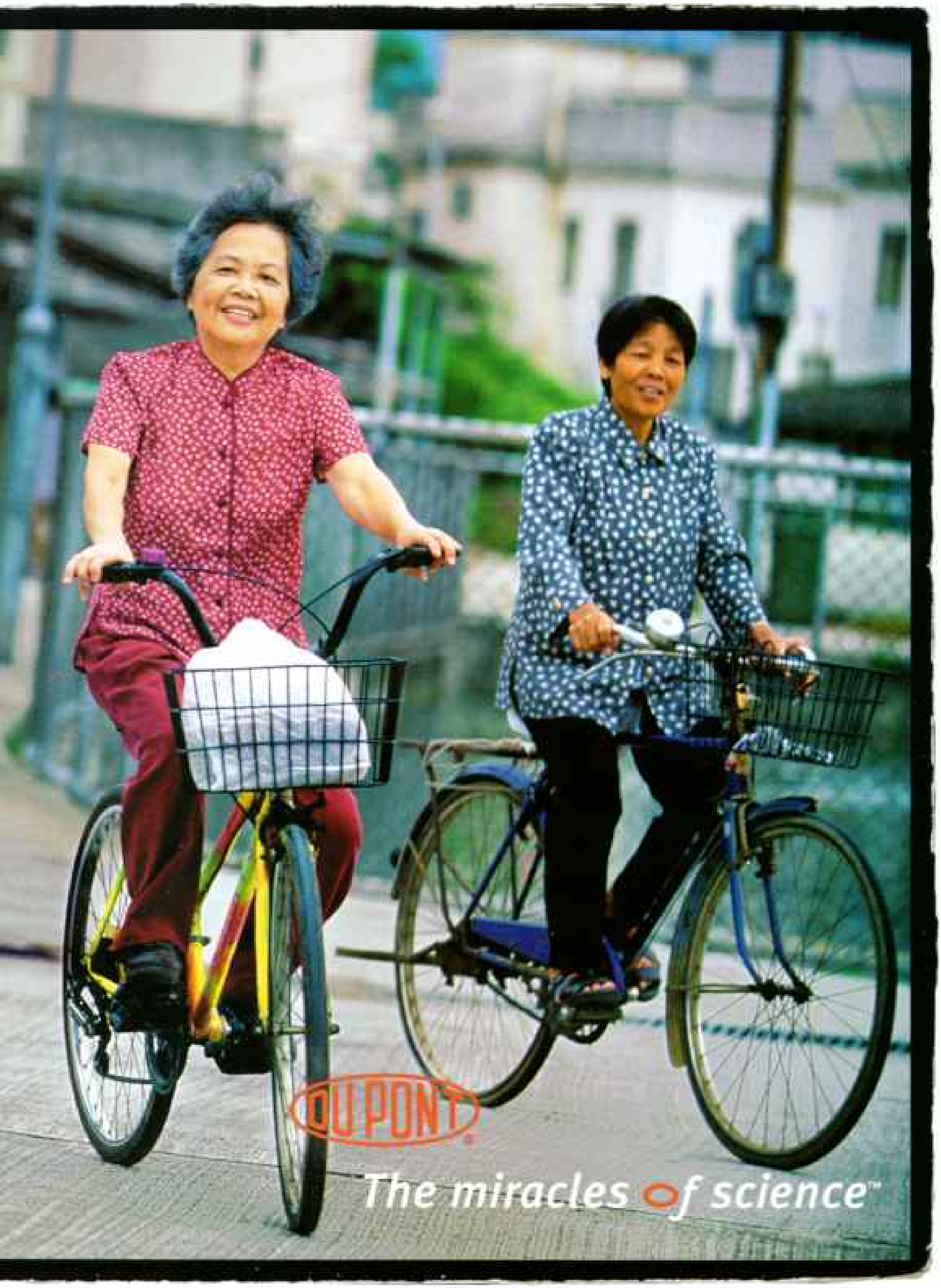
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VOL. 196, NO. 6 DECEMBER 1999

NATIONAL GEOGRAPHIC

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PROTECT ENDANGERED SPECIES

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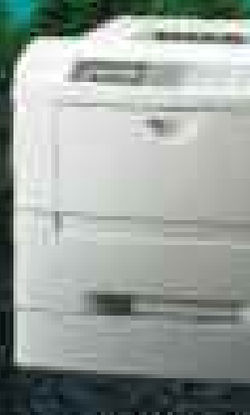

Ecosys Printer

Why can't office machines be economical *and* environmentally sensitive? That's the idea behind Kyocera's Ecosys printers. By eliminating the toner-cartridge system, we gave every Ecosys printer a longer life cycle and a lower cost per page. No cartridges to replace means less garbage and lower maintenance costs. And we also made sure that Ecosys components can be disassembled and identified easily for recycling. Because taking care of the earth is everybody's business.

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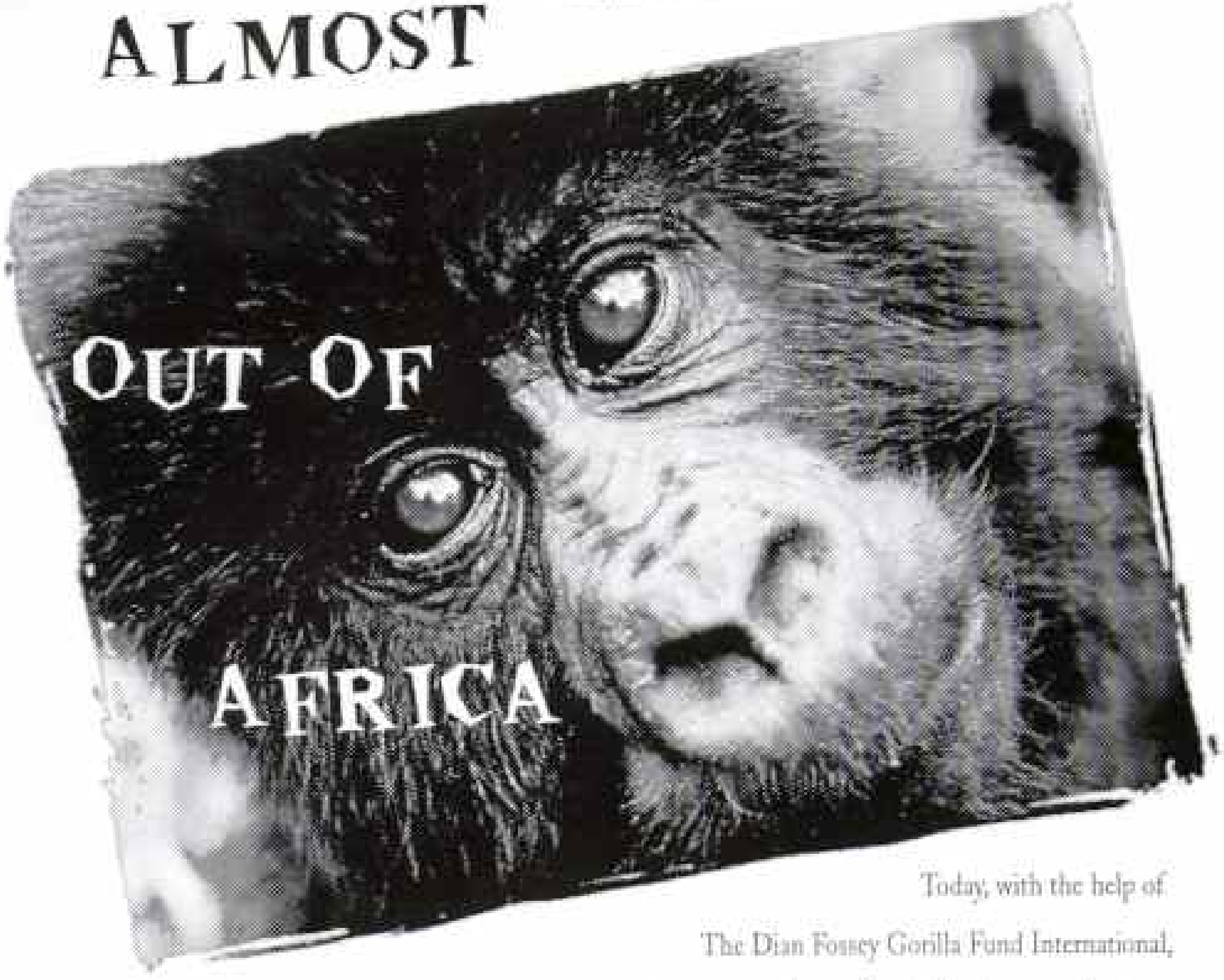
They are majestic. Sensitive and perceptive. Just one glimpse into the soulful eyes of a mountain gorilla, and a lifetime of misconceptions vanishes into the African wind. And even though they weigh up to 450 pounds, they are being driven out of the rain forests of Central Africa because of poaching and human encroachment into their natural habitat. They are now in danger of extinction, with just 650 left in the world.

ALMOST OUT OF AFRICA



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■ FROM THE GEOGRAPHIC ARCHIVES

What Interesting Hats You Have

Black-and-white photography couldn't capture the scarlet-capped girls of Hesse, Germany—even though, as the Grimm brothers' tale has it, the wolf did. Grimm scholars now know that the story of "Little Red Riding Hood"—or "Little Red-Cap"—was first published in France in 1697. But residents of Hesse's Schwalm region prefer to believe that the fairy tale, collected by the Grimms as oral folklore in the early 1800s, was inspired by the traditional red headpieces, known as *Betzeln*, worn by local girls. The hats cover a braided topknot and are part of an elaborate costume, still worn on holidays, that broadcasts age and marital status. Both girls and boys dress in red to symbolize youth and vitality.

Purchased during staff writer Frederick Simpich's travels through Germany in 1920, this photograph has never before been published in the GEOGRAPHIC.

KEY TO 1999

CLOSED DOORS opened to GEOGRAPHIC readers in 1999. Twice they saw the face of Cuban culture, in June and October. A look at Iran came in July, and at Iraq in November. Members also learned in November of newly discovered birdlike dinosaur fossils. Today's flora and fauna were examined in February's biodiversity issue—part of a special millennium series—followed by a human counterpart on global culture in August. To track memorable articles from recent years, a cumulative index for 1989 through 1998 is available for $15.95. The first 110 years of the GEOGRAPHIC, 1888-1998, are available on CD-ROM for $99.95 and on DVD-ROM for $119.95, plus postage and handling. To order, call 1-800-437-5521 or write to NGS, PO Box 11650, Des Moines, IA 50340-1650. An online index can be searched by going to *www.nationalgeographic.com* and clicking "NGS Publications Index."

NATIONAL GEOGRAPHIC

Behind the Scenes

BOB SACHA

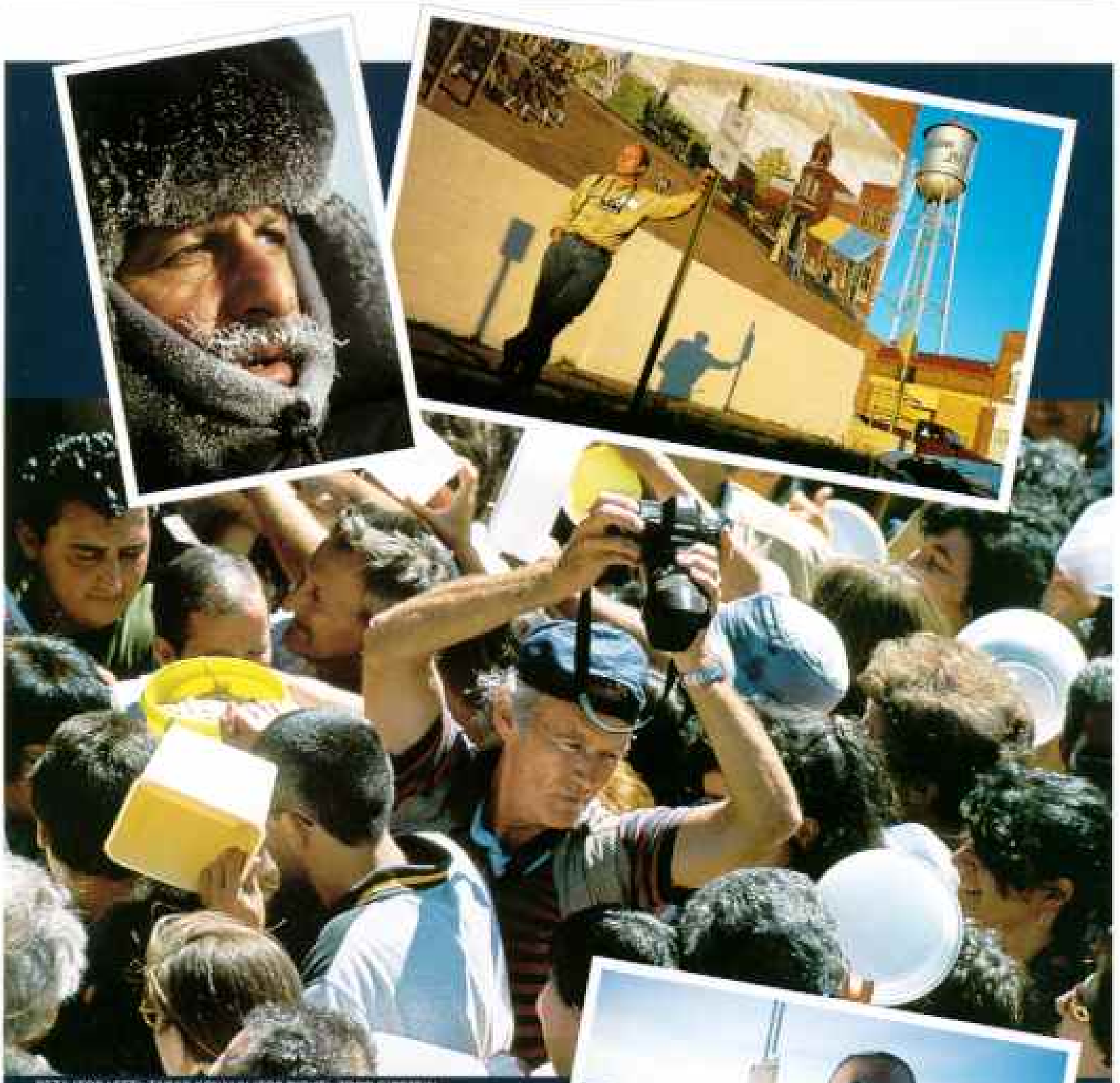
A Boy's Airbrush With Fame

Buddy Gregory had a face full of stars (right) when photographer Bob Sacha took his picture for our December 1986 article on Halley's comet. His dad, Key West airbrush artist Tony Gregory, had decorated the five-year-old himself. When Bob returned to the Keys for this issue, he looked up his former subject—and found him all grown up (top). Bob's shot has followed Buddy, now 19, all his life: A poster of it hangs in his father's shop, and he's also seen himself in advertisements. A friend once sent a card of the image to Buddy's family, not realizing who the kid in the picture was. Buddy still gets painted but only for special occasions. "It's not the kind of thing you'd want to do every day," he says.

TIPPER GORE

Shooting to Make a Difference

Staff photographer Jodi Cobb joins 12 other artists in "The Way Home: Ending Homelessness in America," a show opening this month at the Corcoran Gallery of Art in Washington, D.C. The project was the idea of Tipper Gore, who hopes the images' emotional impact will make people want to help the homeless. Jodi met Mrs. Gore, an avid photographer, in 1976 after covering Nashville for a GEOGRAPHIC story. When the two traveled to Miami to shoot for the exhibit, Mrs. Gore caught Jodi in action (left) with Connie Seay.



REZA (TOP LEFT); TARAS KOWALIV (TOP RIGHT); TODD GIPSTEIN (CENTER); CAPT. JEFFREY FISCHBECK, USN

Previews for the Year 2000

We've got some good stories in store: Polish photographer Tomasz Tomaszewski got an eyeful of Iowa (top right) when traveling across America to update his outsider's view of the country, published in our January 1988 issue.

For our series on ancient Greece Jim Stanfield (center) waded through a mob at a bull sacrifice—but kept on shooting. Part one debuts this month; parts two and three continue in the new year.

Photographer Reza (top left) survived minus 40° temperatures, though his camera batteries did not, while covering China's Black Dragon River. Jay Dickman (above) was literally on thin ice while waiting to photograph an Arctic submarine. When the surface under his heavy, camera-laden sled gave way, he was dumped into the drink. "I'm six feet tall; that water is 12,000 feet deep," he says. "That's all that kept going through my mind."

TEXT BY MAGGIE ZACKOWITZ

NATIONAL GEOGRAPHIC

CartoGraphic

Mapping Ecosystems for Conservation

The rapid pace of global development is forcing conservationists to ask tough questions.

Which pieces of Earth's tattered patchwork of habitats are the most biologically diverse? Which face the greatest threats? Where should the efforts to save endangered ecosystems be concentrated?

Biologists at the World Wildlife Fund (WWF) have undertaken an ambitious effort to provide some answers. They've compiled a digital map of Earth's terrestrial ecoregions, delineating some 900 distinct units, 114 of which are in the United States and Canada (below).

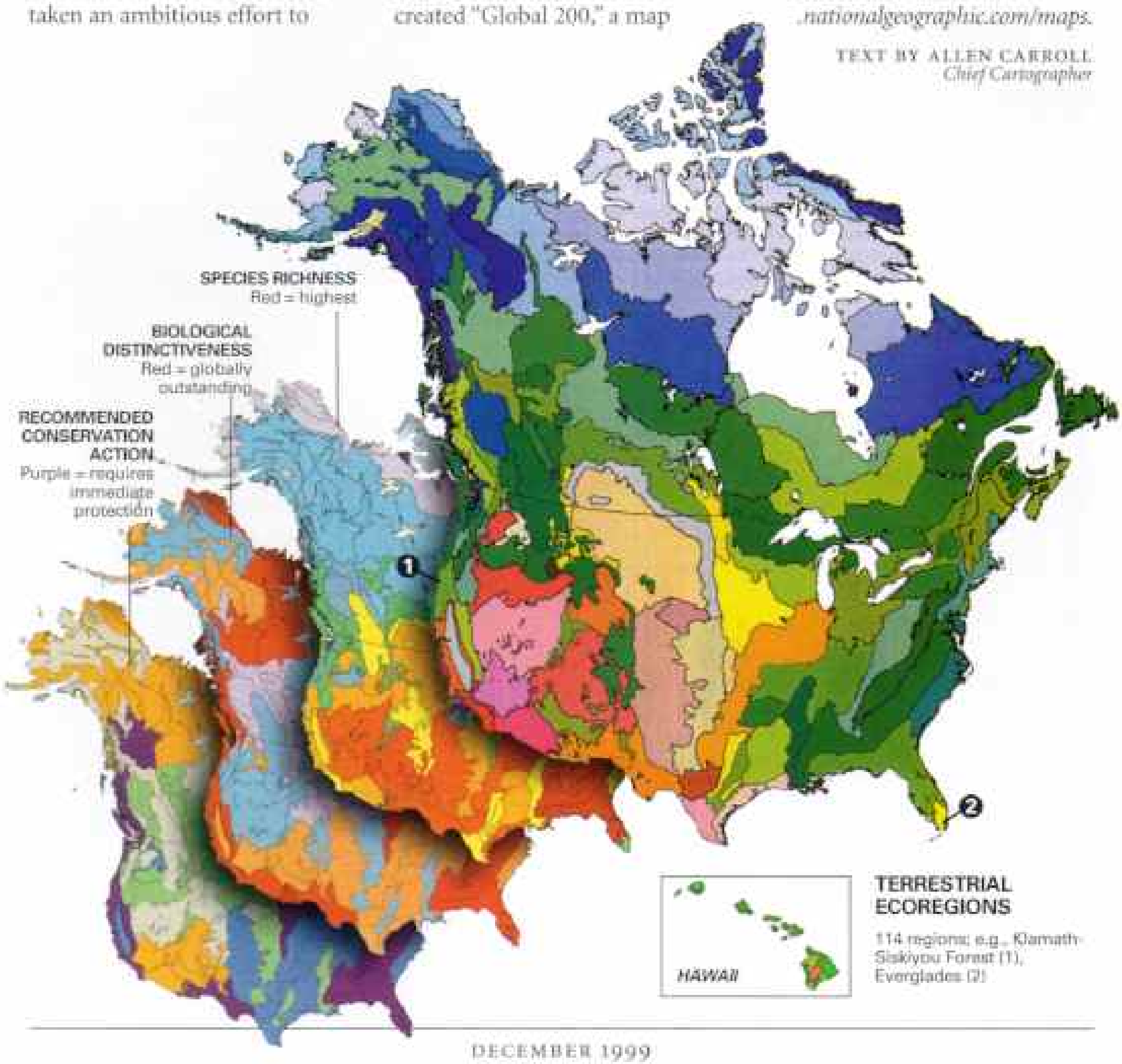
Consulting with dozens of specialists and organizations, WWF is compiling species lists of birds, mammals, reptiles, and amphibians for each ecoregion and noting which species live only in that region.

Analyzing these and other features, the scientists have created "Global 200," a map of the most biologically outstanding regions worldwide.

The next step is determining which ecoregions are in the greatest peril based on habitat loss and risk of extinction for various plant and animal species. This "most endangered" list will aid in rallying politicians, scientists, conservationists, and citizens to come to the rescue of critical ecosystems.

You can tour the "Global 200" map on National Geographic's interactive atlas at *www.nationalgeographic.com/maps*.

TEXT BY ALLEN CARROLL
Chief Cartographer



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Grimms' Fairy Tales

"Happily ever after" happened for the girl at the heart of a touching tale from Jacob and Wilhelm Grimm. When the poor but pious orphan gave her last few scraps of bread to beggars, stars fell from the sky (left) and turned into coins as she gathered them. Enjoy a multimedia version of this little-known Brothers Grimm story, "The Star Money," along with such classics as "Snow White," "Rapunzel," and "Sleeping Beauty," at *www.nationalgeographic.com/grimm.*

■ What can ancient Greece teach the modern world? Read "Echoes of the Heroic Age," beginning on page 54 of this issue, and weigh in at . . . */ngm/9912.*

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New Look for an Old Favorite

The Complete NATIONAL GEOGRAPHIC, our electronic archive of the magazine, has been totally redesigned and updated through 1998. New features in this award-winning reference product include article abstracts, bookmarking capabilities, and a more intuitive navigation system. Learn more at *www.nationalgeographic.com/cdrom/complete.*

What Does This Button Do?

We've all seen shots of "natives" marveling at modern gizmos. This time the natives are National Geographic Society executives, and the item they're eyeing is a UNIVAC computer. What year was it? Find out online in our Landmarks Gallery, then tell us at . . . */trek.*

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Wild Bactrian Camel (*Camelus bactrianus ferus*) **Size:** Shoulder height, average 172 cm. **Weight:** Male, 600 kg; female, 450 kg. **Habitat:** Arid plains, hills and deserts in Mongolia and China. **Surviving number:** Estimated at fewer than 900. Photographed by: John Hare

WILDLIFE AS CANON SEES IT

Just 24 hours old, a wild Bactrian camel calf follows its mother through China's Kum Tagh sand dunes. After about a week of seclusion, the two rejoin other females and young camels; at this time the males are solitary. Able to subsist on shrubby plants and no water for ten days, camels file across the desert on migratory tracks toward an oasis to feed on tall grasses and drink. Ancestors of the domestic camel, wild Bactrian camels are in contrast slim, less woolly, and have smaller, conical humps. Reduced to only three small populations, the wild Bactrian camel is endangered due to poaching, wolf predation and illegal mining. As a global corporation committed to social and environmental concerns, we join in worldwide efforts to promote greater awareness of endangered species for the benefit of future generations.