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MOST PEOPLE would agree that it's a foolish person or family that enjoys a decent income but puts nothing away for the future. Yet collectively we often squander the one thing we were given in abundance and can never replace or make more of—the land on which we all live.

Our cover article by George B. Schaller tells of efforts to save the charming and beloved giant panda. Survival of pandas in the wild is in jeopardy because human encroachment hasn't left them enough of their "wild" to survive in.

Appropriately, the World Wildlife Fund—which long ago took the panda as its symbol—supports Chinese efforts to reverse the panda's plunge into extinction.

This past winter I spent a few memorable days in a place much like the giant panda's south China habitat with a group convened by Daniel Taylor-Ide, director of the Woodlands Institute of West Virginia. We tent-camped in Nepal under Mount Makalu in a pristine landscape that shelters the lesser panda and hundreds of other animals and botanical species.

Two of these, the musk deer and the Asiatic black bear, are seriously endangered because of poachers. Musk sells for more than the price of gold. The Asian medicine market will pay \$600 for a single bear gall bladder—about eight times a villager's total annual income.

Despite the sublime thrill of hiking a 10,000-foot gardenlike valley surrounded by snow-mantled Himalayan peaks, the highlight of the trip was being present when a few dedicated people met to make history. Huddled in an open yak herder's shed at freezing temperatures daily for a week, the group—mostly Nepalese—worked up a plan approved a few days later in Kathmandu by King Birendra to set aside nearly 500 square miles of this high wilderness—ranging from 27,800 feet down to 3,500—as the Makalu Nature Preserve. If a suggestion for a similar preserve on China's side of the border is realized, it will provide a 1,000-square-mile international zone forever reserved for wildlife, with no human habitat.

In land-poor Nepal it's particularly farsighted and courageous to "put away a little something" for the future—especially for species other than man. Maybe this little mountain kingdom—where automobiles reaching Kathmandu had to be carried over mountain passes on the shoulders of porters until 1956—can teach the world a lesson about conservation.

Wilbur E. Garrett

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COVER: *Briefly a freeloader, a panda called Zhen-Zhen takes over a study team's tent in China's Sichuan Province. Photograph by George B. Schaller.*

Secrets of the Wild Panda

TEXT AND PHOTOGRAPHS BY

GEORGE B. SCHALLER

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NEW YORK ZOOLOGICAL SOCIETY

HER NAME is Zhen-Zhen, meaning "precious." She is a female giant panda, somewhat past her prime, a resident near Wuyipeng, our mountain camp in Sichuan's Wolong Natural Reserve, where China and the World Wildlife Fund are collaborating in panda research. For four years, from December 1980 to January 1985, I knew Zhen-Zhen. Her story is, in a way, that of all pandas.

With radio receiver tuned to the frequency of the transmitter attached to a collar around Zhen-Zhen's neck, I push through the closed ranks of bamboo stems. The signal is loud, insistent; she is close. Clouds hang low, spruce boughs sag from rain, and my clothes are sodden in this melancholy weather that bamboo needs to thrive. But without bamboo there can be no pandas.

In a clearing I see Zhen-Zhen. As silently as possible, I approach to within 45 feet and wait. Raising her massive head, she looks at me with innocent gaze (right). She snorts softly in agitation; she does not flee but rests again, a brave and lonely survivor who with the thousand or so others of her kind must fade away unless we devote ourselves to her future. Like a luminous boulder she sits, conveying a calm mystery and the durability associated with fir trees and lofty peaks.

Zhen-Zhen changes position at intervals, sleeping on side or belly, and occasionally pawing flies from her face. After two and a half hours, with the onset of a heavy rain, she stretches, arms above her head, yawns, and begins to feed on bamboo shoots. She plucks a tender shoot, and, with teeth and paws working together, peels off the tough outer sheaths, leaving only the juicy center. She eats rapidly, her actions fluid and skillful, displaying a superb ecological unity between panda and bamboo, until 17 minutes later she dissolves into the shadows.

Visibility in bamboo is so poor and pandas are so adept at maintaining privacy that this rare glimpse into Zhen-Zhen's life greatly pleased me. Despite my daily excursions I observed a panda on the average of only once a month, even though as many as 18 animals visited our 16-square-mile study area. The bamboo thickets provide pandas with not only food but also safety, guarding them with seclusion as they travel on traceless paths. Squat and barrel-shaped, pandas are built for passing under downed trees and through thickets. I am not. My progress is sufficiently noisy to alert any pandas—and they usually vanish on padded paws.

Unable to observe pandas often, we tried to gain insights into their doings by following tracks in snow. Wei-Wei, whose name





LUITZ JACOB

Making an American debut in 1936, the first live panda to reach the West arrived in the arms of Ruth Harkness, who brought it from China's Sichuan Province. Chicago's zoo acquired the cub the following year. Named Su-Lin, it launched the present-day panda mania.

means "grand," is a middle-aged male with a range encompassing 2.6 square miles of ridges and valleys and overlapping Zhen-Zhen's range. His route is typical:

One January day he moves onto an east-facing slope with snow deep in the ravines. There he angles downhill along a spur covered with sphagnum moss and rhododendron. On a knoll stands a large fir. A pungent odor tells me that Wei-Wei has rubbed the bark with the glandular area around his anus, depositing his scent. In fact, a panda's short, bushy tail seems designed as a brush for spreading scent. Wei-Wei, like all pandas, is solitary and usually silent, but he remains aware of others by using an efficient network of scent posts, often located on ridges and other prominent sites. To a passing panda, such posts tell who has been there and how long ago.

Wei-Wei settles down to feed in a shallow ravine. Sitting, he bends bamboo toward his mouth, biting the tops off last year's shoots and the leaves off stems; moving a few feet,

George B. Schaller also wrote the December 1981 *GEOGRAPHIC* article "Pandas in the Wild," and is co-author with Hu Jinchu, Pan Wenshi, and Zhu Jing of *The Giant Pandas of Wolong* (University of Chicago Press, 1985).

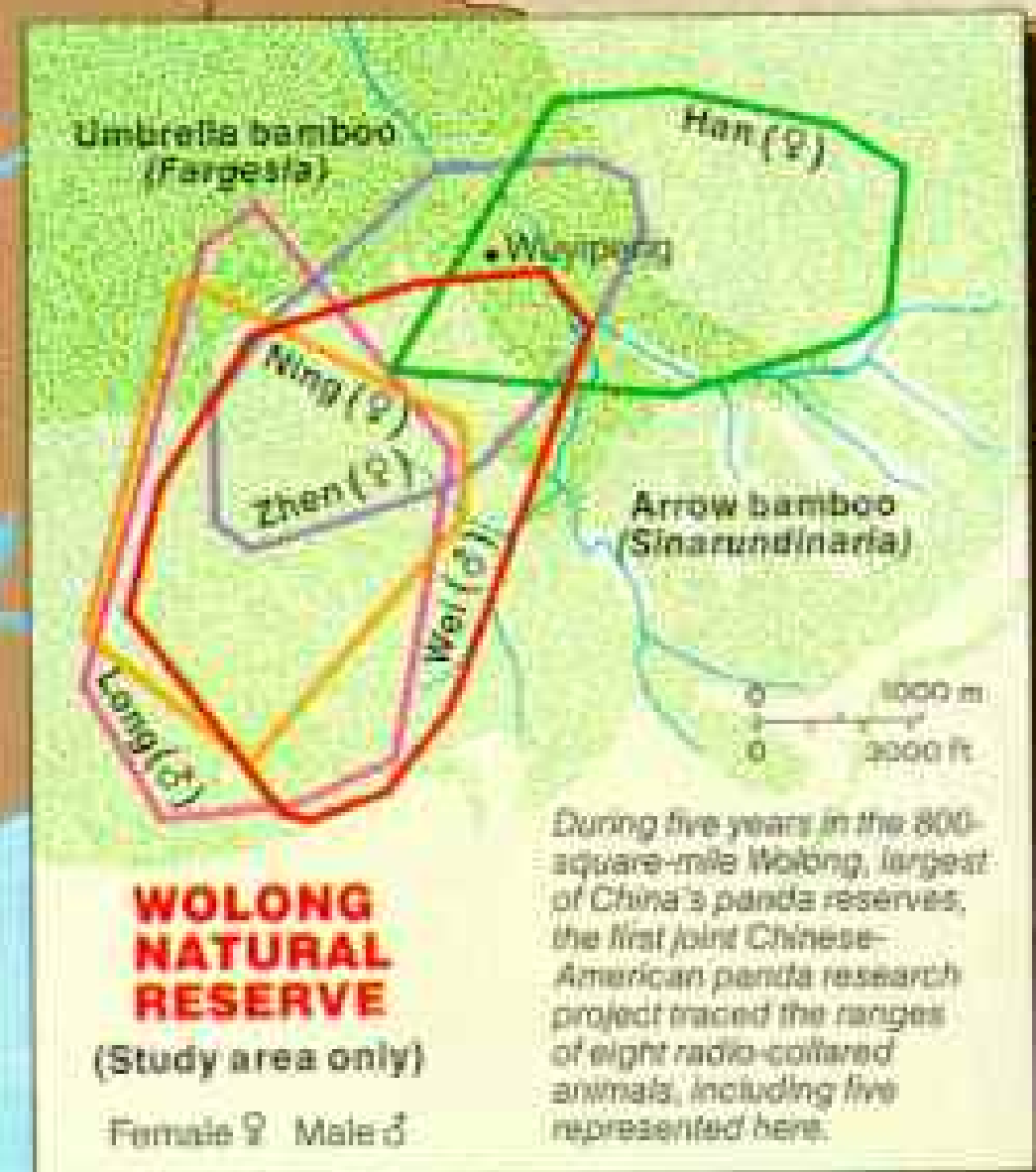
he then eats some more, munching a swath through his domain. Once he ate from 3,481 stems in the course of one day.

Satiated, Wei-Wei sleeps. He builds no nest, he selects no choice site; he merely lies on the snow, a log as a backrest, well insulated from the cold by his dense, springy fur. A few hours later he rises and forages again, leaving behind a copious 17 pounds of spindle-shaped droppings composed of barely digested stems and leaves. Then he pads on, tracing ridges, traversing slopes, balancing across logs spanning ravines.

Hu Jinchu, my principal co-worker and China's leading panda expert, and I have

Home of the panda

RANGING through eastern China and northern Burma, the giant panda appeared in the fossil record three million years ago. Hunting and destruction of bamboo forests have drastically shrunk its range. More than half of an estimated 1,000 survivors live in 12 reserves established by the Chinese. In the mid-1970s a die-off of bamboo starved more than a hundred pandas, and the government launched a panda research project. A cooperative effort with the World Wildlife Fund led by American George Schaller and Hu Jinchu, China's leading expert, began in 1980.



investigated many panda feeding sites. A panda's trail reveals one insistent fact of biological importance: In evolution the animals have become so fettered by bamboo that their fate is inextricably linked to it. Teeth of fossil pandas from three million years ago are similar to those of today's animals, showing that the pact between pandas and bamboo has existed probably as long as pandas have been pandas.

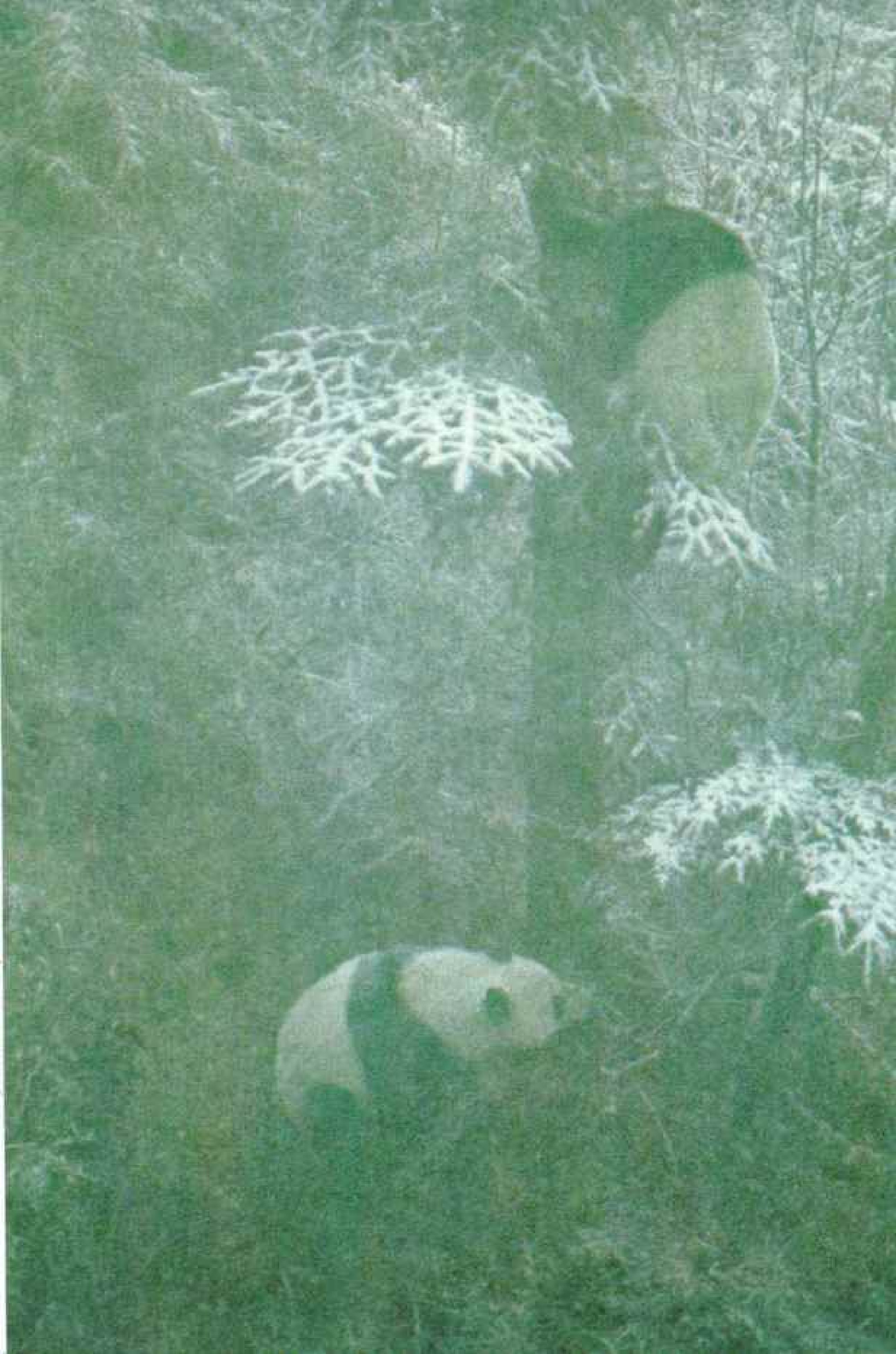
They have a predilection for meat, if they can get it. However, wildlife is scarce and difficult to catch for the relatively slow panda. In the winter-bare forest only bamboo provides an easy food source; leaves

remain fresh and green throughout the year.

How does the panda survive on bamboo? Anatomically, the panda is not a herbivore but a carnivore with a simple stomach and short intestines adapted for digesting meat. Unable to digest bamboo efficiently, a panda obtains only a few nutrients from its food.

HOW TO SOLVE this dilemma? One way is to stuff in large amounts of bamboo, and this the panda certainly does. We calculated that it eats 22 to 40 pounds of leaves and stems each day; when on a diet of bamboo shoots—which are 90 percent water—it may eat







In retreat from the ardent attentions of a suitor, a female who has already mated with the dominant male climbs a fir (left) in the Wolong Natural Reserve. The studies by Schaller, Hu Jinchu, and others show overlapping ranges for both males and females. But adults lead solitary lives except when mating.

The mating season runs from mid-March to early May. Gestation varies from 97 to 163 days. The female gives birth in a maternity den—usually a hollow fir such as one measured by Hu Jinchu (below). A litter consists of one or two underdeveloped, naked cubs, each weighing only a few ounces. The mother can care for only one infant; the other usually is abandoned and left to die.



some 650 shoots weighing 85 pounds daily.

However, an animal is limited in how much it can eat by the size of its stomach, and digestion needs time. The panda has overcome these problems by barely chewing and digesting its food and by passing it through in only five to eight hours. Therefore, so as not to fill itself with useless bulk, a panda must be selective in what it eats.

Our work showed that Wolong pandas prefer the leaves and pencil-thin stems of arrow bamboo that grows above an elevation of 8,200 feet to the tall, thick umbrella bamboo low on the slopes. In spring, however, some animals descend for as long as two months to feast on new umbrella shoots. A panda's diet of arrow bamboo changes seasonally: old, dry stems in spring, leaves during the rainy season in summer and autumn, and year-old stems and leaves in winter. Laboratory analyses reveal that leaves contain much more protein, digestible carbohydrates, and minerals than do stems. Pandas thus should select leaves. Why then are stems eaten in spring? We still don't know.

WE NEEDED to learn more about panda movements and daily activity cycles, and the best way to do that is to fit animals with radio collars. To catch a panda is no easy task. We built box traps of logs where pandas might logically pass. But human logic is not always panda logic. Traps often remained empty for weeks, and we had to check them daily.

We took turns. I liked climbing to the ridge above camp where several traps were located. With a series of abrupt pitches, the ridge climbs higher like a dragon's spine. Some days there was sun, the mountains in gentle repose, the ice pyramid of 20,500-foot Mount Siguniang shining, the air so clear that perspectives changed: It seemed as if I could easily hurl a stick into the stream far below. Other days there was a luminous fog so dense that the world beyond ceased to exist. It was a fitting home for the panda.

The public is so entranced by pandas that their deaths, illnesses, pregnancies, and reluctant romances receive news coverage all over the world. Such international adulation is relatively recent. It began on December 18, 1936, when an infant panda arrived in San Francisco. Named Su-Lin, it

was the first panda to reach the West alive.

The panda was, of course, known in China long before the West became aware of it. More than 3,000 years ago, during the Western Zhou Dynasty (ca 1122-771 B.C.), both *The Book of History* and *The Book of Songs* referred to the *pi*, an early name for the panda. *The Classics of Seas and Mountains*, a famous geography book dating back some 2,500 years, says that "a bearlike, black-and-white animal that eats copper and iron lives in the Qionglai Mountains south of Yandao County." This book refers to the panda as *mo*, another ancient name for the species. Pandas may enter villages and lick and chew up cooking pots, probably the basis for their reputation as iron eaters.

ONE MARCH DAY in 1981, Zhou Shude, normally a taciturn researcher, came toward me leaping high and waving his arms shouting "*Daxiongmao!*" ("large bear-cat"), the Chinese name for panda. A panda had been trapped. It was my first meeting with Zhen-Zhen. We drew near the trap. She sat hunched.

- 9:09 a.m. Howard Quigley, a New York Zoological Society research fellow who was helping establish the telemetry program, approached the trap with a syringe mounted on a pole and injected a sleep-inducing drug.
- 9:37 a.m. Zhen-Zhen reclined in deep sleep, and we pulled her from the trap. We measured her: length 65 inches, including the five-inch tail. Together we weighed her: 190 pounds, an animal of average size. We fastened a radio collar around her neck. "Don't forget to take off the magnet," my wife, Kay, reminded us. The radio becomes activated only on removing a magnet.

Somewhat apprehensively I monitored her breathing. Drugs always present risks to an animal. And we were not dealing with just muscle, skin, and bone but a national treasure, a beloved animal that has become a bridge of friendship between peoples.

- 10:35 a.m. Zhen-Zhen's eyes fluttered, she barked, and suddenly raked the air with a sharp-clawed paw. We pulled her back into the trap to recover. An hour later we opened the door. She peered out tentatively and, recharged with energy, hurried away.

The radios enabled us to collect two kinds of information. Once a day we determined

an animal's location through simple triangulation and plotted its position on a map. These radios also revealed something about a panda's activity: A slow-pulsing signal indicates a resting animal, a fast signal a feeding or traveling one. By listening to the signals at 15-minute intervals throughout the day and night, we could obtain details about the panda's 24-hour routine.

High on a ridge we built a platform of saplings just large enough to hold a two-man tent. From there we usually monitored the pandas. Imagine one of our typical winter nights: The temperature is 19°F, crystal beads of ice are thick on the tent's inner walls, fog has erased the forest beyond. I have the first shift; Kay, beside me, is withdrawn into her sleeping bag.

In the glow of a kerosene lantern I tune the receiver to Long-Long, a young male. He is on my right, downslope, active. I switch the radio frequency to Ning-Ning, a female and possibly Zhen-Zhen's daughter. Her signal is calm and constant, the animal momentarily at rest in a ravine not far from Long-Long. I pour myself a cup of hot tea from the thermos. Kay hears the stir and mumbles:

"What time is it?"

"Only 1 a.m.," I answer. "You can sleep another hour before taking over."

Then I recline, waiting until it is time to contact the pandas again, each alone in that cold stillness, their coats the color of snow and the darkness between trees. I cannot imagine a loneliness deeper than theirs.

NOW, after several years of radio monitoring, we have gained some insights into Wolong's panda society:

- Home ranges of resident pandas are small, varying from 1.6 to 2.6 square miles.
- A panda shares all or part of its range with other pandas.
- Although the ranges of neighboring females may overlap, each has an area of about 75 to 100 acres in which other females do not seem welcome. By contrast, several males may share the same range, but they avoid each other except when competing for a female in heat.
- Pandas are active for 14 hours a day, on the average, most of it spent feeding; they are inactive for ten hours, usually sleeping from two to four hours at a time.



L. M. HARTOG

In safe haven a two-month-old cub is cradled by its mother, Shao-Shao, in the Madrid Zoo. Like most captive panda offspring, the cub is the product of artificial insemination; its father, Chia-Chia, lives in the London Zoo. The first cub successfully conceived by this method was born in the Beijing Zoo in 1978. As of 1985 47 litters had been born in captivity.

- Pandas may forage at any time of day or night, but there are peaks of activity around dawn and in late afternoon.

Though sharing ranges, pandas are self-contained, disdaining direct contact; they are alone together. Meetings are a blend of coolness and violence and remarkably noisy—a medley of squeals, yips, chirps, moans, barks. Possessing such an inscrutable exterior, a panda primarily uses sounds

to communicate subtle shifts in emotion.

The panda's alternating cycle of eating and sleeping throughout the day and night can be explained by the low-nutrient diet and rapid food passage through the digestive tract: A panda must keep its stomach filled to obtain enough calories to survive. We calculated that a panda digests only about 17 percent of the food it eats; even a goose, notorious for processing grass quickly, has an efficiency of 25 percent. For a typical herbivore the figure is 80 percent. Though a panda may spend two-thirds of the day eating, it obtains at best only a small surplus of calories beyond those it needs for body maintenance and growth.

MARCH TO MAY is the mating season. Although we observed pandas courting, much of what is known about reproduction has been discovered in zoos.

In panda reproduction the incredible becomes common. The gestation period is variable, 97 to 163 days. Most births occur in late August or September. Newborns are about six inches long, and weigh a mere three to four ounces—or 1/900 the weight of the mother; their skin is pink and almost naked, and their eyes are sealed until they are more than a month old. They look like ill-designed rubber toys. Such an underdeveloped infant should need a gestation period of only 45 days. It appears that the panda has delayed implantation, a condition in which the fertilized egg divides a few times to the blastocyst stage and then floats free in the uterus for one and a half to four months before implanting and continuing its growth.

"Dead at the height of life's success," says Schaller of this nursing female inadvertently killed in a poacher's snare. Slung from a pole, the body was carried down the mountains for autopsy. Qiang tribesmen had set the trap for musk deer, hunted for their glands—a prized ingredient in Asian medicine. Snares are the second biggest cause of panda deaths, after habitat destruction. China considers the panda a national treasure and forbids harming them. Poachers receive a two-year jail sentence if convicted of catching a panda.







RHINOPITHECUS HOELLERAE



PICOIDES DAVILLENSIS



The richly varied wildlife of the Wolong Reserve includes the Darjeeling woodpecker (left), whose range extends westward into Nepal. The endangered golden monkey (far left) travels in groups of about 70 in winter. When food becomes plentiful in summer, groups may join to form bands of 300.

Peering from the tangle of forest, a takin (below)—an endangered animal related to the musk-ox—thrives in Wolong and several other Sichuan reserves. A tufted deer (lower right) uses sharp canine teeth

for defense; its tiny antlers are hidden in sprouts of hair.

The golden pheasant is trapped by Qiang tribesmen for meat and for feathers which they use to decorate hats (below). More than 3,000 Qiang—people of Tibetan stock—live in the Wolong and farm its slopes. Lying at the eastern edge of the Tibetan highlands and bordering the Sichuan basin, the reserve harbors at least 96 mammal species, 20 kinds of reptiles, and 230 species of birds.



BUDORCAS TAXICOLOR (LEFT); ELAPHODON CEPHALONUS

To catch a panda for radio collaring in order to monitor its movements, researchers bait log traps with goat meat. Although the panda diet is almost exclusively bamboo, the animals eat meat when they can get it. When the panda pulls on the bait, the door slides down, making the capture (below). Researchers tranquilize and examine the animal and fit it with a radio collar, then return it to the trap. Fully recovered, the panda emerges to vanish into the dense bamboo (right). The team tracked some of their subjects for more than a year.



Although a mother often gives birth to two cubs, she usually abandons one of them without attempting to care for it. To hold, suckle, and carry two helpless young for four to five months until they are mobile is probably too difficult. So the birth of a second cub is little more than insurance in the event that the firstborn is not viable.

The constant care needed by a newborn was well shown by the female Mei-Mei at the Chengdu Zoo. Whether sleeping, sitting, or feeding, she held young Jin-Jin constantly in a broad, hairy paw, protecting him from cold or injury. If she relaxed her grip or if Jin-Jin was uncomfortable, he emitted a tremendous squawk, one all out of proportion to his puny size. Mei-Mei immediately responded by shifting him and sometimes licking him solicitously.

Not until Jin-Jin was nearly a month old, weighing two pounds and warmly furred, did Mei-Mei first release him from her





Bamboo crisis struck in the mid-1970s when much of the umbrella bamboo in northern Sichuan flowered (**bottom**) and died. At least 138 pandas starved to death. Researcher Qiu Mingjiang holds four-to-five-year-old umbrella bamboo (**below**), which takes several more years to grow tall enough for pandas to eat. In 1983 a mass flowering in central Sichuan killed most of the arrow bamboo—examined by researcher Shi Junji in the Wolong Reserve (**right**)—but other species kept resident pandas alive. With the encroachment of cultivation on bamboo forests, some panda populations now have access only to stands of a single species.



protective arms into the nest. He was still weak, unable to stand until 75 days old.

ZHEN-ZHEN helped us understand the tribulations of trying to rear an infant in the wild. She had no offspring accompanying her in 1980; therefore, when on April 13, 1981, we observed her mate, we eagerly awaited the autumn birth. In early September she settled into an area of dense bamboo where we knew of a huge fir with a hollow base, an ideal den site. All month she remained within a few hundred feet of that tree. No one went near the den for fear of disturbing her.





By mid-October, when maples had turned gold and viburnum blazed scarlet, Zhen-Zhen traveled so far afield that we wondered if her cub was ill or dead. Hu Jinchu and I decided to investigate. We pushed through head-high bamboo toward the den. Suddenly the vegetation ahead swayed, and Zhen-Zhen lumbered toward us emitting screaming roars. Hu Jinchu retreated hurriedly in the direction from which we came, and I clambered up a nearby tree. Confused by this sudden disappearance and silence, Zhen-Zhen first waited near me, quietly listening, then ambled toward her den. I heard an infant squawk.

It was alive and obviously well protected.

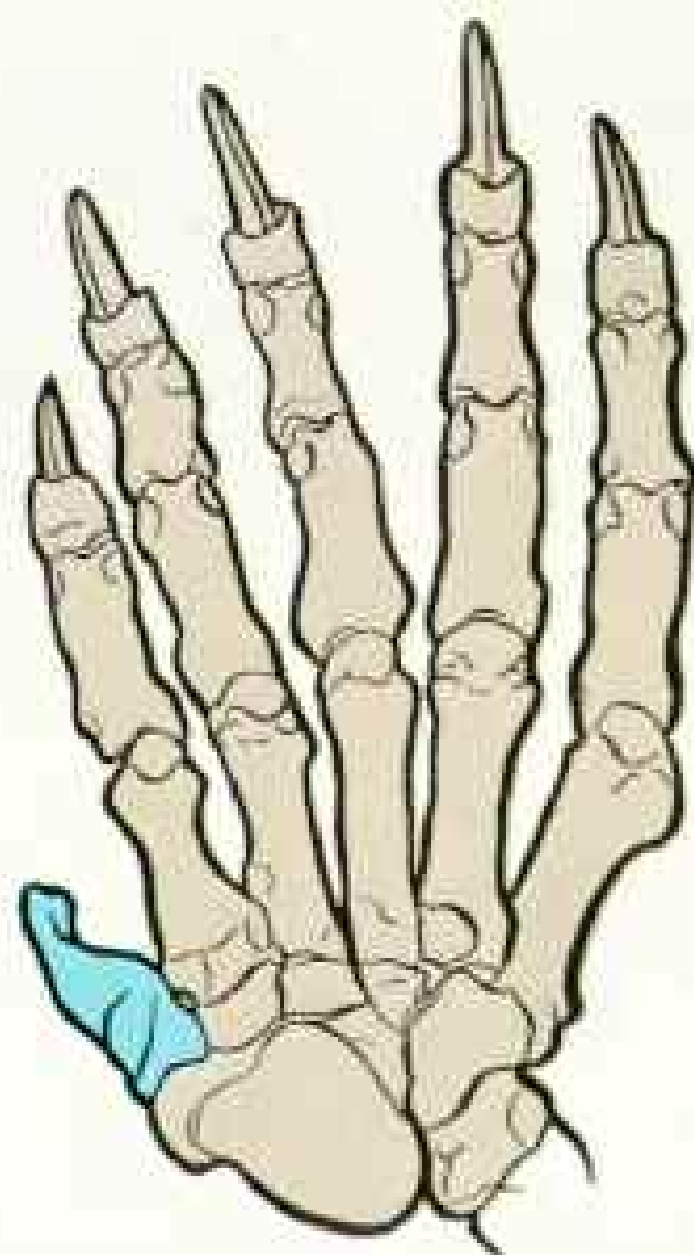
Later, after Zhen-Zhen and her young abandoned the den, we examined it. There was a nest composed of wood dust, raked from the inside walls, and a few twigs. Piled at the entrance were droppings, as well as several logs that Zhen-Zhen had hauled in for reasons known only to her. Equally unexplainable was a five-foot fir sapling that she had placed upright in the den.

Two months later, on December 22, Kay and I returned to the den and removed this little fir. Zhen-Zhen had provided us with a unique Christmas tree. Back at our tent, we trimmed the tree with ornaments brought to



Perfectly designed for a bamboo eater like Zhen-Zhen (facing page), a panda's broad molars (above) are adapted to crushing stalks. Powered by massive jaws, they can chew metal, as a captive panda did with its aluminum bowl, passing the fragments as pellets (right). Pandas have the simple stomach and short digestive tract of a carnivore; leaves and stems pass largely undigested and are easily seen in droppings (below). Consequently, the animals must eat as much as 40 pounds of bamboo a day.

The unique sixth digit—an elongated wristbone—on the panda's forepaw (top right) affords great dexterity.



KAY SCHALLER

remind us of home and Christmases in distant places. There were paper Santa Clauses made by our sons when small, a wooden chickadee that perched on a Christmas bough in the African home of the mountain gorilla, cutouts of animals made from milk-tin lids in the jungles of India. Now we added miniature golden monkeys and pandas given us by Chinese friends.

Somehow Zhen-Zhen lost her infant that winter, and still another of her offspring subsequently vanished, fate unknown.

The loss of Zhen-Zhen's babies is serious, for the panda not only is rare but also reproduces extraordinarily slowly. Since a female will raise only one cub at a time, and since this infant remains with her for one and a half years before becoming independent, she can at most rear one every two years. However, infants often die of unknown causes. Any female that produces one surviving cub

(Continued on page 306)





Saving the panda

CONCERN for the survival of China's living treasure built the Research Centre for the Protection of the Giant Panda and Its Ecosystem (*left*) in the Wolong Reserve. Completed in 1984, it was funded by the Chinese and the World Wildlife Fund and includes a veterinary hospital and nursery.

Pandas reproduce poorly in captivity, "a good indication that we do not know how to manage them properly," George Schaller observes. The problem is under study at the facility, where a sedated female (*bottom left*) is wheeled to the clinic for artificial insemination. It is hoped the research center will produce enough young to supply zoos and restock wild populations. Even under natural conditions the birthrate for pandas is low and infant mortality is high, making any losses a cause for concern.

The panda effort also encompasses work in the field: At the Tangjiahe Reserve in the Min Mountains, Teng Qitao (*right*) raises an antenna to receive radio signals from collared pandas. During the arrow bamboo die-off in 1983, the World Wildlife Fund-Japan contributed 20 pickup trucks, such as this one, to haul rescue teams and pandas. Other contributors came to the rescue with huge infusions of aid: Fifty

Chinese calligraphers and painters donated their works to the China Wildlife Conservation Association, which coordinates the panda fund drive in China. Some 530,000 Shanghai students set aside a "panda donation



day." The Japanese government donated \$230,000. In the United States, children gave five million pennies to a Pennies for Pandas campaign.

The next task facing the Chinese government and the World Wildlife Fund collaboration will be a detailed panda census and bamboo survey to serve as a basis for a comprehensive management plan. "Saving pandas such as Zhen-Zhen is an act of faith, a belief in our future," says Schaller.







Trudging the heights in winter, a team monitors conditions at 10,500 feet (left), the limit of bamboo habitat—and panda range—in the Wolong Reserve. During the 1983 die-off of arrow bamboo, the Chinese government mobilized several thousand workers to comb remote and hard-hit mountains for starving pandas. A rescued cub (above) was taken to a holding station for feeding and physical rehabilitation. Some animals later went to zoos; others were released in areas with ample bamboo.

Bamboo reproduces each year by sending up new shoots from underground stems. But sometimes, at intervals of 40 to 120 years, depending on the species, plants will flower, seed, and die en masse. The curious synchronous timing of mass flowerings is still not understood.

(Continued from page 300) every three years does well. No one knows the life span of pandas in the wild—in captivity it is as long as 30 years—but a female's total production of offspring is certainly low.

Therefore, we were all greatly upset when at least two adult pandas in our study area died in poachers' snares. The local Qiang tribesmen set these snares, not to catch pandas but musk deer. Although killing a panda carries a jail sentence of two years, the high price of musk from the deer's musk gland—a product used in medicines—is a great temptation. Inadvertent deaths of pandas by snaring has kept many populations low; after habitat destruction it is the most serious threat facing the species.

HAVING OVER the years become used to the sights and sounds of our camp, Zhen-Zhen visited on rare occasions at night to snuffle around the kitchen garbage. In January 1984, while I was away, the staff made a concerted effort to feed her. Unable to resist liberal helpings of porridge, sugarcane, and pork, she had virtually moved into camp by the time I returned a month later, bringing two new researchers—University of Colorado botanist Alan Taylor and University of Tennessee zoologist Kenneth Johnson.

Unfortunately several researchers had teased Zhen-Zhen: They poked her with sticks until she attacked, then as she rushed angrily forward, they quickly gave her something to eat. She did not need a high IQ to learn from this spurious sport that aggression equals food. Having an insatiable appetite, she now terrorized the camp.

That first night of our return, at 4:40 a.m., I heard the Chinese suddenly talking excitedly: "*Waiguoren!*—Foreigner!" And then I heard the foreigner's yells. Before I could leap from my sleeping bag, Ken burst in from the cold wearing only long johns, unlaced boots, and a hat all askew. While Zhen-Zhen tried to claw through the back of his tent, he escaped out the door. The next night Ken and Alan moved into the communal bunkhouse with us.

Life now revolved around Zhen-Zhen; little work was done. The cook was afraid to prepare breakfast until Zhen-Zhen had satiated herself in his kitchen, our travels on

trails became furtive as we remained alert to sudden attack, and in the communal room everyone was prepared for rapid exit. Later she slashed a Chinese researcher deeply in the leg with her catlike claws.

In the forest Zhen-Zhen had been imposing, but camp diminished her to a porridge-lapping, creative nuisance who was also dangerous. We three Americans argued that feeding must stop. We were not heeded. Next we suggested that Zhen-Zhen be translocated to another part of the reserve. But she was taken to the Wolong research center instead, where she remained for three and a half months before being released back into the wild, ten miles from her former range.

It took Zhen-Zhen five weeks to return home. But this time, on visiting camp, she received no food, and she settled back into her old life of munching bamboo. She taught everyone that the freedom of a wild creature should not be casually tampered with.

Scientists have devoted an inordinate amount of time to one bit of panda trivia that also has strangely intrigued the public: "Is the giant panda a bear or raccoon?" I am often asked this question. Though the panda is most closely allied to the bears, it has, to the perplexity of scientists, refused to be neatly categorized. "The panda is a panda," I reply, finding joy in this small mystery.

Meanwhile the giant panda as a species lives a marginal life of quiet desperation, stoically seeing its habitat disappear piece by piece. And as if this were not enough, nature seems to demand from pandas a terrible penance for providing them with an easy life. At intervals of 40 or more years there is a mass death of bamboo. During such a bamboo die-off, pandas may starve.

One question obtrudes: Since such die-offs have occurred for millennia, why did the panda not become extinct long ago? There are two answers. First, although much bamboo in an area may die, remaining patches provide pandas with enough food to survive the crisis. Second, several bamboo species often grow at different altitudes on a slope. When a species died, pandas once could move up and down the hillsides to find an alternative bamboo to eat. But in recent years farmers have pushed fields so far up valleys and slopes that now often only one bamboo species caps a mountain



DAVID CLARK

top. When it dies, so may the pandas there.

In May 1983 the arrow bamboo in Wolong and other parts of the Qionglai Mountains mass-flowered and died. We anticipated this event, for numerous small patches had bloomed in the preceding years. One previous die-off of arrow bamboo in Wolong occurred in 1935, memorable because Mao Zedong and his followers passed nearby during the Long March; another occurred in 1893 during a peasant uprising.

THE YEAR 1983 may well be remembered for the global concern for pandas, a shared set of emotions on behalf of a wild species, something new in human consciousness. China mobilized for a serious emergency by constructing stations to rehabilitate starving pandas and organized 4,000 people into rescue teams.

How have the pandas fared since the bamboo died? Hu Jinchu and I surveyed the most seriously affected areas in 1983 and 1984 to assess the conditions. Our conclusion: The die-off is not as extensive as first

Dialing a panda, Schaller checks a radio-collar signal while his wife, Kay, takes notes. From the listening station, a platform of saplings on a 10,000-foot-high ridge, teams monitored panda activity on a 24-hour basis several days each month.

reported, and starvation is not widespread, but pandas are dying in several localities.

Fortunately no Wolong panda has needed rescue or supplementary food: There is still ample bamboo. Most arrow bamboo has indeed flowered, but enough is still alive that most pandas have not even bothered to shift to the abundant umbrella bamboo.

However, in the Xi River drainage southwest of Wolong, almost all bamboo is dead. Hemmed in by high rugged mountains above and cultivation below, pandas have nowhere else to go. Some have descended to villages in search of food, eating maize stalks, grass, and, once, a leather jacket. An unknown number have died, several have been captured and released elsewhere, and others have been taken into captivity.

It is impossible to give accurate figures of pandas that have died or even starving pandas that have been rescued. Teams searching forests for starving animals and villagers out collecting wood or medicinal herbs sometimes find the bones of a panda long dead of unknown causes. And so concerned is everyone about protecting pandas that several have been "rescued" needlessly in areas with much bamboo. Such animals find their way into official emergency records.

But statistics are irrelevant; the unnecessary death of even one panda is a tragedy. The emergency program, carried out with great commitment by the Chinese, will help some pandas through this temporary crisis but will not provide the species with lasting security or prevent future disasters.

Can the panda be saved? Of course. All it needs is bamboo and peace. Recent years have taught us important lessons. Every panda population should have at least two bamboo species available to lessen the impact of a die-off. Bamboo at low elevations must be preserved, or, where already gone, replanted. Existing reserves need to be expanded and new reserves created. Poaching must be controlled. Zoos must cease being a drain on wild populations and instead improve captive breeding to provide a surplus for restocking pandas in their original home.

China's Ministry of Forestry and the World Wildlife Fund are continuing their collaborative effort on the panda's behalf, guided by the spirit of their joint agreement that reads: "The giant panda is not only the precious property of the Chinese people, but also a precious natural heritage of concern to people all over the world."

The panda that came to dinner: Zhen-Zhen helps herself to sugarcane in the main room of the research base while the staff watches apprehensively (top). Fed by some staff members during Schaller's absence, the panda developed a preference for camp food, moved in, and became a dangerous nuisance. After gashing a worker's leg, she was taken from camp in an iron cage (right) and later released ten miles away. By the time she returned to her old home range five weeks later, she had reverted to a bamboo diet.

The next task is to make a thorough panda census and bamboo survey as a basis for preparing a long-term management plan. Detailed studies of the panda's life are continuing. Since I am now devoting myself to other conservation problems in China, I am no longer in personal touch with my old panda friends. For Pi-Pi and Wei-Wei, who have died, only the footsteps of memory rustle on the slopes. And Zhen-Zhen is also gone, having died in 1985 at the age of at least 14 years.

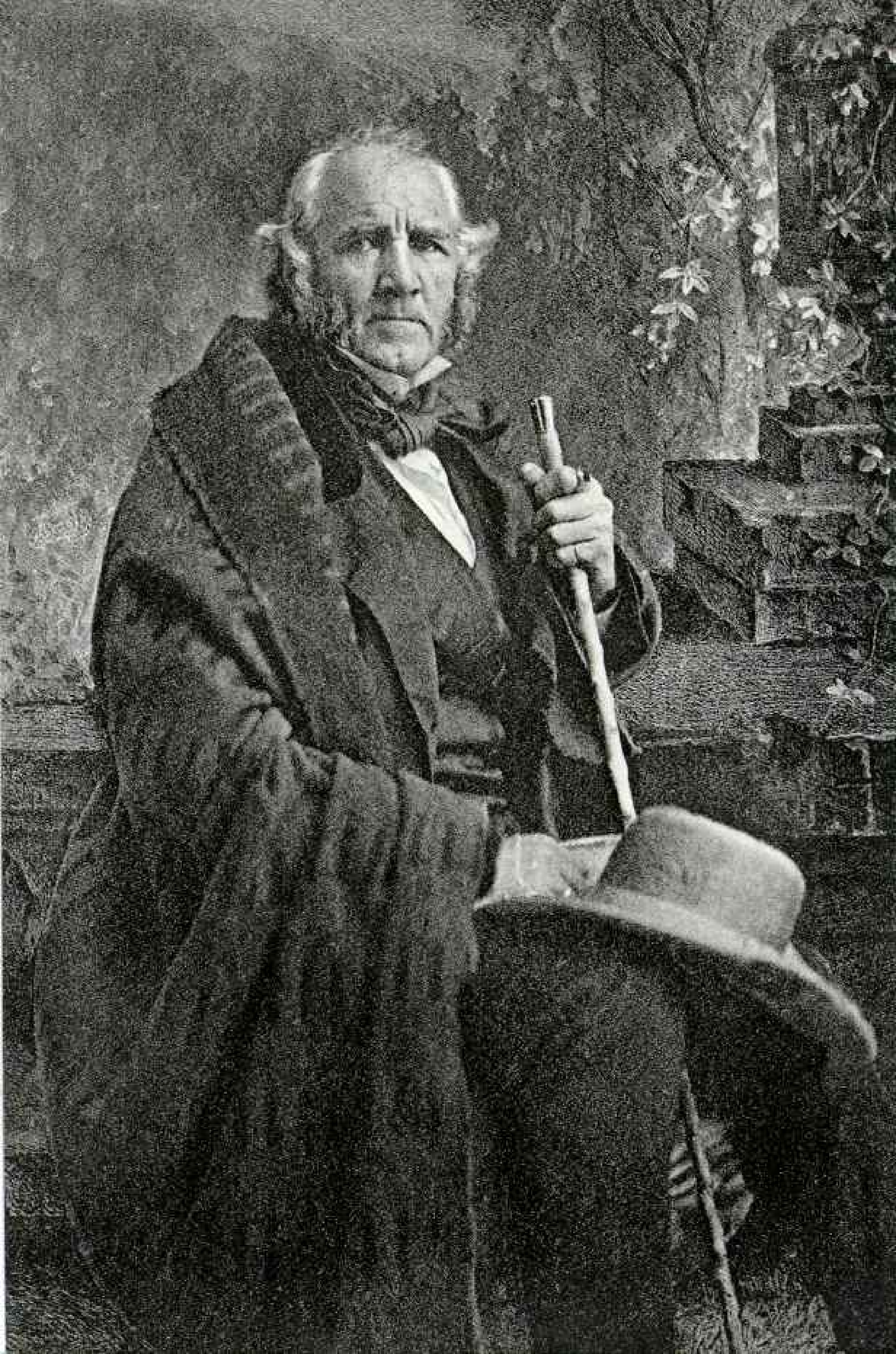
I miss meeting Zhen-Zhen. She has with quiet power become a force for conservation. By protecting her, we assure the survival of thousands of other species within her habitat. By protecting her and her kind, we create an awareness that every species is valuable, that even a panda may shine for only a moment and then no more. □





KENWETH JOHNSON (BELOW)





Sam Houston

SAM HOUSTON

A Man Too Big for Texas

By BART McDOWELL, ASSISTANT EDITOR

Photographs by CHARLES O'REAR, WEST LIGHT

THE CHEROKEE called him Co-lo-neh, or Raven, and they taught Sam Houston their forest secrets—their cures, their ways of hunting game, their omens and amulets. He learned well, for the man Sam Houston cast a spell of his own. His life does yet.

One day, for example, I was following his trail into Cherokee country near the Oklahoma town of Tahlequah. Just as I crossed a creek Indians call Co-lo-neh, I saw two ravens in a tree. They moved restlessly—then flew off together, south . . . toward Texas.

A twinned coincidence, I told myself. But also a fit metaphor for the dual nature of Sam Houston, a man by turns coarse and courtly, cautious and reckless, a man famed for ornate oratory and mystic silences. This year, as we Texans celebrate our 150th year of independence, we share with fellow Americans our hero Houston, born a Virginian, raised a Tennessean, a man even we concede too large for a single state.

Houston's reputation has not always seemed so sunny. He did some unpopular things that many 19th-century Texans deplored. He was the champion of Indian rights and a bitter foe of Texas secession. He also had some Texas-size faults.

"When I was growing up, I didn't want to admit I was related to Sam Houston," Jean Houston Daniel told me; she is the great man's great-great-granddaughter. "I had heard those stories about his drinking and his living with the Indians. I didn't fully appreciate Houston much until I married *that* young man." She nodded toward her husband, Price Daniel, long a Houston buff before he himself followed those famous footprints to the United States Senate and the governor's office in Austin.

Sam Houston IV, a Texas businessman, chose not to name either of his sons



SILVER PICTURES (FACING PAGE); DAVID HANCOCK

A commanding presence served Sam Houston well as U. S. senator from Texas from 1846 to 1859 (facing page). A gold ring, his mother's gift (above), bears the motto that guided his extraordinary career as frontiersman, soldier, and statesman.

Sam V: "Too much of a burden for them, I felt." The mantle still weighs heavy. But Sam Houston's stature has increased with time. Marquis James wrote a prize-winning Houston biography in the 1920s, *The Raven*. The Texas Centennial in 1936 brought a closer look at Houston's deeds. And John F. Kennedy paid him homage with a chapter in his 1955 *Profiles in Courage*.

"He was one of us," says Lady Bird Johnson, "or at least the way we like to think of ourselves. So courageous, so daring. Flamboyant, yes, but he was also tough and a man of vision who dreamed big dreams."

The governor of Tennessee, Lamar Alexander, calls Sam Houston "the most interesting figure in Tennessee history." The Alexanders have named a son William Houston Alexander. So much for Texas ownership.

I CONFESS a personal bias: Sam Houston was a friend of my great-grandfather and figured in family folklore. (Pappy, as we called him, took Sam's advice and cast his county's only vote against secession.) But this year I have followed Sam Houston's migrations, read his letters and speeches, and even examined some fanciful bits of wood that he was forever whittling. I've read what his enemies and neighbors said, and have talked with Cherokee whose forebears knew him well. I know Sam Houston better now. And admire him even more.

Sam Houston's birthplace—a rustic log house—long ago tumbled into dust, but a marker on Highway 11, near Lexington, Virginia, notes the spot. Just as well: The highway itself is a better memorial to his restless, westbound spirit.

He was born on March 2, 1793, the fifth of nine children. His mother, Elizabeth Paxton Houston, was a brave lady, managing the farm while her soldier husband, Maj. Samuel Houston, served as inspector of militia, traveling over Virginia. When the major died, it was the widow who moved her brood by wagon west to Blount County, Tennessee, where her husband had bought land. Sam was then a rangy 14. He would remember his father for "indomitable courage" and his mother as "gifted with intellectual and moral qualities . . . nerved with a stern fortitude."

Near Baker's Creek I paced off a portion of the Houston family's 419 acres, hard and hilly, in summer supremely green, a fertile land that smells of hay. On the horizon stands a blue view of Chilhowee Mountain, scenery easier to praise than to cultivate. Especially for young Sam; farming always bored him. Between chores—or instead of them—Sam read books, some carted over the mountains from Virginia, majestic books like Alexander Pope's translation of *The Iliad*. At 15 he ran away and lived with a band of 300 Cherokee Indians. Four decades later he recalled in some autobiographical notes "nothing half so sweet . . . as this sojourn . . . among the untutored children of the forest." That sojourn lasted, off and on, for three years, and the chief, Oo-loo-te-ka, adopted the fatherless Sam as his son.

After the Cherokee gave him the title Co-lo-neh, Sam Houston regarded the raven as his talisman, a sign of his personal destiny.

"The raven is a bird of honor, but Co-lo-neh is also a Cherokee military rank, a leader of war parties," notes Leon Gilmore, tribal historian of the Cherokee nation in Oklahoma. "Sam Houston would have learned a lot about the rituals of making medicine."

THE CHEROKEE offered Sam both friendship and credit. But, at age 19, Sam returned to Maryville, Tennessee, determined to earn money to pay debts. Though short of formal education, he set himself up as a schoolmaster, charging eight dollars a term tuition, payable in cash, corn, and "domestic cotton cloth." Years later he recalled that his time as a schoolmaster gave him "a higher feeling of dignity and self-satisfaction than any office or honor . . . later held."

His log schoolhouse stands near Maryville, meticulously rebuilt in a wooded valley surrounded by tobacco farms and dairy pastures. "White-tailed deer still come

to graze and lick our salt block," said curator Norman Harris. A spring—Sam Houston's own—still seeps silently at the foot of a nearby maple. Algae flotsam and a sign ("unsafe for drinking") warn off visitors today.

The Blount County seat, Maryville, was the setting for another chapter in Sam's life. Here he enlisted to protect his country in the War of 1812, vowing that his Maryville neighbors "shall hear of me."

Quickly promoted from private to ensign to third lieutenant, he was ordered south to fight the Indian allies of the British, the Creek. His commander was Tennessee's own Gen. Andrew Jackson. In the Battle of Horseshoe Bend in eastern Alabama, Sam caught a barbed arrow in his thigh, and General Jackson himself ordered Houston out of the battle. But the Creek fought with bitter bravery, retreating to their last redoubt, a covered ravine, beyond the reach of artillery. When no one else volunteered to lead a charge, Houston—hours after his injury—painfully dashed down the slope to portholes bristling with guns and arrows. He was five yards from the redoubt when two bullets smashed his right shoulder.

After the victory a doctor removed one lead ball but left the other embedded in Houston's shoulder. Why torture a man so certain to die?

He survived, but the wound never completely healed. Andrew Jackson went on to win the Battle of New Orleans against the British without his wounded lieutenant, but Old Hickory's admiration for Sam Houston was fixed for all time.

THE YOUNG VETERAN soon became an Indian agent and even accompanied one Cherokee delegation to Washington. A wider world had opened for Houston, but he returned to Nashville, population 3,000, the backwoods capital of Tennessee. He borrowed books to read law and finished his 18-month legal studies in six months. He was elected prosecuting attorney and then major general of the Tennessee militia. Of course, he was a frequent guest at Andrew Jackson's plantation, the Hermitage. The moment was propitious: Tennesseans were planning a U. S. Presidency for their victorious general.

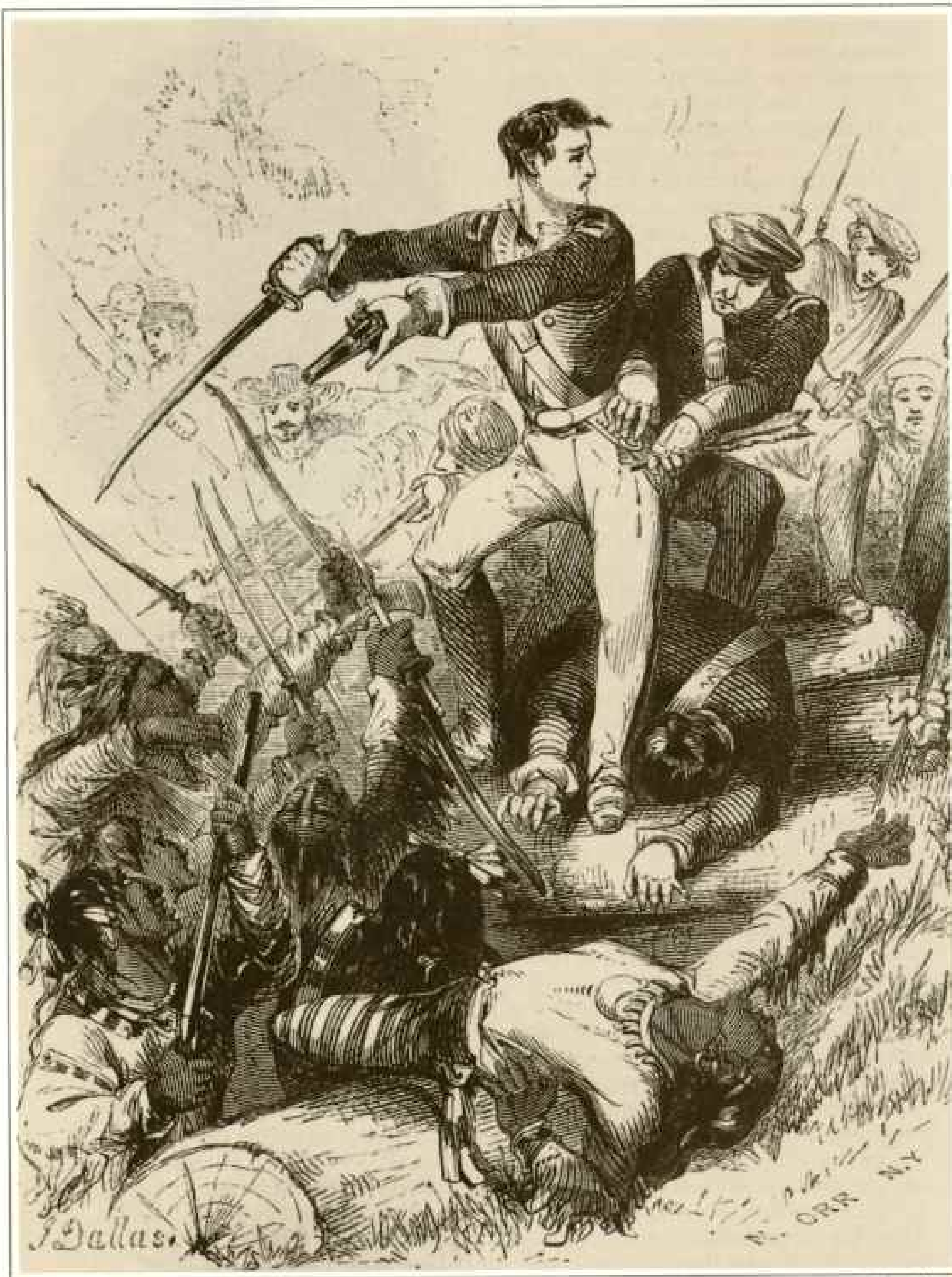
The Hermitage today still evokes the atmosphere of great events. It grew over the years from a cluster of log cabins to one of the grandest residences of the West.

Sam Houston was comfortable there and already built to its scale. If Hermitage ceilings were 14 feet high, well, Sam himself "stood six feet six inches in his socks . . . a remarkably well proportioned man, and of . . . gallant bearing." So wrote his contemporary Judge J. C. Guild. "He enjoyed unbounded popularity. . . ." No wonder Houston was a welcome guest of Aunt Rachel, as he called Mrs. Jackson; in the Hermitage dining room today, a large silver tray on the sideboard (page 315) is traditionally "a gift from Sam Houston." Perhaps it came later when Sam was more prosperous. At this point in his life Sam's compliments were more extravagant than his presents. He wrote Jackson, "You have been your country's . . . faithful guardian. . . . The next President will be the 'People's choice.'"



SAN JACINTO MUSEUM OF HISTORY ASSOCIATION, HOUSTON

"Magnificent barbarian" to many in white society, Houston was the "Raven" to Cherokee who adopted him as a teenager. He later lobbied for the tribe in Washington, where he wore Cherokee garb, as he did for this portrait.



NATIONAL ARCHIVES

"If you fail this time, I'll smite you to the earth," cried 21-year-old Sam Houston to a fellow officer who had tried to remove a Creek arrow from Houston's thigh during the War of 1812. Bleeding profusely, Houston then led a charge at the Battle of Horseshoe Bend, Alabama, that won the admiration of his commanding officer, Andrew Jackson.



Bonds of battle united Houston and Jackson in lifelong friendship. When Sam was challenged to a duel, Old Hickory coached him to steady his pistol (below) by biting a bullet. Jackson also steered his protégé through the crossfire of politics in Tennessee, where Houston was congressman and governor. The Hermitage, Jackson's home, preserves a silver tray (left) described as a gift from Houston.



Old Hickory looked proudly at his brave young friend and sent the word: Sam Houston, age 30, became a U. S. congressman.

He plunged deep into congressional intrigues to make Jackson President, recruiting friends, infuriating foes. In Tennessee he was even challenged to a duel by one William A. White, the political ally of a disgruntled office seeker. Houston chose pistols at 15 feet. He practiced marksmanship at the Hermitage with Old Hickory as coach, according to Marquis James. To steady your aim, Jackson advised, bite on a bullet. The duelers met in a pasture just across the Kentucky boundary. Sam fired, severely wounding White. He thanked God when White recovered.

Jackson then coached Houston for another conflict, a hotly contested race for governor of Tennessee. Houston used his mentor's campaign techniques, slapping backs, mixing with crowds at barn raisings. He became governor at 34.

WHEN JACKSON was elected President in 1828, the young governor was the man to watch as a logical successor. He had it all. Almost.

Noting his success with ladies, friends urged him to marry and settle down. They could have saved their breath, because Houston had fallen deeply in love, "and it may be that I will splice myself with a rib," he confided to a friend. The girl was Eliza Allen, 18-year-old daughter of a powerful family.

On January 22, 1829, as Sam Houston approached his bride's home for the wedding, he saw a raven flutter and die in the road. Or so Houston later recalled. But no omen could have been as dark as events following the wedding.

Less than three months after the elaborate ceremony, Tennesseans were shocked to learn that Eliza had returned to her parents' house. The marriage was finished. Houston said only, "This is a painful, but it is a private affair." One week later, the governor wrote, "It has become my duty to resign."



Birth of a New Republic

“ALL NEW States are infested, more or less, by a class of noisy, second-rate men, who are always in favor of rash and extreme measures. But Texas was absolutely overrun by such men.” Thus a biographer described Houston’s adopted home in 1832. Many of his new neighbors howled for independence from Mexico, which meant war. Houston urged caution. But in 1836, after Mexican dictator Santa Anna and his well-trained

army of 4,500 crossed the Río Grande to stamp out rebellion, Houston took charge of the Texas army—a ragtag force of 900 that was little more than an armed mob.

Santa Anna split his army, sending a small force east under Gen. José Urrea. He led the rest toward Washington-on-the-Brazos, where upstart Texans were writing a declaration of independence.

Then came the Alamo. The news of Santa Anna’s cruel

victory sent frontier settlers bolting east for the safety of U. S. territory. Behind came Houston’s army, its general desperately maneuvering for position. After more than a month of retreat, Houston finally confronted his foe at San Jacinto. To the terrified people of Texas, the results of that battle (pages 322-3) were like a miracle. They quickly elected Houston, the miracle worker, president of their new republic.

Houston's descendants today believe that Eliza was a young girl persuaded by her family to marry an older man with a great future—and then found she did not love him. Others have speculated that Eliza loved someone else . . . that Houston flew into a jealous rage . . . or that Houston's old war wounds were repugnant to his young bride. Certainly his spirit was wounded.

Houston always defended Eliza's name, but drunk or sober, even after their divorce and Eliza's remarriage, he never told the story. Instead, he caught the river steamboat *Red Rover* and sailed west on the Cumberland. He would live with old Cherokee friends, now resettled on the Arkansas River.

"I was in an agony of despair and strongly tempted to . . . end my worthless life," he wrote later. "At that moment, however, an eagle swooped down near my head, and then, soaring aloft with wildest screams, was lost in the rays of the setting sun. I knew that a great destiny waited for me in the West."

An eagle, not a raven? Cherokee historian Gilmore explains: "The eagle is sacred. It's good luck to see an eagle."

ON HIS WAY WEST Houston was already thinking of Texas, then a part of Mexico's state of Coahuila. Along the way Sam wrote a friend that he might "conquer Mexico or Texas, and be worth two millions in two years."

The bravado of a heartsick man, perhaps, but President Jackson heard of the letter and wrote his friend for reassurance, "I cannot believe you have any such chimerical visionary scheme in view." Answering from what is now Oklahoma, Houston gave Jackson a pledge to do nothing "to injure, or involve my country."

His adoptive father, Oo-loo-te-ka, gave Houston a warm speech of welcome: "My wigwam is yours—my home is yours—my people are yours—rest with us."

So Houston, wearing leather shirt and beads, let his hair grow again for plaiting in a queue. And in a brief time—such was the force of Houston's personality—he became one of the most influential men among the Cherokee, Osage, and even his old adversaries the Creek. His letters lobbied the War Department for fairer dealings with the red man. He opened a trading post near the Neosho River.

Though still legally married to Eliza, Houston took a Cherokee wife, Tiana Rogers, a famously beautiful widow. "Cherokee permitted polygamy in those days," notes Gilmore. "It was a Christian ceremony—I've seen it in a family Bible."

But at his trading post, the Wigwam Neosho, Houston remained a troubled man. "He'd make a sale and have a party; that's the tradition," says Gilmore. Others confirm the tales. Houston drank heavily of ardent spirits, as they called liquor; he even earned a new sobriquet, Oo-tse-tee Ar-dee-tah-skee, translated as Big Drunk.

THE YEAR 1831 was a fulcrum for Sam Houston. His mother lay dying in Tennessee, and Houston returned in time to bid her good-bye. She was buried on a steep, green hillside beside Baker's Creek Presbyterian Church.

Time has settled the cemetery headstones so they now stand askew, "and we don't know the exact gravesite—it's toward the middle of the cemetery," notes local historian Mrs. Edith Little. Nor do we know what regrets the hymns and Scriptures may have stirred for the grieving Sam Houston. Certainly, the long, jolting miles from the family farm to this country church attested this woman's faith and her determination. Sam returned to his wigwam changed.

Soon he was heading east again, accompanying a Cherokee delegation to see President Jackson in Washington. On the way Houston stopped at Nashville, visited the Hermitage, and on its grounds cut a hickory sapling to make himself a cane.

Weeks later, in Washington, Sam Houston found dramatic use for his cane. In the House of Representatives an Ohio congressman, William Stanberry, denounced the Jackson Administration and accused Houston of dishonesty. A rash act. Houston tried to challenge Stanberry to a duel; the congressman refused



Texas' declaration of independence was signed March 2, 1836—while Santa Anna laid siege to the Alamo—in a tiny wood-frame building in Washington-on-the-Brazos. A replica of the hall stands at the original site (above). Within months,

Houston's note—but took the precaution of arming himself with two pistols.

Two weeks later Houston encountered Stanberry on Pennsylvania Avenue, called him a "damned rascal," and whacked the congressman with his cane. In the ensuing fight Stanberry drew a pistol, pressed it against Houston's chest, and pulled the trigger. The charge did not explode. Houston disarmed the congressman, then lifted Stanberry's feet in the air and "struck him elsewhere," as a witness delicately testified.

President Jackson's enemies arranged for Houston's arrest for contempt and trial before the House of Representatives. The incident became a national sensation.

Jackson himself worried about his friend's buckskin clothes—and gave him



Houston was writing a letter (bottom right) to his cousin John in which he expressed his desire to “get Texas annexed to the United States.” The hero of San Jacinto (top right) had long shared this dream with his mentor, President Andrew Jackson.

money to buy “a coat of the finest material . . . trousers in harmony of color . . . with a white satin vest.”

The star-spangled Francis Scott Key enlisted as Houston’s attorney, but Sam ran the show himself. The trial lasted a month, and even in that era of Webster and Clay, Houston’s oratory made history: “Sir, so long as that flag shall bear aloft its glittering stars—bearing them amidst the din of battle. . . .” And so on. He mentioned Greece, Rome, Caesar, Cromwell, Bonaparte, Blackstone, and the Apostle Paul. At the end, the great Shakespearean actor Junius Brutus Booth pushed through the crowd to embrace Sam Houston.

Sam’s own reaction was lasting. “I was dying out,” he said, “and had they taken

me before a justice of the peace . . . it would have killed me. But they gave me a national tribunal for a theatre, and that set me up again."

AND ON THE ROAD. On December 2, 1832, Sam Houston reined his horse into the Red River and splashed his way into Texas. An eagle was circling overhead.

Why Texas? Well, John Quincy Adams insisted that Jackson and Houston secretly conspired to steal Texas from the 11-year-old Mexican Republic. So did most Mexicans. The Mexican secretary of war in those years, José María Tornel y Mendivil, wrote that "in the United States nothing is done without a preconceived plan . . . everybody works by common accord. . . ."

Perhaps he overestimated Anglo tidiness. Certainly in 1832 Texas was untidy. English-speaking colonists had been settling in that vacant subdivision of provincial Coahuila since the days of the Spanish crown. Mexican independence had come only in 1821—and the new republic had given way briefly to a monarchy, then to civil war. The state of Zacatecas seceded; so did Yucatán a bit later. The neglected area of Texas seemed ripe for change. The 20,000 Anglos and 5,000 Hispanics there seemed hardly worth the bother to the eight million other people of Mexico.

What kind of people were these Texans? Some, like Stephen F. Austin, hoped for the rights of trial by jury and religious freedom and were still loyal to their adopted homeland of Mexico. But by no means all.

"The first wetbacks," notes Dr. Nettie Lee Benson, of the University of Texas, "were the people who illegally crossed the Sabine River from the United States." Southerners, mostly, though generally not slaveholders, people seeking new land.

And the new land itself? "Texas is the finest portion of the globe that has ever blessed my vision!" So wrote Sam Houston. He bought acres of that land near the Trinity River and began the practice of law, representing eastern U. S. investors.

"He was an indifferent businessman," notes Robert Schaadt, director of the Sam Houston Center in Liberty, who has studied many of Houston's transactions. "He had a fortune in land, but never realized a profit."

HOUSTON'S serious speculations were political. In February 1833, after traveling "near five hundred miles across Texas," he wrote Andrew Jackson that Texans were "without laws to . . . protect them. . . . The Government is essentially despotic. . . ."

The despot who now seized power in Mexico was Antonio López de Santa Anna, a disaster for Mexico and one of history's authentic vainglorious villains. Costumed like a peacock and styling himself the Napoleon of the West, Santa Anna scrapped the country's federal constitution and with remarkable cruelty began crushing all opposition. By the end of 1835 even the most reluctant Texans were discussing independence, though the cautious Sam Houston noted "it is yet too soon to say this publicly."

Not for long. Santa Anna's army moved into Texas to disarm the colonists. Shots were fired and tempers rose. A general consultation of elected delegates was called, and the men narrowly voted down a declaration of independence. Instead they set up a provisional state government within Mexico ("a triumph of potential confusion," it was called) and elected Gen. Sam Houston to command a Texas army.

General Houston was realistic: "We must meet the enemy with an army worthy of our cause," he cautioned. Houston wanted to consolidate his forces; Texas volunteers at Goliad should be redeployed; he ordered the Texans in San Antonio to blow up the Alamo ("nothing more than a church . . . surrounded by poplars"). His orders were superseded by the provisional council. Houston, "most miserably cool and sober," feared that "dissention will destroy Texas."

On February 28, elected delegates—among them Houston himself—met on the



Heroic figures in the war for Texas independence ride again in The Lone Star (left), an outdoor drama staged each summer in Galveston.

Represented at center is Sam Houston in his Cherokee buckskins, flanked by Mexico's General Santa Anna, Davy Crockett, Jim Bowie, Houston's scout Deaf Smith, Alamo commander Colonel Travis, and several wranglers.

A more sorrowful figure stands guard over the fortress at Goliad (below), where a detachment of Santa Anna's forces massacred 352 Texas defenders.







The Battle of San Jacinto



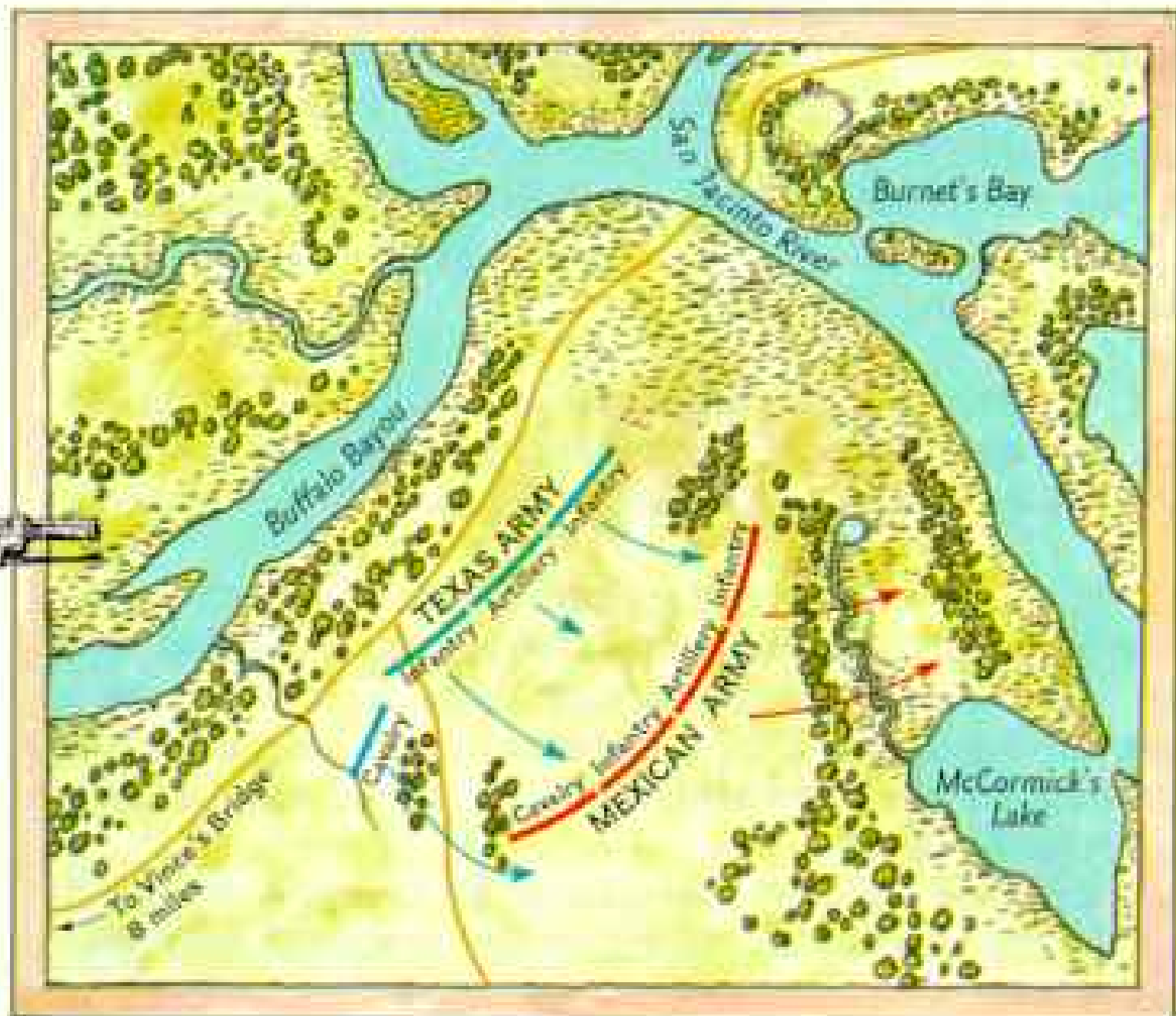
"SURRENDER OF SANTA ANNA," BY WILLIAM H. HUDDLE, WHICH HANGS IN THE TEXAS STATE CAPITOL, AUSTIN. COURTESY TEXAS HIGHWAYS MAGAZINE

INSCRUTABLE as always, Houston had formed his plans in Indian-like secrecy, divulging nothing to his mutinous lieutenants, nothing to his troops. But all knew that

here, along the banks of the San Jacinto River, Houston meant to end his cat-and-mouse game with Santa Anna. At midafternoon there was no sign of life from the Mexicans, who had

camped several hundred yards away across a field.

Finally came the order to assemble. The band of one fife and one drum struck up the popular love song "Will you come to the bow'r I have shaded for you?" and Houston ordered a charge. Cries of "Remember the Alamo! Remember Goliad!" stirred the blood of Texans swarming toward the Mexican camp. Surprise was total: Despite desperate attempts to rally, the Mexicans were overwhelmed as Texans fell upon them with Bowie knives and rifle butts. In 20 minutes the battle was over. Santa Anna had donned civilian clothes and tried to escape but was captured, suspicions aroused by his fine underwear and confirmed by Mexican cries of "*¡El Presidente!*" as he was led into camp. He surrendered to Houston, who lay under a tree, his leg shattered by a rifle ball (*above*).



BATTLE PAINTING BY JOHN DAWSON



banks of the Brazos River to organize a government. The time and place were dreary. A rainy blue norther chilled the delegates, but on March 2—Houston's 43rd birthday—they put their names to a declaration of independence.

By then the Alamo was under siege, and Houston set off with volunteers to try and save Col. William B. Travis and his 188 men. But on the way, Houston left his army for a moment and, as he had learned from the Indians, held his ear to the earth. Not the faintest rumbling disturbed the morning calm. He knew the guns had ceased in San Antonio. The Alamo had fallen.

When three Alamo survivors rode into camp—a young widow, her baby, and a servant—panic seized the Texas army. Houston rallied the men with his own booming voice, but despair was spreading.

"We cannot fight the enemy ten to one, in their own country," wrote Houston. His strategy was formed: Retreat to the more populated east Texas and hope enemy forces would divide.

It was a dark moment, comparable to George Washington's forlorn retreat across New Jersey. The Texans at Goliad had fought and fallen—every prisoner of war ordered shot by Santa Anna. Flee, whimpered some. Fight, shouted most. An orderly retreat took courage, especially when

mutinous volunteers accused their leader of incompetence and even cowardice.

"The enemy are laughing you to scorn," wrote Provisional President David G. Burnet to Houston in early April. "You must fight them. You must retreat no farther." But Houston continued his retreat through cold mud to the Gulf coast. Men slept in the rain and awoke an hour before dawn to reveille beaten on a drum by a sleepless General Houston himself.

For all its discomfort, rain had served the Texans well. Santa Anna's three armies were delayed and separated. The dictator's own force, some 1,500 men, were camped near Buffalo Bayou on San Jacinto Bay.

AND SO, AT LAST, Houston had his chance. He studied his much marked map, for he had never seen this spot before. He made an eloquent speech to his troops: "Victory is certain! . . . Remember the Alamo!" He had given them their battle cry.

On the morning of April 21 General Houston slept past reveille—his first real rest in six weeks—and awoke to full daylight. He studied the clear sky . . . and saw an eagle circling overhead. He dawdled, or seemed to, until 3 p.m. As the sun slanted behind him, Houston formed his troops. This was Mexican siesta time; the confident Santa Anna was sleeping, as were many of his men. They would wake, if at all, to face a westering sun behind the Texans.

At four, Sam Houston, astride a big white horse, raised his sword. A drum and fife began to play, and the ragtag army moved out of the mossy oak trees that

Texas-size shrine, a limestone obelisk towering 15 feet higher than the Washington Monument marks the hilltop where Texas won her freedom—an event celebrated annually at the San Jacinto Monument (facing page). Ceremonies will mark the battle's 150th anniversary on April 21, 1986. Inside, four generations of Houston's descendants (below) gather amid a display of battlefield memorabilia.



concealed them and up a slight incline. The Mexicans did not stir. Then came the noise of battle, the rumble of hooves as the Texas cavalry charged, the blast of Houston's two small cannon, his infantry's first shocking volley. And men's voices shouting, "Remember the Alamo!" Surprise was utter.

Confusion and carnage lasted only 20 minutes. It took longer for Texans to tally the extent of victory: 630 Mexicans killed, 208 wounded, 730 taken prisoner. The Texas army of 900 warriors had lost nine men.

SAM HOUSTON lay in prideful pain. A bullet had splintered his right leg when his horse was killed beneath him. The tableau is familiar to all Texans: Old Sam Jacinto lying beneath an oak, a humbled Santa Anna standing before him. The painting is a Texas icon, our heroic kinfolk wedged in wholesale. (Lyndon B. Johnson's great-great-uncle John Wheeler Bunton is half hidden by a tree trunk—which prompted LBJ to question the authenticity: "My uncle would never have gotten behind a tree when they were taking a picture!")

Houston saved Santa Anna from a lynching and thus assured the dictator's recognition of the free Republic of Texas. And Houston, who certainly never hid behind a tree, was elected the republic's president.

His tasks were terrible. Annexation by the United States was impossible, since war with Mexico would have been a certain consequence. The new republic was embattled and broke, and its president lived in a shack. It's hard to conceive such poverty if we visit the San Jacinto battlefield today, hemmed in by the hardware of

oil refineries and grain elevators, its channel a mobile of merchant ships. And just to the west stands the city named for Sam Houston, fourth largest in the U. S., richer than Croesus and Texas tall. Yet when artist-naturalist John James Audubon journeyed to Houston City, in 1837, he described "the president's mansion" as "a small log house, consisting of two rooms," the "ground floor . . . muddy and filthy."

Sharing his quarters with the surgeon-general (they slept on camp cots), Houston brought some order to his frontier republic. But toward the end of his first term, he took again to his ardent spirits while Texas returned to untidy ways.

Things grew worse for Texas with Houston out of office. But for the man himself, fortune smiled. At 47 he courted and married an Alabama beauty, Margaret Lea, age 21. As an exemplary family man, Sam Houston was overwhelmingly reelected president of Texas.

The republic was now too poor to buy firewood for the president's residence. Mail service ceased. The Texas minister to France pawned his watches to pay bills. Houston cut his own salary by half. When Santa Anna threatened Texas anew, Houston himself guaranteed the cost of sugar and coffee for Texas troops.

Hope lay in U. S. annexation—or perhaps a protectorate with England or France. Houston played a cagey game. U. S. abolitionists wanted no more states



with southern sympathies. William Lloyd Garrison said, "All who would sympathize with that pseudo-Republic hate liberty, and would dethrone God."

Yet other Americans felt uneasy about a British protectorate for Texas. Houston kept options open and statesmen guessing.

When the British pressured Santa Anna to sue for peace, Texans celebrated. Especially President and Mrs. Houston, now the parents of a son. A bumper grain harvest made the Texas dollar more valuable than the U. S. dollar, and the young republic was recognized by France, Belgium, the Netherlands, and now Great Britain. Even the old ailing Andrew Jackson worried that Europeans would somehow seduce Texas.

HOUSTON'S GAME of diplomacy ended with his second term. Though the Texas Constitution excluded him from another, he had set events moving. In less than three months a resolution for the annexation of Texas passed in the U. S. Congress, so Texas became the 28th state of the U.S.A. Houston later tipped his hand: "If ladies are justified in making use of coquetry . . . you must excuse me for . . . the same means to annex Texas to Uncle Sam."

As U. S. senator, Houston went to Washington in 1846, in time to counsel



EUGENE C. BARRER
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UNIVERSITY OF TEXAS AT AUSTIN

"Lord help the fish down below!" Houston told a friend who congratulated him on having his sins washed away in Little Rocky Creek (left) at age 61. Others had pitied Margaret Lea (above) when the 21-year-old Alabama belle married the Texan, then 47 and a man "accustomed to the elaborate comforts of an Indian wigwam" and "totally disqualified for domestic happiness" in the eyes of onlookers. Yet Houston relished his role as husband and father; he and Margaret had eight children.



CULVER PICTURES (ABOVE); GEORGE EASTMAN HOUSE COLLECTION

"The noblest Roman of them all," read the caption of this 1861 cartoon about Houston's refusal, as governor of Texas, to swear allegiance to the Confederacy despite threats of violence and impeachment. A U. S. senator when the 1850 daguerreotype (facing page) was taken, Houston at one time fancied himself as the Consul Marius, who stood fast even as all Rome reviled him.

to be branded a traitor in my old age?" His bare bosom, as one man described it, had hair "as thick as a buffalo mop."

Even so, his enemies gave Houston a trouncing. The legislature was set to dump him as senator. Two years later, though, he ran again for governor.

"Mark me," he said in his one big campaign speech, the day of secession "will be written . . . in the blood of humanity. . . ."

This time Houston won the election. The large Houston family moved into the handsome new governor's mansion in Austin—seven children and another soon to come. It was the longest period of family life that Houston had ever enjoyed.

Family legends still abound. Like the time prankish six-year-old Andrew Jackson Houston locked the door of the senate chamber while the senators were in session—and hid the key. His father had to threaten the boy with a term in jail before Andrew would tell where the key was hidden. Later the governor observed that his son had better control over the senate than he did himself.

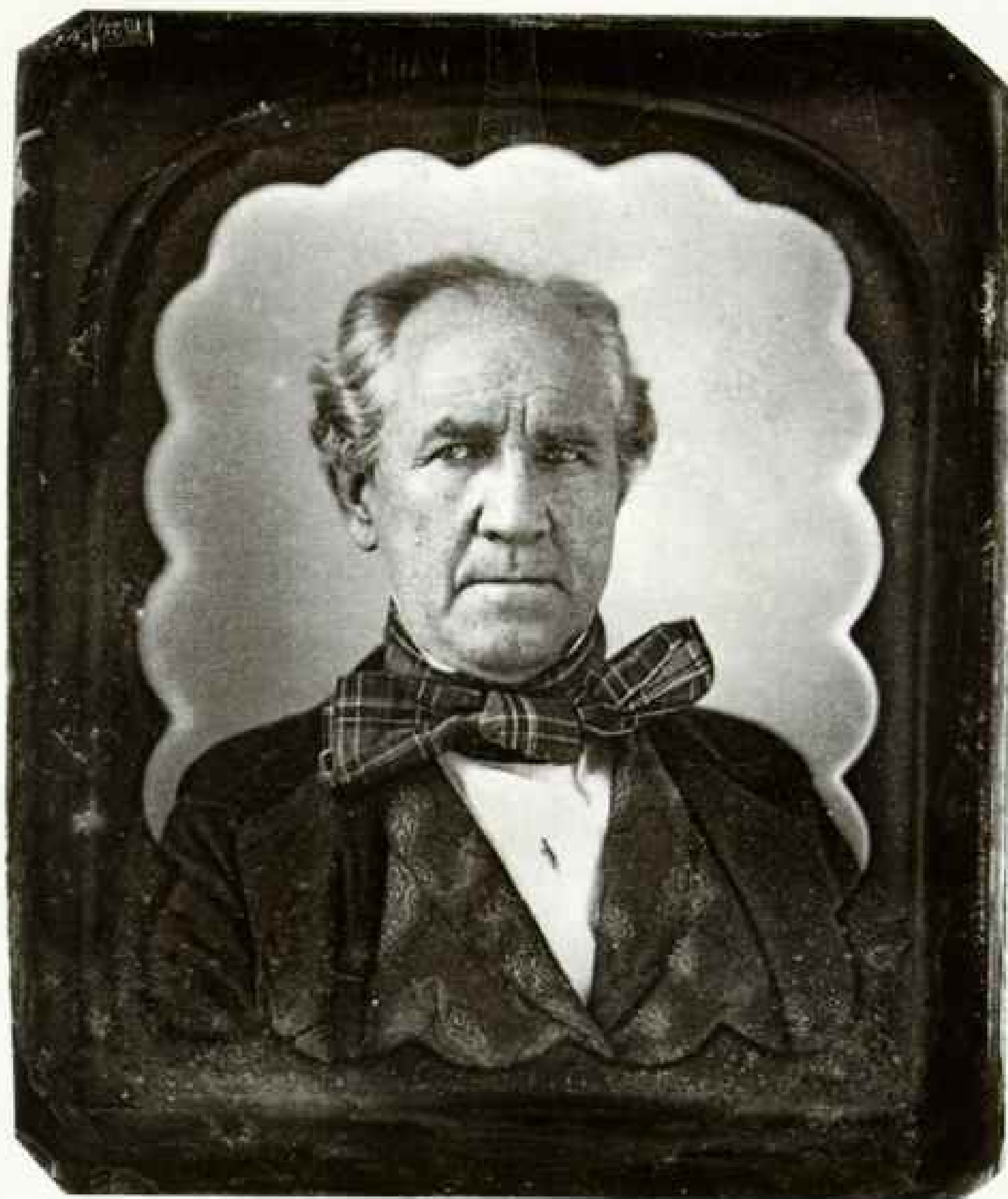
HE WAS PROBABLY RIGHT. Secessionists were busy; one even pled for a "Texan Brutus" to kill the governor. After Lincoln's election in 1860, a vote was scheduled for the secession ordinance. Houston again took to the stump. Asked what he thought of one secessionist leader, he replied scathingly, "He has all the characteristics of a dog except fidelity."

President Polk strongly against war with Mexico; he favored the peaceful purchase of western lands. He shuttled between his Texas homes and Washington, leaving Margaret and his growing family in Texas. But he wrote loving letters home, and attended a Baptist church in Washington, which pleased his devoted wife. He also had national concerns. Some Southerners were advocating nullification. Not Sam Houston: "I am as unionified as General Jackson was. . . ." People had even begun to mention Houston for President of the United States: a Union Southerner.

But the slavery question dogged him, as it did the nation. Houston himself owned a few slaves, like the house servants he had bought to prevent the separation of children from their family. He later freed them. But he had as little love for abolitionists as for Jefferson Davis: "as cold as a lizard and as ambitious as Lucifer."

When Houston voted against the Kansas-Nebraska Act (it permitted the westward spread of slavery), his enemies yelled in wrath. Houston defied them in 1857 and ran for governor, independent of any party.

IT WAS A HOT SUMMER and a hotter campaign. Sam rolled across the state in his buggy, tore off his shirt, and orated. "What! I a traitor to Texas!" he bellowed, limping on his San Jacinto ankle. "Was it for this I bared my bosom to the hail of battle—



Crowds grew hostile. But the old warrior roared on: "Your fathers and husbands, your sons and brothers, will be herded at the point of the bayonet. . . . The North . . . will overwhelm the South."

But when ballots were tallied, 18 counties voted for the Union, 104 for secession.

The secessionist convention required all state officials to take oaths of allegiance to the Confederacy. Houston wrote out his farewell: "I will not yield those principles which I have fought for. . . ." He gracefully left the governor's mansion and knew two years of sorrow before he lay mortally ill in his Huntsville home. (The gray bedroom seems too small a place for a giant's death.) As Margaret read to him from her Bible, the old man spoke his last words, "*Texas . . . Texas! . . . Margaret. . .*"

Eloquent to the end. But to me the one finest speech of this ambitious, glory-loving man was a silent one . . . when the secessionist convention had summoned him to renounce the Union. Houston was sitting alone in the basement of the capitol, whittling on a stick. A clergyman watched him and heard the summons from the convention above: "the call thrice repeated—'Sam Houston! Sam Houston! Sam Houston!' but the man sat silent, immovable . . . whittling steadily on." □



MOROCCO'S
ANCIENT
CITY OF

FELZ



Deep-dyed tradition, unfaded since medieval days, persists in the Islamic holy city of Fez el Bali – Fez the Old – where a vendor wearing his city’s namesake headgear hawks equally traditional babouches, or pointed slip-ons.

By HARVEY ARDEN
NATIONAL GEOGRAPHIC SENIOR WRITER

Photographs by BRUNO BARBEY
MAGNICH



The living and the dead share a hillside outside Fez, where newly dyed goat- and sheepskins dry in the sun amid whitewashed tombs. Fez was founded about A.D. 800 and



became the capital of Morocco's first national dynasty. Timeworn walls date from the early 13th century, when Fez's rulers held sway over much of Morocco and Moorish Spain.



In cramped Fez el Bali, houses press so tightly upon each other that only donkeys and pedestrians can thread most of the city's passageways. The only street open to motor traffic,



built above a tributary of the Fez River, dead-ends at a car park, center. The green-roofed Qarawiyyin Mosque at upper right, largest in northwestern Africa, was founded in the ninth century.



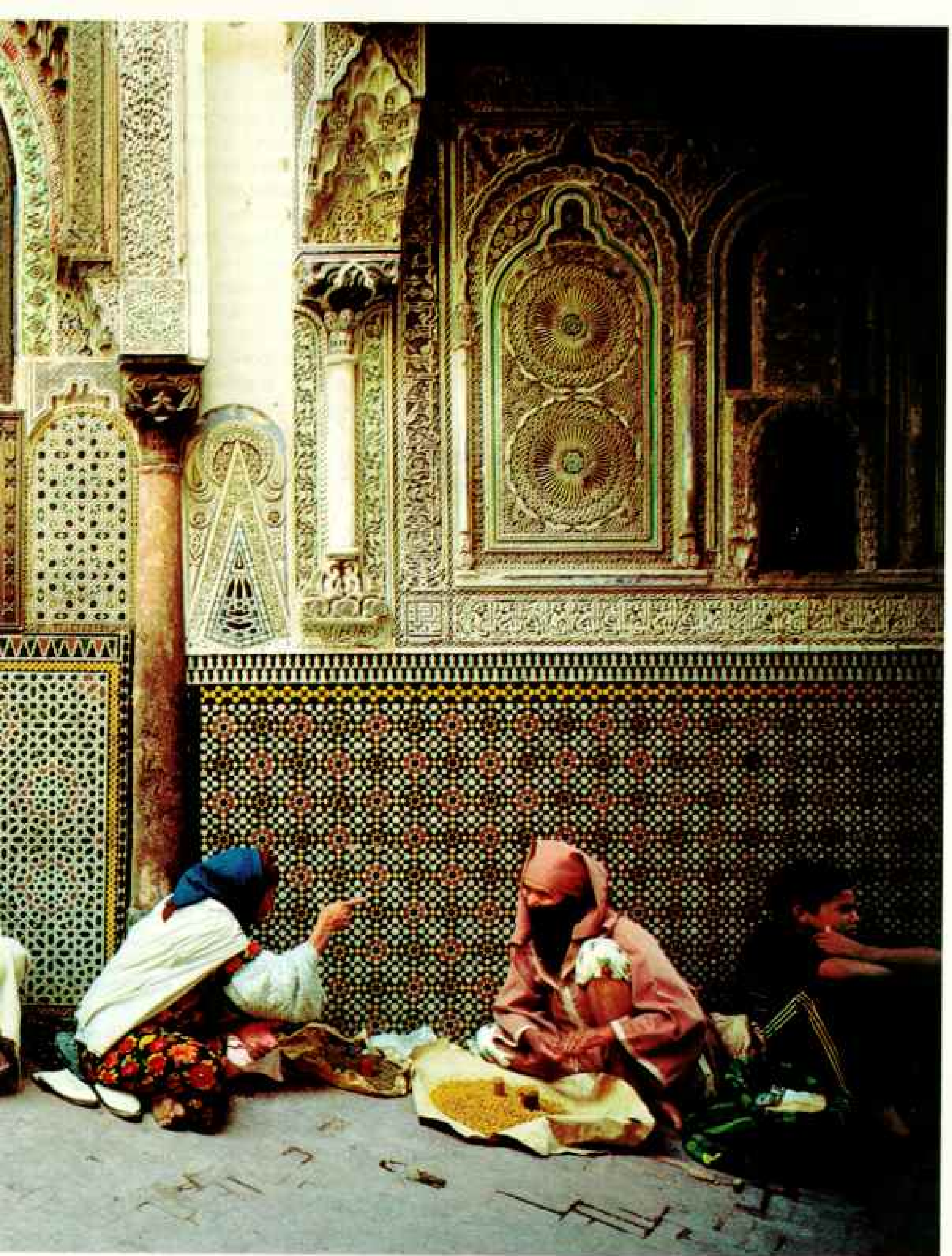
Compressed but composed, a many-splendored Fezzi bride rides a mida, or ceremonial tray, during her spectacular presentation to applauding wedding guests. She is borne aloft



by strong-armed ngagef, or wedding arrangers, who provide the opulent traditional Moroccan finery and paraphernalia for the grand occasion – an expense paid for by the groom.



Breathtaking artistry has transformed an everyday street into a magnificent display of Fezzi craftsmanship in tile, stucco, cedar, and bronze. Citizens pause to gossip outside



the shrine of Moulay Idriss II, who established the capital at Fez. Passersby may drop donations into the slot of the copper plaque, left center, to receive the blessing of the venerated Idriss.

NIGHT DOESN'T FALL in Fez. It rises. Hardly has the glaring African sun dipped behind the hills than the darkness wells up from the deep bowl in which the city huddles. The shadows seep quickly upward through claustrophobically narrow streets, pooling inside the thick walls that hug this 1,200-year-old spiritual capital of Morocco in a crumbling stone embrace.

For a few moments only the tops of the minarets remain sun-struck. Then they too, like candles on a cake of stone, are snuffed out from below by the rising darkness.

Elsewhere it is still afternoon; in Fez it is night. Elsewhere it is still the 20th century; in Fez it is the Middle Ages.

The city has many names, many identities: Fez el Bali, or Fez the Old, founded about A.D. 800; Fez the Holy, one of the most renowned religious centers of the Muslim world; Fez the Imperial, one of the four great capitals (along with Marrakech, Rabat, and Meknès) of Morocco's ruling dynasties; Fez the Secret, city of political intrigue and labyrinthine streets whose dizzying turnings seem always to lead to a windowless wall and a locked door with its iron grating rusted shut.

Add to these one modern title: Fez the Endangered, a city fighting for its very survival as it threatens to implode from age, disrepair, and staggering population pressures.

Night had already risen when I arrived, hot and dusty, after the four-hour taxi ride from Casablanca. It was mid-September, tail end of the hot season that moves up here in summer from the Sahara, some 250 miles south. Temperatures in July and August routinely hit 110°F, and even now hovered in the mid-90s—reminder of the lingering years-long drought that had driven tens of thousands of mountain Arabs and Berbers out of the flanking Rif and Atlas ranges into already desperately overcrowded Fez.

We dipped out of the late afternoon daylight into a deep pool of dark blue shadows at the bottom of which the old walled city—Fez el Bali—lay submerged like some ethereal Atlantis, its few electric lights winking fitfully as if about to sputter out. Our headlights gave dim glimpses of a timeworn stone wall on the right and, on the left, a vast cemetery whose ghost-white

tombstones marched up a hill to the skeletal remains of some shattered building.

We came at last to a weathered Moorish gateway, and I wondered where in this medieval world my modern hotel could possibly be located. Honking some donkeys out of the way, we drove inside.

I blinked my eyes. There, indeed, was the hotel—the Palais Jamai—a gracious pink building rising amid the pleasure gardens of a 19th-century vizier's palace. The taxi door was opened by a tall, fiercely mustachioed man in a white toga-like djellaba. A paradigm of Moroccan traditional dress, he sported a long, curving, silver-sheathed dagger, pointed yellow slip-ons, or babouches, and a black-tasseled fez—the cylindrical Islamic headgear whose distinctive bright red color (today simulated with chemicals) in ancient times derived from natural dyes now lost to memory.

Taking one fleeting look at my dusty visage and disheveled clothes, the impeccably attired doorman smiled imperiously, sniffed, and allowed a bellboy to wrestle with my luggage.

After dining on French haute cuisine—France, it must be remembered, ruled Morocco from 1912 to 1956—I walked outside for an introductory stroll. It was already past eight, and the little hotel plaza was all shadows. One of these shadows now detached itself from the others. The tall and gangling figure of a man in jeans, T-shirt, and sneakers materialized before me.

"A big welcome to you, sir!" came his husky voice. "You are American, yes? May I have the honor of showing you our city?"

I mumbled, "No, thank you," and turned down a small dark street. He followed.

"Very easy to get lost in Fez," he persisted. "May I walk with you? Please, no money. I am not an official guide. But you can help me with my English, and I can help you with the streets. We can be friends, yes? Is good to have a friend who knows the way."

I glanced warily down the long-shadowed street. This fellow's company, I decided, was worth chancing for a few minutes . . . and so I met Abdellatif, the wonderful Fezzi who was to become my constant companion. Together we strode down that dark street, turned a blind corner, and entered the 14th century.



“BALEK! BALEK!”

The driver's warning shout came almost too late as his donkey abruptly rounded the same corner. Abdellatif yanked me into a doorway just as the heavy-laden animal rumbled past with only centimeters to spare. Atop its huge burlap-covered load sat the shouting driver, furiously beating the beast's rump with a switch. His djellaba had a sharply peaked hood that gave him the antique look of some erstwhile Moroccan grim reaper—which, indeed, he'd almost been for me.

“Take care!” Abdellatif cautioned. “Streets very narrow. You must jump out of the way when they come. That's what he shouts: ‘Balek!—Make way!’”

We came out on a plaza at the center of the medina, the old city. It was crowded with people—little girls carrying wooden trays of oven-bound bread dough on their heads, veiled women doing the family wash at an exquisitely tiled public fountain, a bearded old man selling caged birds, old Berber ladies with tattooed chins squatting on the

curbs with their hands held out in supplication, ragged porters lashing slow-moving donkeys loaded down with ice and sheepskins and Pepsi-Cola cases.

“No cars here, not even motorcycles,” Abdellatif said. “The donkey is the taxi of the medina!”

The night air was clangorous with the rhythmic hammerings of the ironworkers at work on their kettles, coppersmiths beating a syncopated tap-da-tap-tap-da-tap on their ornate trays, the rasping voices of the street vendors, the tinselly laughter of schoolgirls in their crisp pastel smocks, and, above it all, the raucous crying of the roosters, which seem to crow all night from the rooftops as if announcing some perpetual dawn of the spirit.

Adding to the sensory assault were a thousand tingling aromas of spices and newly cut cedarwood, of singed oxhorn (used for combs) and sizzling hot cooking oil, of freshly baked bread and ugly-smelling animal hides—all simmering together, as it were, in the warm night air.

Abdellatif, buying a bouquet of mint leaves from a vendor, handed me a sprig. "Squeeze these by your nose," he advised. "Makes Fez smell much better!"

Seemingly endless rows of pigeonhole shops lined the streets.

"This way is the street of the spice sellers and drug sellers," said Abdellatif. "And down there are the thread sellers and the shoe stores.

"You want a carpet? My cousin Muhammad, he'll give you a good deal. Maybe a brass tray or some blue Fez pottery? How about a leather jacket? Moroccan leather is the best in the world!"

This is Fez as it has always been—a huge emporium of craftsmen, traders, mer-

sky. "Allahu akbar-r-r-r-r," it cried—"God is great!"

THE VIEW from the balcony was magical—as if I were peeking over the leading edge of a flying carpet. Seen from above, Fez el Bali looks like a cubist vision. It's as if some mischievous genie had swept a flat city off the nearby plateau and dumped it helter-skelter into this valley. It seemed hard to believe that within that mere square mile or so of compressed architecture lived some 200,000 people—almost half of them impoverished newcomers, many squatting amid the ruins of derelict palaces.

Off to the right rose the gilded battlements



A blessing shared:

Newlyweds retire after frenetic days of wedding ceremony and celebration. Their life will probably be no honeymoon in desperately overcrowded, physically deteriorating Old Fez, where he manages a small business. As contemporary in their tastes as they are traditional in their beliefs, the couple can always escape from their antique environs to enjoy a few minutes of 20th-century city life in Ville Nouvelle—modern Fez—a five-minute drive from the old city.

chants, and hustlers of every variety, all converging on this great inland crossroads linking the Mediterranean and the Sahara, the Atlantic and Algeria.

Abdellatif led me through a tangled skein of dark alleyways, and suddenly, turning one last blind corner, we were back—somehow—at the Palais Jamai.

That night, a little after 4 a.m., a voice woke me as if in a dream. I stumbled out of bed and out onto the balcony. It was the muezzin of a nearby mosque, calling the faithful to early morning prayer. His voice, a piercing tenor, came right out of the night

of Fez Jedid, or New Fez—built to house the sultan's palace and retinue a mere 700 years ago and today bustling with 50,000 people. Beyond that, a vague glow on the horizon, lay modern Fez—the Ville Nouvelle, established during the French protectorate, and the newer sections, which together house another 350,000 or so inhabitants.

Fez has never been preserved. It has *persisted*. For nearly 12 centuries it has outlived its founders, its protectors, its destroyers, its reformers, its saviors.

Founded by Idriss I, a descendant of the Prophet Muhammad, in the late eighth

century, it became, under his son Idriss II, in the year 192 of the Islamic calendar—A. D. 808 by the Gregorian—the capital of Morocco's first national dynasty, the Idrissids. Call out "Idriss!" in the streets today and the faces of the great kings' namesakes turn your way.

Later dynasties—the Almoravids, the Almohads, the Merinids, the Wattasids, the Saadians, and the still reigning Alaouits—had their capitals sometimes at Fez, sometimes at Marrakech, Meknès, or Rabat. In the 1300s Fez rose to its greatest eminence as the Merinids reestablished the capital there, endowing many new koranic colleges to continue the city's position as one of the intellectual leaders of the medieval world.

A covenant sealed:

Consoled by his mother after the ceremony of circumcision, a child of Islam will grow up in a pluralistic Moroccan society that accommodates a spectrum of life-styles—from rock-ribbed fundamentalism to middle-of-the-road conservatism to freewheeling modernism. The black veil worn by this mother will likely be cast aside by her daughters. In Morocco, traditional garb, like life-style, becomes increasingly a matter of personal choice.



Fez's great Qarawiyyin University—the oldest Arab university in existence—poured forth scholars, poets, mystics, mathematicians, legalists, and statesmen who were the glory of the Arab world and who, shuttling between Morocco and Moorish Spain, helped dispel the Dark Ages in Europe.

ABDELLATIF invited me to his home for the feast of Aid el-Kebir. "It celebrates Abraham's sacrifice of the sheep, instead of his son Ishmael," he explained. "Each family saves up and buys a sheep to kill at home. You can watch

King Hassan kill a sheep on TV. Here every man is king in his own house."

I mentioned that, in the Bible, Abraham sacrificed the ram in place of his son Isaac, not his son Ishmael.

Abdellatif shook his head. "Ishmael was the one, the Koran says so."

His home is a four-room apartment on the third floor of a tenement of indeterminate age. All the buildings of Old Fez, it seems, have a patina of antiquity about them—even those built in this century. When a structure becomes unsafe, it is simply torn down and replaced on the same spot, often incorporating the stones and timbers of its predecessors. Buildings 50 or 500 years old may look virtually the same.

"This building is new," Abdellatif said proudly. "Maybe only 70 years old."

The rooms were all but empty of furniture except for the traditional long divans along the walls. A few photographs, magazine clippings, and calendars hung on the bare walls. In one corner of the parlor sat a squat television set with a piece of see-through blue plastic taped over the screen.

"Soon we get color," Abdellatif vowed.

Out on the porch the sacrifice took place amid much jocularly. Four sheep were killed for four families. Menfolk did the killing and butchering, women hosed down the

carcasses, children squealed and ran about, blowing up the lungs like balloons. Invoking local custom, at one point the men pierced a vein in one of the sheep's thighs and sucked the blood. "For strength!" they exclaimed.

LATER WE SAT amid the pillows of the divans and, from a communal brass tray, enjoyed a huge feast of freshly sacrificed shish kebab, deep-baked chicken

tajine, and a steaming mountain of *cous-cous*, Morocco's national dish of semolina, vegetables, and chunks of lamb, prepared, Fez style, with cinnamon and sweet yellow raisins—all of this surrounded by small plates of peppery condiments, olives, nuts, yogurt, sweetbreads, and huge wheels of Moroccan bread. The repast was washed down with repeated glasses of scalding, intensely sweet, green mint tea, the national drink. "It is our Scotch whiskey," Abdellatif commented.

Rendered nearly immobile, I took a nap while the women and children carried out the dishes and finished off their contents amid much giggling in the kitchen.

One night not long after that, a great wind sent clouds of dust and palm fronds flying through the streets. The air turned thick and green. Then the wind let up and I heard a strange sound. *Rain!*

People came out into the streets, faces openmouthed to the sky. They held out their arms, mumbling prayers of thanks.

Next morning a thick, pearly fog covered everything. I got up just past dawn and strolled through a cemetery outside the city. A tint of sunlight, suffused in the fog, gave everything an unearthly cast. Groups of men in their peaked djellabas were out walking among the tombs, each wrapped in his own private shroud of fog.

Moroccan cemeteries aren't shunned; they are an integral part of the social landscape. People sit among the tombs to read or smoke or just to contemplate the panorama of the walled city on one side and the sensuous hills of geometrically spaced olive trees on the other. Here in Fez the living and the dead coexist in perfect harmony.

"PLEASE, SIR, avert your eyes. . . ."

We were climbing a narrow stairway to the apartment of a university student named Azzedine. He cautioned me in matters of propriety. This apartment building was once the *dar*, the city mansion, of a well-to-do Fezzi family—a commodious home built around a large fountained patio ringed with ornately carved and mosaicked stone columns. Perhaps a dozen families live here now. At one of the landings I couldn't help glancing down into the patio, where several of the women were doing their



In 700-year-old New Fez, or Fez Jedid, site of a royal palace often visited by King Hassan II, attendants (above) bear covered brass trays of food to guests at the wedding of the King's daughter in September 1984. Moroccan carpets (facing page) provide a grand entry into the palace for the visiting president of Brazil.



laundry at the fountain. That's when I drew Azzedine's admonition:

"Please, sir, avert your eyes—the patio belongs to another family. One does not look in on them unless invited. . . ."

Azzedine, who bears a striking resemblance to a young Omar Sharif, took me up to his family's third-floor apartment. After removing our shoes, we sat on the ubiquitous divans in the parlor, to be served the equally ubiquitous sweet mint tea and Moroccan almond cookies.

On one of the divans sat Azzedine's elderly uncle, wearing Ali Baba pantaloons, a simple blouse, and a red fez over his shaven skull. He sipped his tea and gazed at us with detached curiosity.

VIRTUALLY ALL the aristocracy of Fez has now abandoned the deteriorating medina for the more comfortable, modern Ville Nouvelle or left for Rabat or Casablanca or Tangier. The central government in Rabat is abundantly staffed with Fezzis, whose acumen and polished social grace are legendary.

In one old dar of nearly 50 rooms I was served tea by an elderly woman who lives there alone with two servants.

"The family has gone to Casablanca. We would sell the house, but who would want to buy it?"

Shrugging, she waved a slender hand at the peeling walls, crumbling mosaics, aging cedar beams, cracked tile floors.



Visage of the mighty: Portrait of Morocco's Hassan II—one of earth's last absolute monarchs—goes up outside the royal palace during one of the King's frequent visits to Fez. From Rabat, the modern capital, Hassan II often visits his other palaces in Fez, Marrakech, Casablanca, and elsewhere. His father, Mohammed V, assumed the title "king" after the expulsion of the French in 1956. In former times Morocco's rulers were addressed as "sultan."

"It is hard for him to move about," Azzedine said. "He worked many years as a tanner, standing all day in the vats. His knees aren't so good now—rheumatism."

When we finished, Azzedine lifted a silver shaker and sprinkled us with rosewater—refreshing as a rain-scented breeze.

Then we went into his tiny study—filled with hundreds of books. A student of Arabic literature and Moroccan history, he lovingly caressed the gilt leather bindings. "This is a history of the Qarawiyyin Mosque in three volumes," he said, "and here a set on the history of Fez. Someday—Allah willing—I will write a history of Fez myself. . . ."

"More tea?" she asked, maintaining an unassailable dignity.

I was invited into another tarnished jewel of a building filled with seven or eight squatter families, who retreated cautiously at our approach. The fountained patio was strung with clotheslines and ragged laundry. Tin cans and empty plastic milk jugs lay strewn on the intricate tile-and-marble floor.

"It's almost impossible to evict them," Abdellatif said. "To force them out would be difficult. There could be riots. How can you evict thousands of poor people? Where would they go? The government turns its eyes. We are a feeling people."

French architect Jean Paul Ichter has more than a feeling for Fez; he is possessed by the old city. For a quarter of a century he has poured his dreams not into its past but its future—first as a municipal planner, today as director of a private organization called Hadara (Civilization). Along with the governmental Delegation for the Safeguarding of Fez and some private groups, Ichter's program seeks to help in UNESCO's efforts to preserve the medina.

"You must understand the enormity of the problems facing this city," he explained as we toured the medina. "When I came here in 1960, there were perhaps 200,000 people in all of Fez, old and new. Today we estimate 600,000—nearly half in the old city—

newcomers. Even so, the shacks often spring up overnight.

"Almost as bad, the cultural life has deteriorated. Most of the scholars, the lawyers, the statesmen have gone elsewhere. The Qarawiyyin University was shifted out of the old city after a thousand years and has become just another university. The French themselves started the brain drain in 1912, when they moved the capital from Fez to Rabat—mainly to get away from Fez's political intrigues.

"The old city has *given, given, given*—how much more can it give before it dies?"

"The time has come for the world to give something back to Fez. That's why we founded Hadara—to enlist world financial

Image of the lowly: Palm held out in supplication, a beggar awaits the generosity of strangers. Of sadaqa, or charity—considered a "loan to God"—the Koran instructs: "O ye who believe! Give of the good things which ye have earned. . . ."

Unhappily, opportunities to fulfill the command abound in today's Fez, bursting at its ancient seams with thousands of new arrivals driven out of nearby mountains by drought and economic desperation.



with 25,000 new arrivals every year, many driven by drought or hopes for a better life. By the year 2000 there will be more than a million. Think what that means! We must build 6,000 housing units and 200 classrooms each year just to maintain the level we are at!

"Those who can't find a place in the Ville Nouvelle or the old city build their shacks anywhere. If that goes on unchecked, the medina soon will be strangled. It is fortunate that Old Fez is mostly surrounded by cemeteries—they help separate her from the new city and the housing projects the government is building to accommodate the

help and to see that every bit of that help goes directly to the renewal of Old Fez."

He took me into an old *medersa*, or Islamic college—an exquisite ruin, its central fountain dry and broken, its carved, mosaicked walls flaking and peeling.

"Imagine this alive with people again as it once was. Not restored into a museum piece but into a living entity again." A fire burned in Monsieur Ichter's eyes. "Perhaps we can't make it a koranic college as it was, but imagine it as a theater or a library or a concert hall or as the headquarters of some cultural organization! This is what I dream about!" (Continued on page 352)



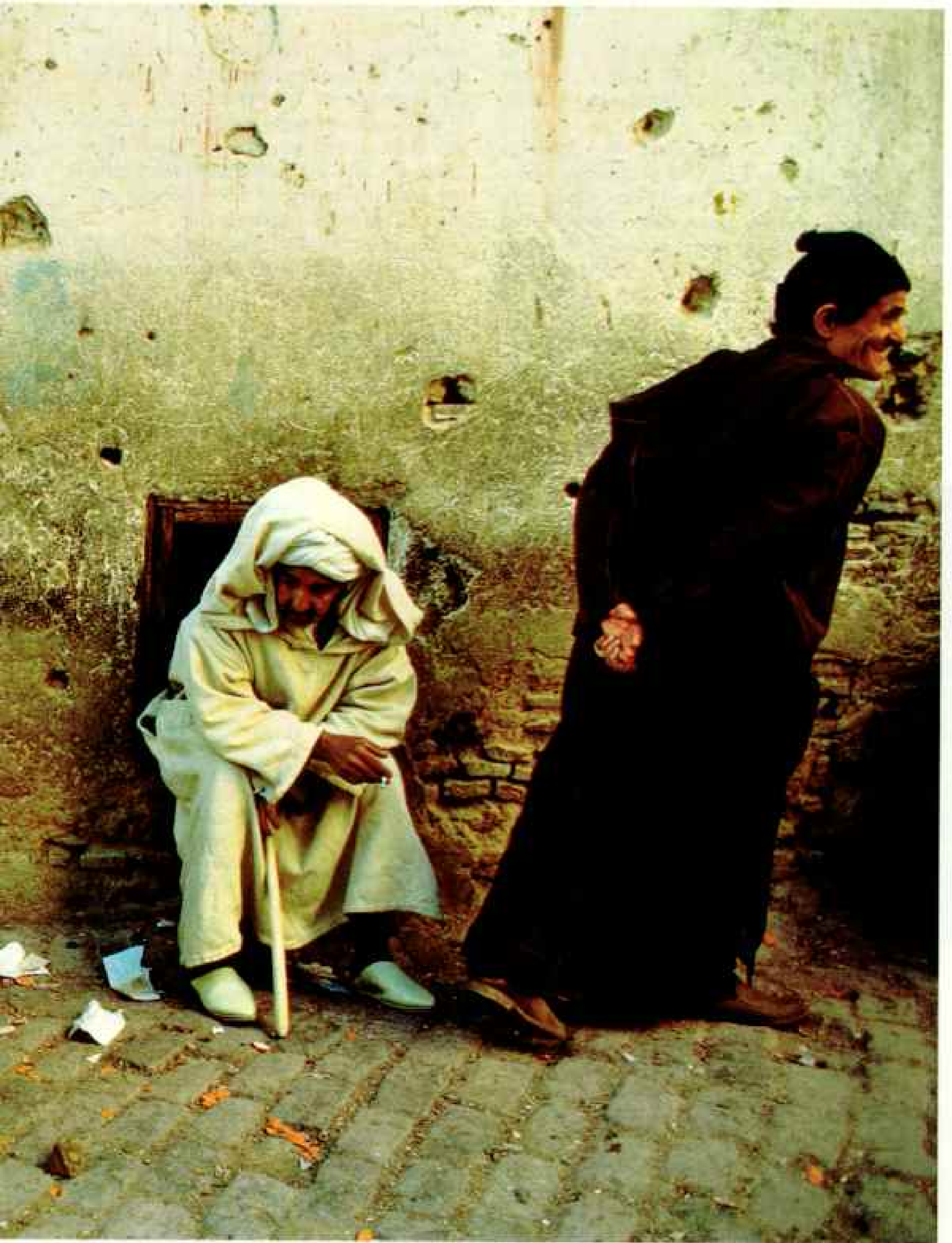
Thunder of hooves, lightning of gunfire create a tumultuous storm as charging Berber horsemen, reining in their steeds moments before reaching the crowd,



set off an ear-cracking volley from muskets. Held outside the walls of Old Fez, this traditional entertainment—called a fantasia—celebrates the wedding of the King’s daughter.



Special delivery, Fez style – a four-foot-drive vehicle idles with an unlikely payload in the old city. With motor traffic virtually impossible in the labyrinth of narrow streets,



donkeys and mules become the conveyers of heavy goods. A jarring fate awaits unwary pedestrians who fail to heed drivers' shouts of "Balek! Balek! – Make way!"

MONSIEUR JACQUES, a Jewish businessman who runs a souvenir shop in the Ville Nouvelle, recalled the world he knew.

"A generation ago there were perhaps 17,000 Jews in Fez. Our people lived here for more than a thousand years. Once, you know, a Jew was grand vizier. For centuries Fez was a famous center of Jewish learning. The great philosopher Maimonides himself lived here for a time—you can still visit his house. A special Jewish quarter was built right beside the sultan's palace in Fez Jedid.

"Today there are perhaps 450 of us left. None live in the Jewish quarter anymore. Most live in the Ville Nouvelle. Some went to Casablanca, where there's still a large

restoration of Fez, but they don't mean Jewish Fez. That ceiling must be fixed, but how can we pay for it? Who will hear?"

We ended our walk at the Jewish cemetery in Fez Jedid, where hundreds of white-washed tombs are embedded into a single concrete foundation. "It helps prevent desecration," Monsieur Jacques said.

He sighed heavily. "Perhaps I will be the last Jew buried in Fez." He almost smiled. "One could have a worse honor."

ABDELLATIF'S friend Rachid took us out for a day's holiday. First we swung over to the Ville Nouvelle, a five-minute drive from the old city, and enjoyed a *citron*—or lemon ice-cream soda—



Lamenting a lost world, a rabbi who now lives in London returns once a year to his native Fez to visit the tombs of his ancestors. For centuries the Jews of Fez, many of them renowned scholars, lived in a special quarter by the royal palace. Since the founding of Israel in 1948, the city's Jewish community has dwindled from 17,000 to a mere 450 or so. Most moved to Israel, France, Canada, and the United States—despite assurances by Kings Muhammad V and Hassan II that they could remain in safety.

Jewish community. The others have gone to Israel, France, Canada, America. . . .

"No, we weren't driven out. But after Israel was founded in 1948, there were fears, suspicions, even a few anti-Semitic outbreaks—though nothing on a grand scale. The Jews started leaving. With each Arab-Israeli conflict more left.

"The former king, Muhammad V, assured the Jews that they could stay. His son, King Hassan II, today tells them they can always return. But, I must tell you, it is finished, *all finished*. . . ."

We visited one of the remaining synagogues. "You see how the ceiling is almost falling in?" he says. "They talk of the

at one of the outdoor cafés lining the wide and gracious Avenue Hassan II. Traditionally garbed Berber women dodged amid the honking traffic side by side with young university girls in snug jeans and revealing blouses.

When the French established their protectorate over this part of Morocco in 1912, they began construction of this regional administrative capital on a plateau southwest of Old Fez, creating a European-style city with broad boulevards, smart shops, public gardens, modern housing, and a proliferation of administrative buildings.

Since the French were ousted in 1956, the Ville Nouvelle has stretched its boundaries

into the surrounding plains and hills to accommodate the continuous flow of newcomers from the mountains. Today the city bulges at its fraying seams. To ease the population pressure, the government is constructing housing developments that fill up as fast as they're built.

"Too many people here!" announced Rachid. "Let's get out of town!"

Within an hour we were in another world, winding in Rachid's chugging Fiat through a magnificent emerald-green cedar forest in the Middle Atlas mountains just southwest of Fez. We passed several dusty rural villages, then reached surprising Ifrane—built about 1930 as a ski resort for French colonials. Its Alpine-style chalets seemed

Moroccan carpet among the fallen leaves on the shore beside an idyllic little lake. Rachid opened the door of the Fiat and turned the radio on loud, filling the air with the sweet-sour strains of Arab pop music. A fire was built and the teakettle soon whistled. We enjoyed sweet mint tea, olives, fresh fruit, bread . . . and one thing more.

Rachid poked in the ashes of the fire.

"Yes, it's ready!"

He pulled out a small, blackened, ash-covered object. With thumb and forefinger, he broke a piece off and handed it to me.

"Eat!" he said. "Eat! Is from Allah!"

I recognized the charred remains of the little bird.

"Eat!"

Tempting passersby with foreign delights—a scene unthinkable in more conservative Saudi Arabia or Libya—movie posters reflect the influence of the French, who ruled Morocco as a protectorate from 1912 to 1956. Seeking to sidestep the entrenched political factions of Fez, the French moved the national capital to Rabat. A Gallic legacy remains in the old city, adding spice to the Berber, Arab, and Andalusian cultures that molded the unique character of Fez over the centuries.



utterly, though delightfully, out of place.

"Now we have a picnic down at the lakes!" enthused Rachid.

We skirted the shores of a series of small shining-blue natural lakes cupped among the mountains. Rounding a curve, Rachid suddenly braked to a screeching halt.

"Wait!" he cried. "Back there. . . I think we hit something!" He jumped out, ran back up the road, and returned with the still twitching body of a bird about the size of a pigeon in his hands.

Pulling out a pocketknife, he exclaimed, "In the name of Allah!" and quickly dispatched the pitiful form.

Abdellatif and Rachid unrolled a red

Dutifully, I ate. It had the taste and texture of semiburnt rubber bands.

"Delicious, yes?" said Rachid, sharing the remainder with Abdellatif.

After this strange and exhilarating feast we leaned back on our elbows like three well-fed sultans and stretched out on the red carpet among the brown leaves beside the blue lake.

Already it was late afternoon. A mauve and gold sunset spread across the fast-fading sky. Down in Fez, several thousand feet below, night would have already risen. . . .

We rolled up the carpet and climbed back into the Fiat for the 45-minute drive back to the 14th century. □



Narwhal: Unicorn

By
JOHN and DEBORAH FORD
Photographs by
FLIP NICKLIN

Thrusting its great spiral tusk aloft, a male narwhal appears to joust with other bulls beside our kayak off the coast of Canada's Baffin

Island. They seem to vie for possession of an injured cow, center, that later died of an unexplained tusk wound.

The single tusk, usually



of the Arctic Seas

limited to males, reaches lengths up to ten feet and earned the narwhal its Latin name, *Monodon monoceros*—"one tooth, one

horn." Believed to be the legendary unicorn horn, narwhal tusk was once prized as a powerful antidote and panacea.

Our research on narwhals supports the idea that the tusk is both a weapon and a symbol of dominance in ritual displays.



RELAXING on late spring ice, Baffin Islander Seeglook Akeegok (above) listens to underwater sounds over our battery-powered hydrophone. The

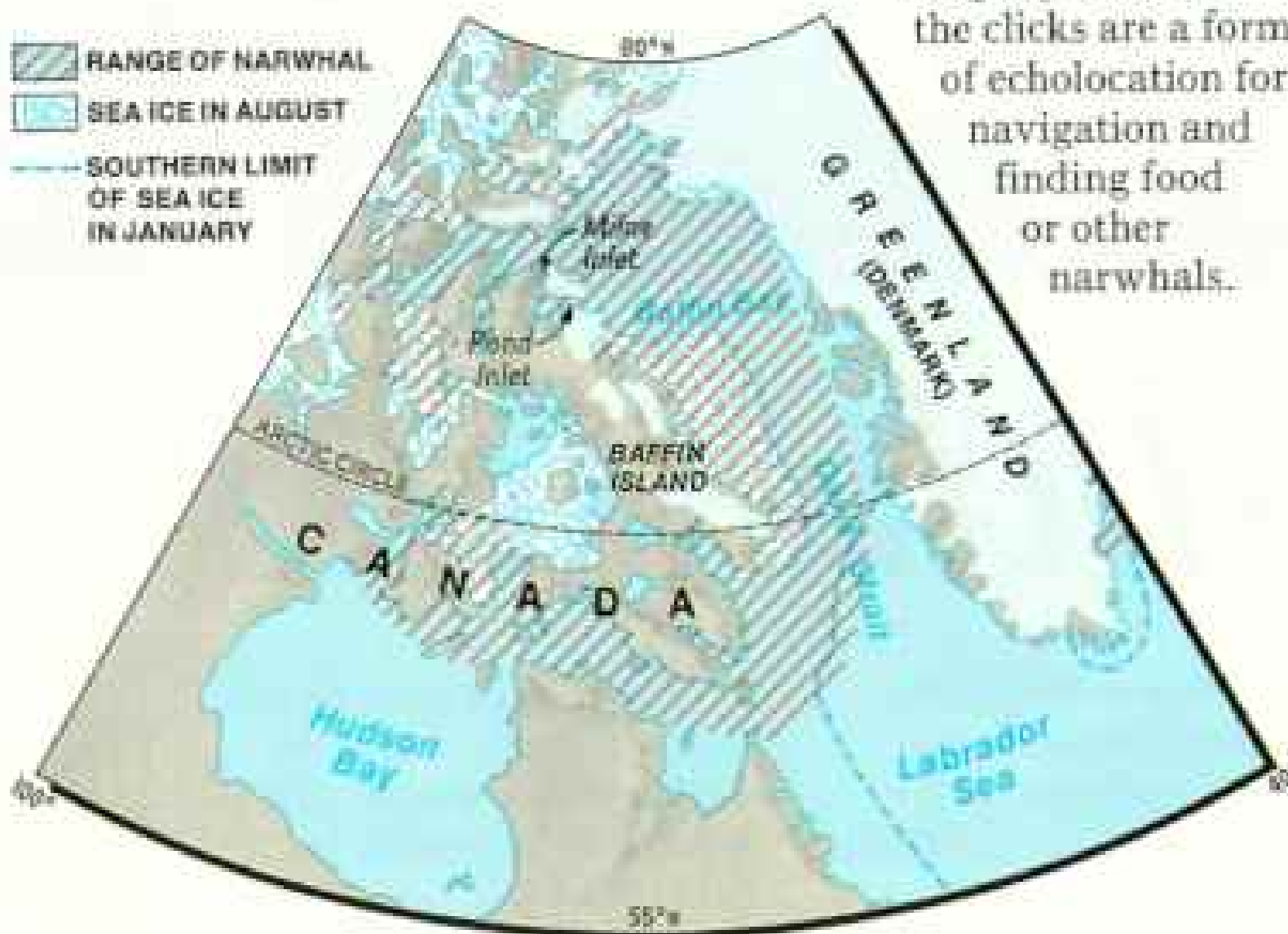
instrument registers a wide variety of calls, including those of seals, belugas, and bowhead whales, as well as the clicks and whistles peculiar to narwhals. Our analysis of narwhal sounds suggests that their calls represent social

"language," while the clicks are a form of echolocation for navigation and finding food or other narwhals.

Creatures of the ice edge, narwhals migrate seaward in winter with the advancing ice and return shoreward during summer breakup. Their diet consists mainly of arctic cod, Greenland halibut, squid, and pelagic shrimp. Three major stocks of narwhals exist in the Arctic Ocean. The largest stock, our Baffin Bay-Davis Strait group (map, below), numbers at least 20,000 narwhals. Though the narwhal is not considered endangered, Canadian law restricts hunting to Inuit and sets an annual limit of 542 animals for all Inuit villages.

Though Greenlanders eat narwhal meat, Baffin Islanders prefer only the delicious muktuk, or skin, which is rich in vitamin C. Until recently, narwhal tusks were a major source of income—a large specimen in good condition selling for as high as \$1,000. In 1983, pressed by environmentalists, the European Economic Community prohibited the import of narwhal tusks by member countries, and prices dropped to a fraction of their former level.

A mother and newborn calf (right) roam the tranquil waters of Milne Inlet in northern Baffin Island. Narwhal cows calve every three years after a gestation period of about 15 months. At birth narwhal calves average five feet in length and 180 pounds. Adult bulls reach lengths of 15 feet and weights of nearly two tons.



Biologists John and Deborah Ford are longtime marine mammal researchers. Diver Flip Nicklin has also photographed other species of whales for the GEOGRAPHIC.







A *FLOURISH* of tusks (*below*) marks the struggle among several bulls for possession of the dying cow, at center with one flipper above water. Underwater observations of the mysterious behavior by photographer Flip Nicklin revealed that the bulls were trying to mate with the female—behavior that still puzzles scientists. The contest among the bulls continued for several

hours after the cow died.

Our research camp (*left*) perches on the ice at Pond Inlet. Our work here was sponsored by the West Coast Whale Research Foundation of Canada. Major funding has come from World Wildlife Fund-Canada, with additional support by the National Geographic Society, the Donner Canadian Foundation, the Polar Continental Shelf Project, and the Vancouver Public Aquarium.



UNDERSEA FRENZY

*seizes the bulls in a wild
melee surrounding the body
of the dead cow, top center.
Tusk or bullet scars crease
the head of the bull at
far right. Later the bull
pointed its tusk at Flip
Nicklin and loosed a series
of clicks at him, possibly
in warning or in an attempt
to identify him.*







recently given birth and was lactating, though we never saw a calf during the seven-hour episode. Multiple lacerations around the cow's head (**below**) attest to the ferocity of the bulls' attack.

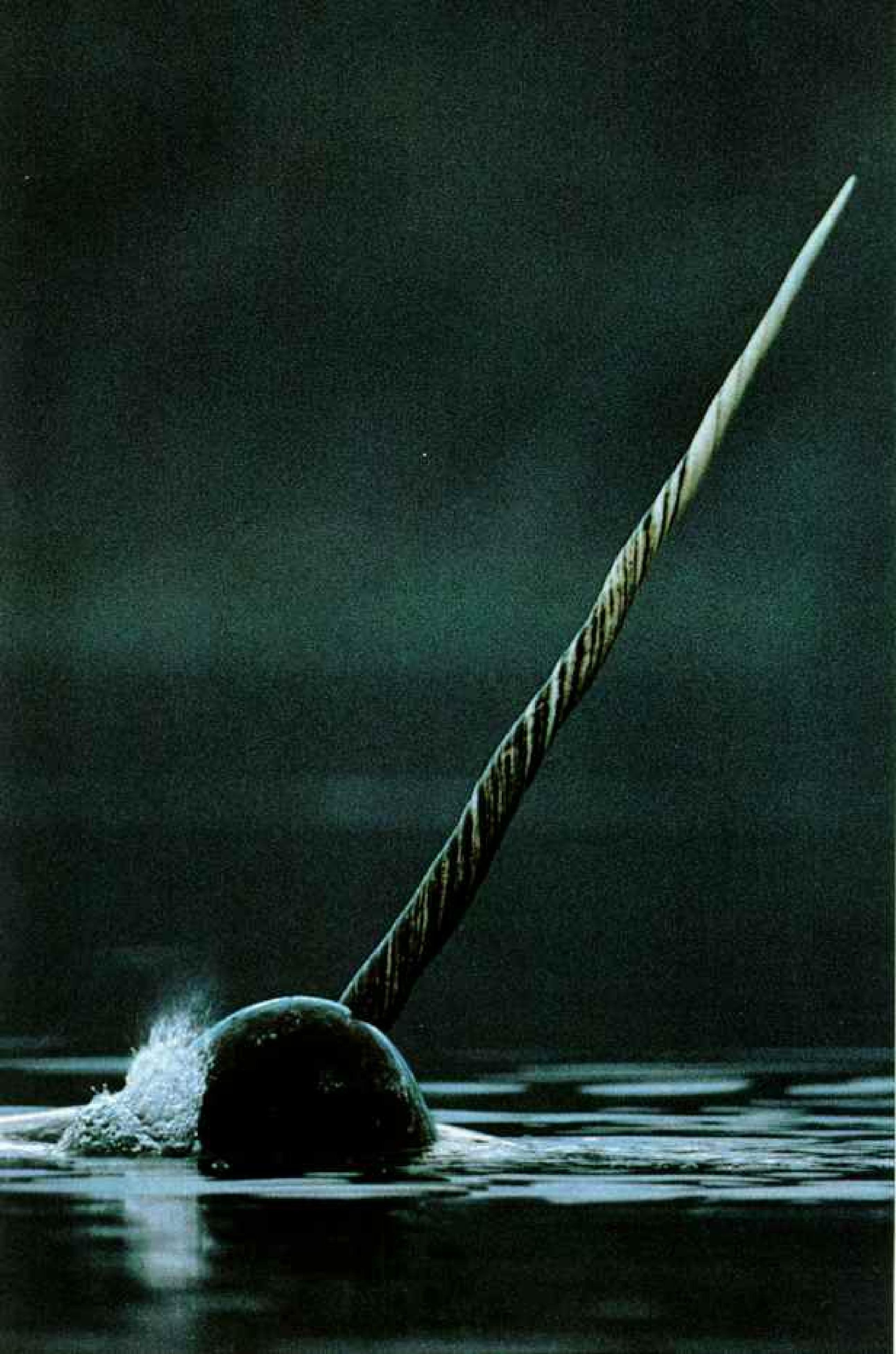
A gleaming spire (**right**) lifts above the glassy calm of Milne Inlet as a bull surfaces. This tusk appears in perfect condition and measures from seven to eight feet long. Doubtless because of constant use, one of every three tusks of adult males is broken to some extent.

While hunting is not a threat to narwhal populations, increasing development of the Arctic could tip the balance against them. Further research will help us protect and understand this animal, one of the most magnificent and mysterious dwellers of the polar seas. □

G RIM POSTMORTEM reveals the almost certain cause of death: a massive tusk thrust (**above**) that penetrated two feet into the body, puncturing the uterus and

hitting the spinal cord. Suffusion of blood through the surrounding muscle tissue indicated that the cow was still alive when the thrust occurred. Further examination showed that the cow had





**THE TENNESSEE-
TOMBIGBEE WATERWAY**

BOUNTY



OR BOONDOGGLE ?



FOR SIX DECADES it was a bright promise in the platform of southern politicians and a cocklebur to northerners who wanted federal funds for their areas. The idea was simple: Structure a 234-mile waterway to join the Tombigbee River with the Tennessee, providing another outlet to the sea parallel to the Mississippi River. It became a reality in January 1985, thanks to the great congressional logrolling tradition: You vote for my project, I'll vote for yours.

In 1971 Congress directed the U. S. Army Corps of Engineers to begin constructing what became America's largest and costliest federal navigation project. Opponents called it a "two-billion-dollar fishing hole" and a "waterway to the backwoods." Fearing competition, railroads joined environmentalists to bring costly but unsuccessful court suits. But Congress continued support, seeking in part to help one of the nation's poorest areas. U. S. Presidents, Republican and Democrat alike, concurred, using the Tennessee-Tombigbee Waterway as a spur to desegregation and minority hiring.

We asked Carolyn Bennett Patterson, a native of Mississippi, where the dreamed-of waterway was supper talk during her childhood, to report on what the Tenn-Tom has meant so far. —THE EDITOR

By CAROLYN BENNETT PATTERSON
SENIOR ASSISTANT EDITOR

Photographs by SANDY FELSENTHAL

THEY WERE BITTER COLD, those January days. Bitter cold for Mississippi, that is, with gusts of biting wind and stinging showers of sleet. At night I was grateful for the warmth of the pilot-house as the towboat *Eddie Waxler* made history with the first commercial passage on the new 234-mile Tennessee-Tombigbee Waterway last year (preceding pages).

By day I was warmed by the host of well-wishers who waved, cheered, and tooted horns on the banks and bridges as we chugged upstream from the lower end of the waterway at Demopolis, Alabama, to its upper terminus at the Tennessee River near Iuka, Mississippi.

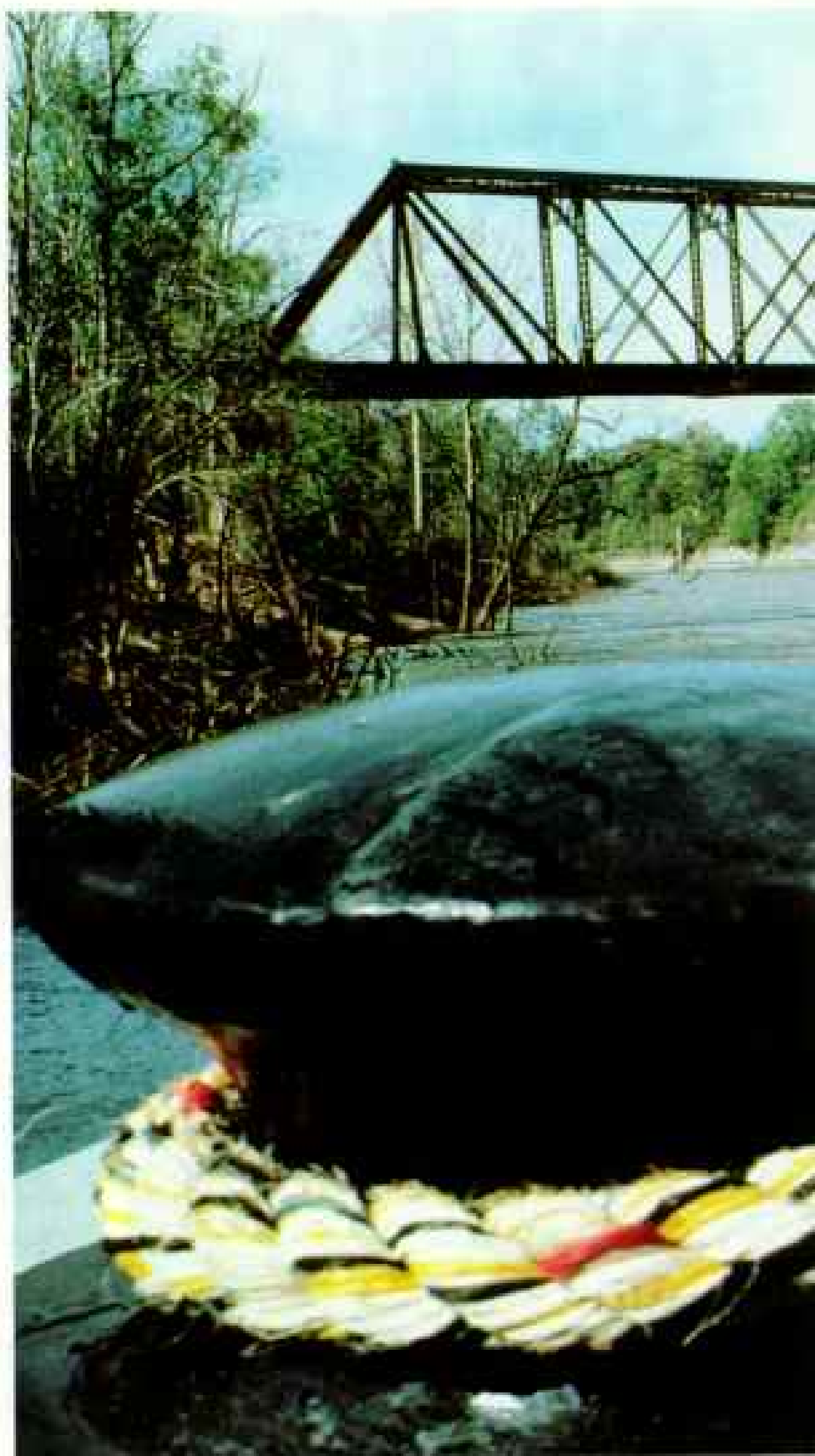
At each stop in the brand-new locks, optimistic speeches and student-band music welcomed towboat and crew, who would continue up the Tennessee to Sheffield, Alabama with 64,000 barrels of gasoline and diesel fuel in four barges. The waterway's completion suggested that a new day had dawned and that life, somehow, would be better in a part of America where opportunity is meager and poverty a cruel constant.

Then, near the upper end of the waterway where U. S. Highway 72 crosses, a message drifted down from one of the dozens of onlookers on the bridge. Written on yellow notepaper, it read:

*For the past, the times that I knew as
a child
I played, I lived and I grew
In a land where waters now flow,
I bid you, "Hello."
For that past is now gone,
As for the future, you now travel on,
Both a sad and happy day.*

The poem had been written by Treva Jane Belue, who, I later learned, grew up in Holcut, Mississippi, the only village destroyed by the waterway.

Holcut was but a minuscule part of the cost of the Tennessee-Tombigbee Waterway, the biggest, most expensive, most controversial federal navigation project in the nation's history. Its cost of 1.8 billion dollars was 600 million dollars more than the next costliest, the 1.2-billion-dollar McClellan-Kerr Waterway in Arkansas and Oklahoma. The Tennessee-Tombigbee figure does not reflect the years of hearings in the United



States Congress, 11 major studies by environmentalists, economists, and engineers, or two attempts to stop construction. And there were uncounted, hidden costs not tallied in dollars and cents.

What did all this buy? Mostly an idea, rooted in geography. People looked at a map and saw that the mighty Tennessee River, linked to a network of other navigable streams, flowed tantalizingly close to the headwaters of the Tombigbee River, whose waters empty into the Gulf of Mexico at the port of Mobile, Alabama. Ah, a shortcut to the sea—if only the two could be linked. Surely the cost of shipping bargeloads of coal, grain, wood, and other products would be cheaper. And for the people in one of the



poorest sections of the South, it seemed such a connection would bring trade and industry their way.

The project, first studied when Ulysses S. Grant was President, was finally authorized by Congress in 1946. In an engineering feat that outdug the Panama Canal, the United States Army Corps of Engineers spent 12 years building the waterway; it was completed in December 1984, 19 months ahead of schedule.

The corps created the waterway in three sections. For the river section—149 miles north of Demopolis—engineers stabilized the Tombigbee's banks and deepened its channel. North of Amory, Mississippi, they channeled the river into a 46-mile chain of

Throwing off a line, Eric Swanson practices a deckhand's skills during a 12-week course near Columbus, Mississippi. Barge companies line up to hire graduates of the Golden Triangle Vo-Tech program, the country's only hands-on riverboat school, created to fill Tenn-Tom needs.

lakes and, for the final, most difficult segment, dug a 39-mile canal 12 feet deep and 280 feet wide across the divide that separates the Tennessee and Tombigbee Valleys. In all, 307 million cubic yards of earth were removed—96 million more than for Panama's canal.

The divide cut alone employed 5,000 workers and ate (Continued on page 372)



Historic meeting of two rivers occurred December 11, 1984, as a dredge cut through an abandoned railroad embankment, permitting water from the Tennessee, foreground, to join that of the Tombigbee near Amory, Mississippi. The train heads west atop a new span, one of six railroad and 14 highway bridges built



during the project. In the 1970s the Corps of Engineers estimated the waterway would carry millions of tons of coal for export, a figure made unrealistic by a decrease in demand in the 1980s. But in the first year of operation the Tenn-Tom carried more than 1.5 million tons of freight, including 25 other commodities.



Southern dream come true, the Tenn-Tom opened in January 1985, when the towboat Eddie Waxler, picked by lottery, pushed four barges loaded with gasoline and diesel fuel upriver (below). Here the tow enters computer-controlled Bay Springs Lock, highest of ten in the system. Some 40 million gallons of water fill the enclosure in ten minutes, raising the tow 84 feet.

On June 1 excited Mississippians (left) crowded the Bay Springs Lock at the waterway's official opening and met corps officials Brig. Gen. Peter Offringa, right, and Brig. Gen. Forrest Gay III aboard the towboat Mississippi.





STEVEN RACES, THE COMMERCIAL APPEAL, MEMPHIS, TENNESSEE (ABOVE)



"This is precious land they are traveling through," says Treva Belue (right) of passengers on the Mississippi, as she lays a wreath for her hometown, the only hamlet in the path of the waterway. The corps purchased 1,500 acres in the Holcut area (top, in 1974), displacing 100 people in 28 homes.

Former townspeople (above) gathered to greet Mississippi Congressman Jamie Whitten aboard the vessel. He supported Belue's idea of creating a memorial park, as she says, "so people won't forget the human cost of the waterway and the promises yet to be carried out."

up a fourth of the money spent on the waterway. Here immense machines dislodged as much as 30 cubic yards of earth at a time, and a one-of-a-kind "rock monster" laid a million tons of limestone along the banks of an 11-mile stretch. "They transformed the landscape," Mississippi writer Irene Page reported, "filling in ravines and valleys and creating gently rolling and terraced hills that were never there before."

I RETURNED to the Tenn-Tom in the late spring, timing my voyage to coincide with ceremonies dedicating the project. And I sought out Treva Belue, who had written the poem dropped from the bridge. With her I visited the site of Holcut, now



partly underwater and partly on land the corps has reserved solely for wildlife. Truthfully, Holcut wasn't much: a shirt factory, a couple of country stores, several dozen unassuming houses.

But, brushing away tears, Treva remembered: "It was just a little village where everyone knew one another. You would walk out in the morning, and people would call out, 'How you doing?' Oh, how much life was here, and now such a silence!"

Treva wanted the Corps of Engineers to put up a marker on the waterway commemorating the town that died in every way but memory. And she wanted the corps to develop a park with picnic tables on the bluff where people can come for remembrance.

The next day aboard the *Mississippi*, a big Corps of Engineers towboat, I passed the townsite with Democratic Congressman Jamie Whitten of Mississippi, whose 23 terms in office give him the longest tenure in the U. S. House of Representatives. As chairman of the powerful Appropriations Committee—and abetted by fellow committee member Democratic Congressman Tom Bevill of Alabama—Whitten was largely responsible for securing the federal funds for the waterway.

Treva and a group of former Holcut residents had gathered to watch the *Mississippi* pass—and to drop into the water a wreath of flowers for a village and a way of life that had ended. "I'm in favor of a marker,"

Congressman Whitten told me. "I want people to know that folks lived here and that sacrifices were made for progress."

We sat, the congressman and I, in big leather chairs before the picture windows of the *Mississippi's* wheelhouse, looking out on the neat, rock-sided banks as the red-clay hills and barrens of northeastern Mississippi slid by. Of Whitten's progress down the Tenn-Tom the *Wall Street Journal* was to later write, "Rivaling Cleopatra, A Pork-Barrel King Sails the Tenn-Tom."

When I asked him about the charges that the Tenn-Tom was "history's biggest boondoggle" and a "pork-barrel bonanza," the congressman laughed.

"You want to know what boondoggle and pork barrel mean? They just mean it's the other fellow's project. But, seriously, you have to have a little vision to make progress. When the Tennessee Valley Authority was coming along, people said that there was no

need for cheap electricity in the rural areas. But when the electricity came, development followed.

"Maybe," Congressman Whitten said, "there isn't much traffic on the Tenn-Tom yet, but there will be. And development will come because the Tenn-Tom is here."

I SAID GOOD-BYE to Jamie Whitten and drove back to Pickwick Lake on the Tennessee River. There I set out in a houseboat to run the whole length of the Tenn-Tom, from the Tennessee south to Demopolis, and on to Mobile on the Gulf. My companion and skipper was Elizabeth Ann Roberts, a pioneering young woman who had taken off from her job as first mate on a Gulf coast oil-rig supply boat.

It was late when the two of us set out alone, bound for the Bay Springs Marina. The clouds started gathering about five o'clock, ominously dark to the west. Just as



Cheek by jowl, symbols of the Old South and New coexist in Tishomingo County, Mississippi. Three generations living in a century-old yellow-pine farmer's cabin stave off rural isolation with a satellite TV antenna. The corps sponsored inventories of such architecture and archaeological sites along the Tenn-Tom.

twilight fell, the lightning show began: great jagged streaks that lit up the whole sky.

The storm was really heaven-sent in more ways than one; the flashes of light showed us the distant banks and kept us in midstream. As the wind roared up, making the water a frothing chop of waves amid driving rain, Libby steered us calmly into safe haven.

Bay Springs Marina is a dream realized for its owners Frank and Virginia Mills and their family. Leaving a job as a supervisor in an Ohio steel mill, Frank sank his lifetime savings into the marina—one of the few on the Tenn-Tom so far—and the family felt hard times during the year before the waterway's completion.

Now pleasure boats en route to the Tenn-Tom dedication filled marina slips, a portent for future success. And, after a steel-mill town, Frank sees his new home as "just like living in a national park."

Libby Roberts and I arrived for the dedication of Lock A at Amory during a blast-furnace heat wave and tied up to the concrete lock wall, where Mississippi's Governor Bill Allain paid us a call.

"I grew up in Natchez," he recalled, "waving at the boats going up and down the Mississippi River—boats that rarely stopped in the state. That's what we want to avoid with the Tenn-Tom Waterway. We want those boats to stop and do business here. But every town along the waterway can't have a port with an industrial park filled with new factories."

To try to save the waterway towns from risky investments in schemes to attract industry, the governor has drawn together representatives from 18 federal and state agencies to guide the communities in working together rather than competing.

But the town of Amory, a onetime railroad center with a population today of 7,500, is way ahead of everybody else, thanks to its dynamic and personable 45-year-old mayor, Tom Griffith.

Mayor Griffith downplays his role, saying, "I sorta shake the trees, and others sorta rake the leaves," but the activity around town tells the story.

On a tour of Amory's new 350-acre industrial park and port, I saw Weyerhaeuser's 700-foot dock where a conveyor belt can load onto a waterway barge 840 tons of

wood chips an hour. Nearby, the Tom Soya grain company plans an elevator that can store a million bushels of soybeans. Other industrial developments are in the wings.

While the waterway brings prosperity to the towns, it has exacted a toll from the country people who live along its banks. Talking to Darryl Reich, a young farmer who also works as a mechanic, I learned that hundreds of families, along with their farms, have been split by the project.

"My father lives on the east side, actually only two miles from me," he said, "but I rarely see him now because I have to drive 35 miles to get there."

ALONG a stretch of the old, now bypassed Tombigbee River we found the "campus" of the nation's only on-river pilot and crew training course, a part of the Golden Triangle Vo-Tech School near Columbus, Mississippi.

The director of the course, Capt. Dean White, showed me his two towboats, the *Robert A* and the *Mateur*, which serve as sleeping and eating quarters as well as training facilities for the students, then ten young men. They are instructed in safety, boatmanship, towing, and even cooking.

Libby Roberts, who earned a Bachelor of Science degree from the University of Southern Mississippi, is the only woman graduate of the riverboat school. To build muscles for handling heavy lines and machinery, she lifts weights. And when out in the Gulf of Mexico on all-male ships for weeks, she prudently tucks a knife into her boot.

"We also try to teach our students to cope with the isolation of life on the water," said Dean, pointing out that such isolation contributes to the bonding of the river people as a special fraternity.

I sensed that special relationship whenever we passed one of the few towboats on the waterway. I had learned in the *Eddie Waxler* wheelhouse that idle chatter between skippers flows in a language of unusual color and distinction. But when professional information is exchanged, everyone is strikingly polite, offering a chorus of "Thank you" and "I certainly appreciate that" and "Mighty fine" and "Roger." I had never experienced such verbalized courtesy.

Just south of Columbus the Tenn-Tom



Waterway begins its run through the heart of Alabama's black belt, the rich soil that made cotton king in antebellum days and today assures the lush greenery of cattle spreads and soybean plantations.

Cruising to an overnight at Aliceville Lock and Dam, we found the river a broad highway lit by a huge orange moon. With the "Moonlight Sonata" on the tape deck, the night came close to perfection.

On shore, carpenters were busy with a huge structure whose elegant Ionic columns reflect the Greek Revival style of the Old South. The Corps of Engineers Resource

Management and Visitor Center is scheduled to open this spring with Edward L. Jenkins as its director. Mr. Jenkins joined the corps as a maintenance worker in 1948 upon graduating from Tuscaloosa's Stillman College, a black, church-supported school, and now heads up a team of rangers who manage nine parks or public-use areas.

Since the waterway was built in compliance with the National Environmental Policy Act, the first major water project to be so, the corps must also tend to thousands of acres given to forest enhancement with the planting of 100,000 seedlings a year. It



Bird-dogging a beer, Buckshot—on command from his owner, John McClanahan—opens a refrigerator (left), retrieves a can, and climbs on a bar stool (below) to deliver it to Homer Swain, owner of the Elbow Room in Columbus.

Ducks are the prize for game warden Perry Gann (far left), hunting in a slough alongside the canal. Of 111,000 acres acquired, the corps set aside 9,000 for recreation and 43,700 for wildlife, where some hunting is permitted. New lakes have created 1,000 miles of shoreline, a bonus for wading birds.



cooperates with state officials who stock lakes with hybrid striped bass, bluegill, and catfish; and it manages habitat and farms for wildlife food.

With chief ranger Gene Ellington I rode out to the gardens where corn, peas, and beans are being grown specially for the deer, turkey, and ducks along the waterway.

"We treat some of our wildlife pretty good," Mr. Jenkins told me. "It's part of our promise to maintain the quality of the environment."

I had a chance to see how some of the people fared at Memphis (pages 384-87), one of

the poorest incorporated communities in the United States. The village—about 300 people living mostly in shacks or run-down mobile homes—centers around a single, half-burned store, partially covered in tar paper. Down the road is a parking lot and concrete ramp built by the corps for the launching of small boats on the waterway.

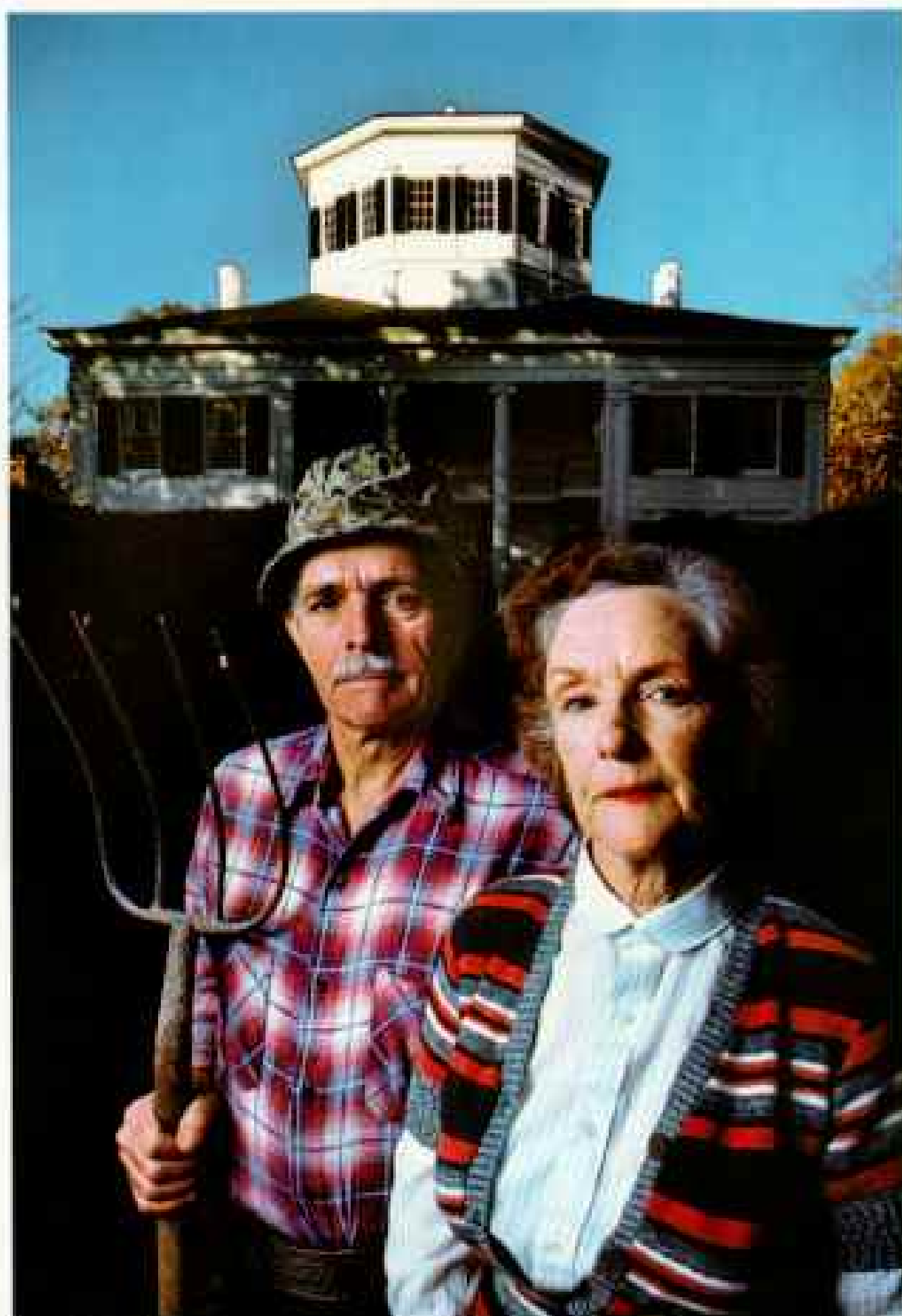
At a falling-down picnic table beneath shade trees outside the town store, I talked with 42-year-old Willie King and 27-year-old Kenneth Smith, both blues singers and community activists.

In a village where most people live on

Mississippi showplace, Waverly lay vacant for 50 years with trees growing into the windows and graffiti covering the walls. Then in 1962 Donna and Robert Snow (right) purchased the house and 40 acres, noting "even in shabby condition it was beautiful." While raising four children, they restored the 134-year-old mansion and the grounds that had been hub of a 50,000-acre cotton kingdom worked by 1,000 slaves.

In the central hall the family enjoys Christmas dinner (below). Guarded by 718 mahogany spindles, the stairs lead to a 65-foot-high cupola that once overlooked gardens with a swimming pool, pastures, and corn and cotton fields sloping to the Tombigbee (facing page).

Visitors fees help pay for renovation that, as Donna Snow says, never ends. The Engineers have received an application for a permit to build an industrial site on corps riverside land at upper left.







welfare or Social Security, the two are trying to promote an Old Memphis Development Corporation. Since much of Memphis is strewn with old cars, the corporation would repair and sell used automobiles.

We went over to see Dinah McMullen and her nine children, sitting in her yard to hear Willie play his guitar and sing a song he wrote: "Well, if you're black, living in Pickens County, trying to stand up for your right, you have to put up a hell of a fight, in Pickens County. . . ."

Thereafter Dinah's children, all in the church choir, sang: "Let it shine, shine, shine. Let your little light shine. . . ."

DOWNSTREAM we pulled into the port of Epes, population 400, for a swim. An eight-million-dollar limestone bathtub, glistening white with stepped sides

and open at the waterway end, the port has yet to attract a single industry. We swam in glorious solitude.

Interesting at eye level, the port of Epes is spectacular from the air, as I had discovered earlier, flying with agents of the United States Fish and Wildlife Service to count waterfowl.

As we skimmed the treetops, biologist Dwight Cooley taught me how to look. And the birdlife was marvelous to behold, even though in March most had already headed north for summer homes.

Among the surface-feeding ducks, we counted mallard, black, gadwall, pintail, American wigeon, northern shoveler, wood duck, and green-winged and blue-winged teal. We saw among the diving ducks the ring-neck, scaup, bufflehead, and golden-eye. We also sighted deer and wild turkey.



Mists of morning portend a new day for Waverly Ferry Landing (above, right), which once had a wharf for steamboats and ferries. Later the railroad swing bridge was built. Transiting the waterway, pleasure boats may bypass Columbus Lake, in the background, to explore other backwaters. Downstream in Alabama, Epes seeks progress with a 580-acre industrial park and port excavated from limestone. Awaiting development, it hosted the author's houseboat on a hot June day (below).



The Tenn-Tom and its new lakes offer 44,000 acres of water surface and lure more and more waterfowl to the area. The waterfowl population peaked in January, when more than 44,000 birds were counted.

But from the air one could also see what the so-called spoil (the corps prefers the term disposal site) has done to the landscape in many areas. The sandy loam that was originally excavated to make the waterway and the silt that must now continually be dredged from the completed project cover vast areas and frequently kill the trees, making for ghostly forests.

"And the silt is choking out many of the old river bends," our pilot, Pete Douglas, pointed out. "That will contribute to the gradual deterioration of the quality of the water flowing into the Tenn-Tom."

Despite all the corps can do to mitigate them—and much is being done, all the time—such deleterious effects of the waterway are what environmentalists feared and futilely went to court to stop.

BACK AT WATER LEVEL on the houseboat, we sailed beneath the soaring white bluffs that signaled the historic town of Demopolis. There antebellum homes and Civil War links draw many visitors. At Bluff Hall, preservationist Gwyn Turner told me, Confederate President Jefferson Davis had been entertained when he came to review his troops in the town.

Below Demopolis, the Tombigbee River is known as the Black Warrior-Tombigbee Waterway and has long connected Mobile seaport with the industries of Birmingham. Even so, the river often flows through wild stretches where no human habitation appears along the heavily eroded banks with trees akimbo over the water.

In Mobile's harbor Lambert C. Mims, then the city's mayor, showed me where the port has spent more than 230 million dollars in anticipation of Tenn-Tom commerce. Most of the money went for new export coal terminals and grain elevators.

"I think the Tenn-Tom will change the lives of millions of people, put bread on their table, and give them an opportunity in life," the mayor told me.

As for Tenn-Tom traffic, however, there hadn't been as much as predicted for the first

year—only about a tenth (1,501,331) of the expected tonnage for the first ten months—but it saved American shippers more than two million dollars during that time, he said.

Before leaving Mobile, I dropped by corps district headquarters and learned that Treva Jane Belue got much of what she wanted. The corps will create a Holcut memorial overlook with a marker telling of the town that is no more. Former residents plan on adding a monument that can be seen from the water. It was a happy ending for at least one waterway story.

I hoped there would be many more in the years ahead. □





Doorway to the world, Mobile (left) sees Tenn-Tom waters empty into the Gulf of Mexico. Here barges off-load grain, coal, and lumber for transfer to freighters. The port underwent a 232-million-dollar modernization in anticipation of increased waterway traffic. A five-million-dollar stacker-reclaimer (below) helps McDuffie Coal Terminals rank among the nation's largest.



The Hidden Tenn-Tom: BYPASSED BUT STILL STRIVING

TALK I HEARD for years was the Tenn-Tom was going to mean improvements for all communities on the waterway, that it would bring jobs and make life a little better. Hear tell there are already 1,000 new jobs because of the waterway. That's beautiful, but we haven't seen any yet," says Willie King of Pickens

County, Alabama. His great-uncle, Alex "Junior" Ivy, still draws cooking and washing water from a well (*right*) as he has all his 90 years. Sharecropping—his former employment—has gone the way of the mule, and former cotton fields are planted in milo and soybeans by big owners with big machinery.

Boaters on the Tenn-Tom,

like drivers on a broad interstate, pass unaware through some rural counties that, by federal standards, remain among the most severely depressed in the nation. Those in Alabama with populations of 10,000 to 25,000, no large towns, and few employers count a high proportion of elderly and disabled citizens and single mothers with small children. Family income—often from government assistance, low-wage jobs, or small farms—can drop below \$5,000 a year. High-school students in Greene County (*left*) know few jobs await them after graduation; some go into the Army, others to Birmingham or beyond seeking work.

The corps helped, midway in the project, with training programs and quotas—it reached its goal of 30 percent minority hiring in its workforce of 3,000 to 5,000 annually. But upon completion this opportunity waned. Now one small businessman notes, "Everyone has a shot at development, but the big guys are moving in; the little ones can't compete."

On a bend of the Tenn-Tom, Memphis tries. Alabama historians say it was a bustling cotton town crowded with warehouses, saloons, stores, and a hotel in the 19th century, a description of prosperity borne out by the elegance of tombs in the overgrown cemetery. By the turn of the century, books say, it was a







ghost town, a judgment that draws chuckles from a black resident: "That must mean the white people left; we've always been here—since slavery days."

In 1976, 100 residents voted unanimously to incorporate. Their leader, now mayor, the Reverend J. T. Williams (*lower left*) says, "We knew the corps was coming on the Tenn-Tom, and we anticipated getting a piece of the pie." The town obtained a federal grant and loans to bring in piped water for houses and

trailers lining its red-clay streets, where Jerry McMullen and guitarist Charles Hamilton, Jr. (*below*), make their own fun. But the city council refused to vote a property tax and now seeks funds elsewhere to build a community center.

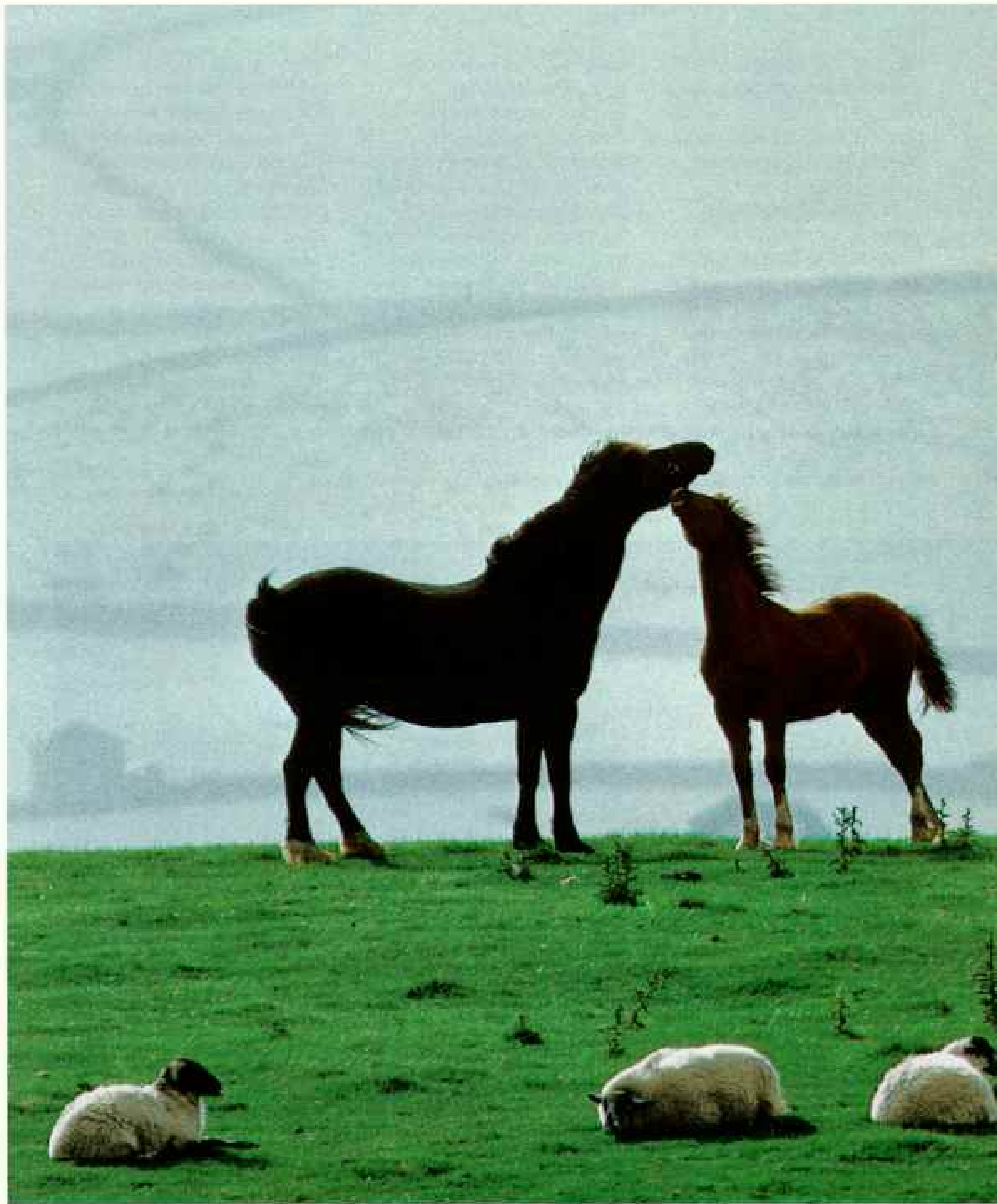
And the waterway? In the early corps plans, Memphis was scheduled for recreational facilities. But revised plans left Memphis with only a boat ramp, a small gravel parking lot, and little hope for development without political

intervention. "We ain't dead yet," Williams laughs. "I'm still dreaming."

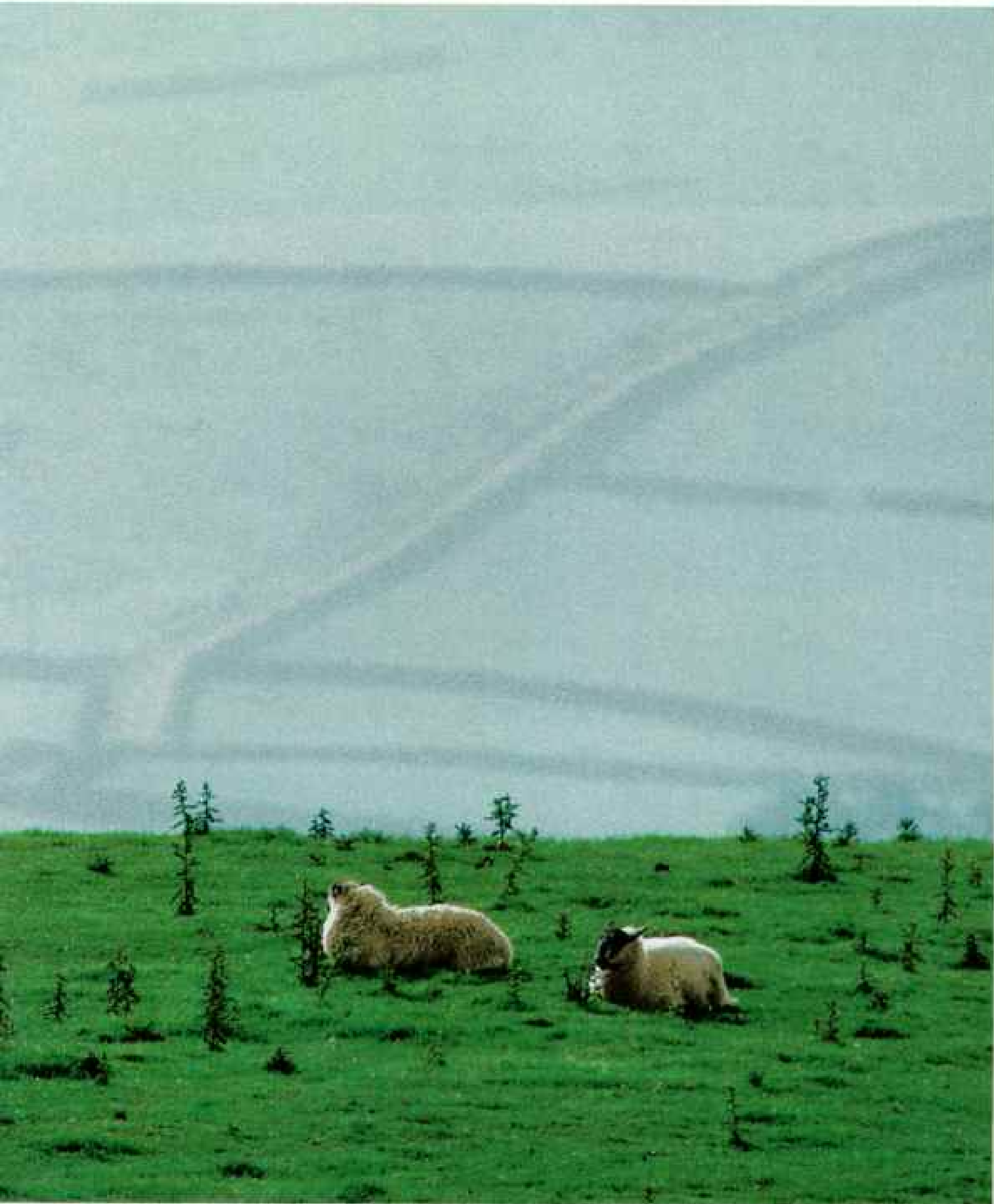
In Sumter County, Eva Thomas (*left*) dreams too: "I'd like a cooking job." She prepares chicken and rice for a son, four daughters, and four grandchildren who share her three-room cabin. A neighbor pleads, "Let people in power know we're here. We need jobs." For now, as local carpenter-songwriter Kenneth Smith sings, "Taking the days, as they come."

—ALICE J. HALL
ASSISTANT EDITOR



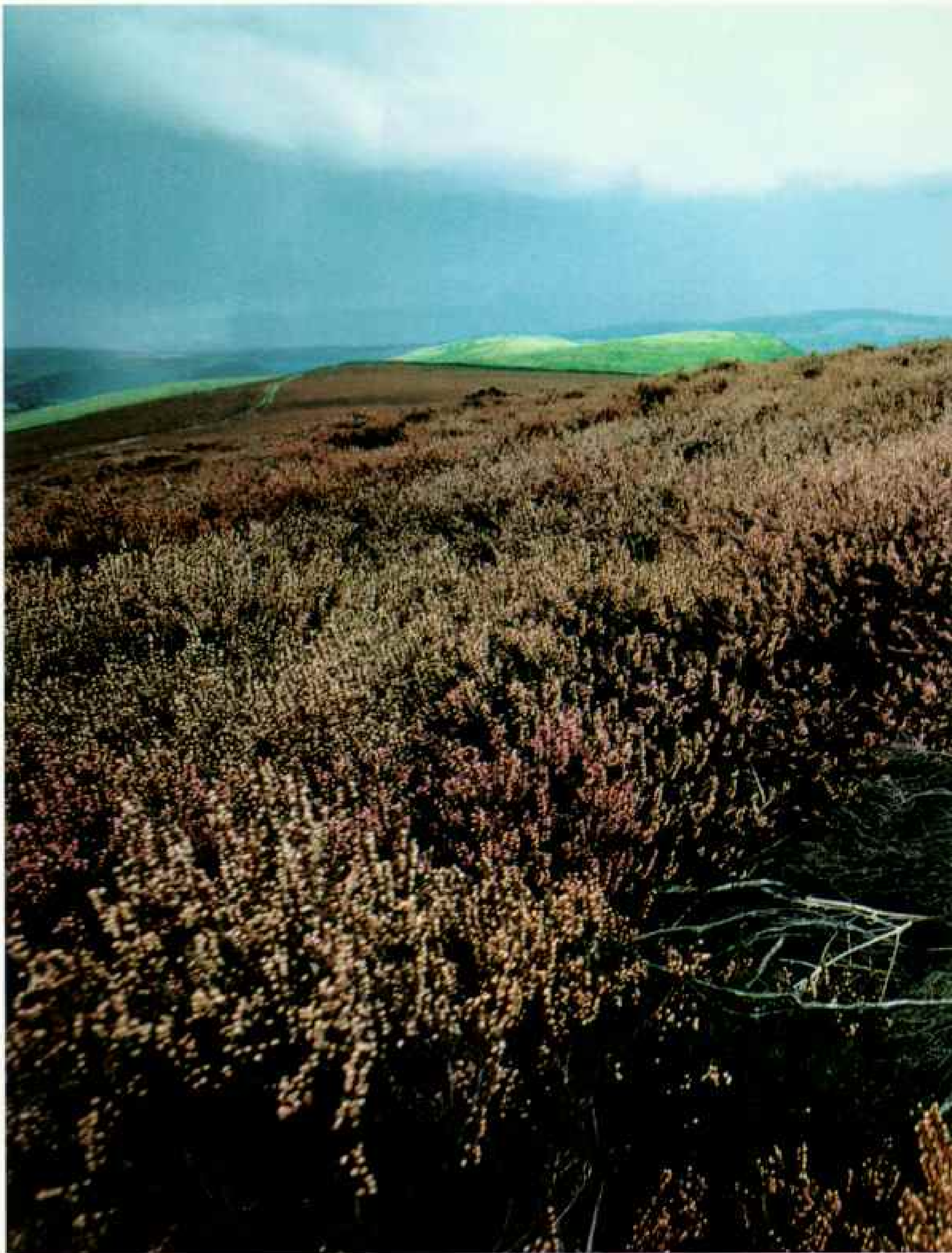


TO SCOTLAND AFOOT ALONG THE
Pennine Way



Sheep nod while horses nicker against a scrim of walled Yorkshire fields along the Pennine Way, first of 14 designated long-distance footpaths in Britain — one that troops through northern England, up fells and down dales by way of bogs, moors, and villages.

By DAVID YEADON Photographs by ANNIE GRIFFITHS



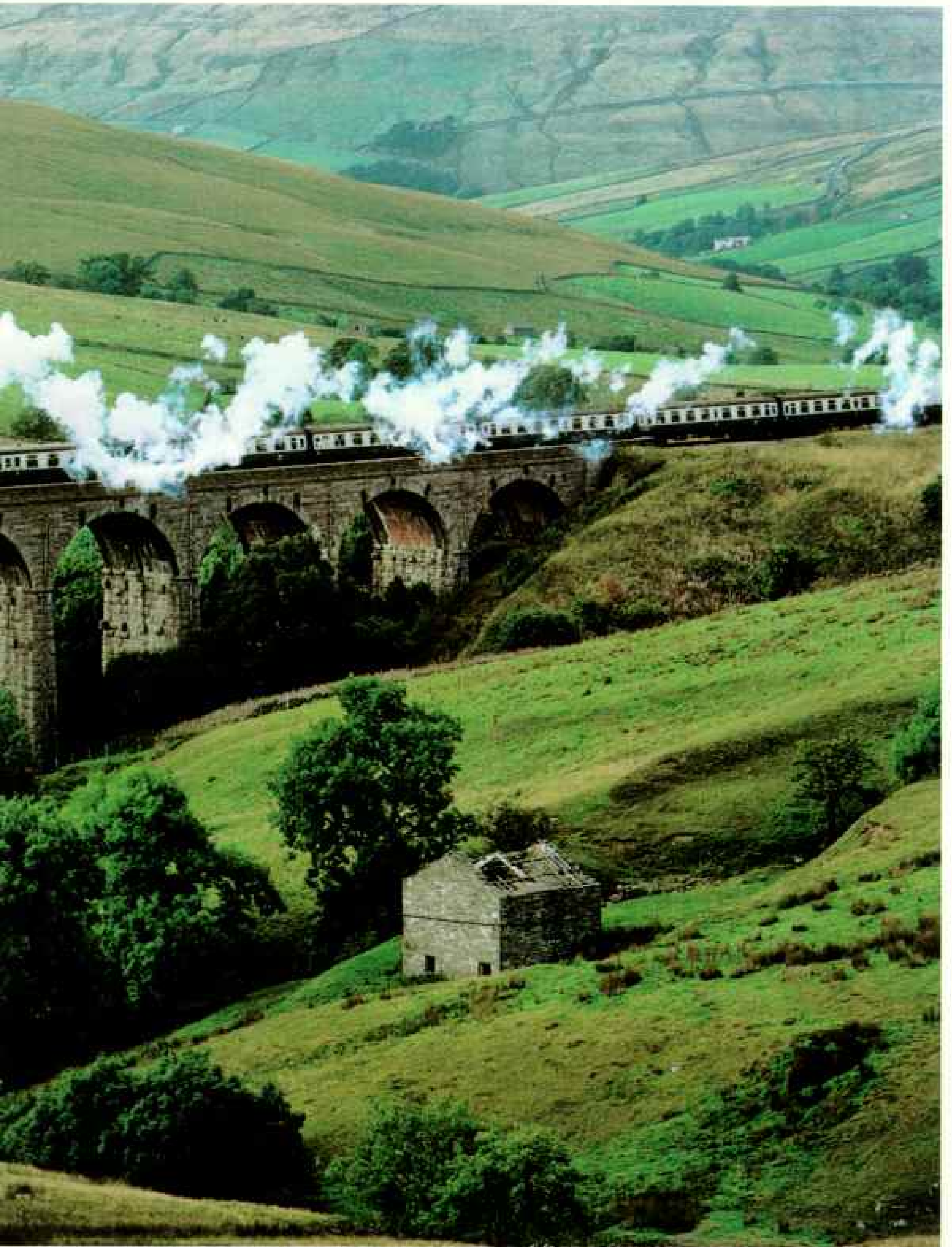
Summer's purple heather gone to autumn rust clutches at a moor in the literary landscape of the Brontë sisters. One might almost expect to see the dark, malignant figure of Heathcliff



from Wuthering Heights passing in silhouette when "the cold blue sky was half hidden by clouds, dark grey streamers, rapidly mounting from the west, and boding abundant rain."



Booming across Dent Head Viaduct, the Duchess of Hamilton — a Coronation-class locomotive exhibited at the New York World's Fair in 1939 — carries steam enthusiasts on excursion along the Settle-



to-Carlisle run. British Rail's plan to terminate service on this route through the Yorkshire Dales National Park has drawn protests from train lovers and those out for Pennine views minus hiking blisters.

DAY ONE, and I was stuck in a peat bog! I'd wandered from the narrow Pennine Way, high on the treeless, wind-worn hills of northern England, and was up to my thighs in an acidic mire of beer-colored water, rotted heather, sphagnum moss, and cotton grass compacted over centuries into a black, spongy mass.

Flailing, I sank two feet deeper. Then, sacrificing what remained of freshly pressed hiking clothes, I lay belly down on the mud and slowly tugged myself out, pulling on clumps of marsh grass and almost losing my boots in the process. The ooze gurgled and closed.

A curlew's sad cry echoed over the Pennines, stumps of great mountains thrown up 300 million years ago. Seated, blackened and wet, on a patch of heather, I sensed the utter loneliness of ancient moors that seemed to stretch to infinity in every direction.

My plan, despite a discouraging start, was to walk the entire 270-mile length of the Pennine Way, a footpath that meanders like the track of an inebriated snail along the hills. Beginning at its southern end in Edale, in the Peak District National Park, the footpath passes along the backbone of England through the hills of Brontë country and mill-town valleys once part of the Celtic kingdom of Elmet before entering the dramatic white limestone Yorkshire dales. Still farther north it crosses Northumberland and the Cheviot Hills, where the people speak in a singsong dialect delightful to listen to but almost impossible to understand. Beyond Hadrian's Wall, particularly, the land becomes lonely again, merging into the border forests, until the path ends at last at Kirk Yetholm just over the Scottish border.

The Pennine Way was declared Britain's first national long-distance footpath in 1965. Only about 6,000 hikers make it from one end to the other each year, according to Tom Stephenson, onetime leader of the

David Yeadon, Yorkshire-born author and illustrator of more than a dozen travel books, now makes his home in New York City. Minneapolis photographer Annie Griffiths' credits include a chapter on the Midlands in the Society's recently published *Discovering Britain & Ireland*.

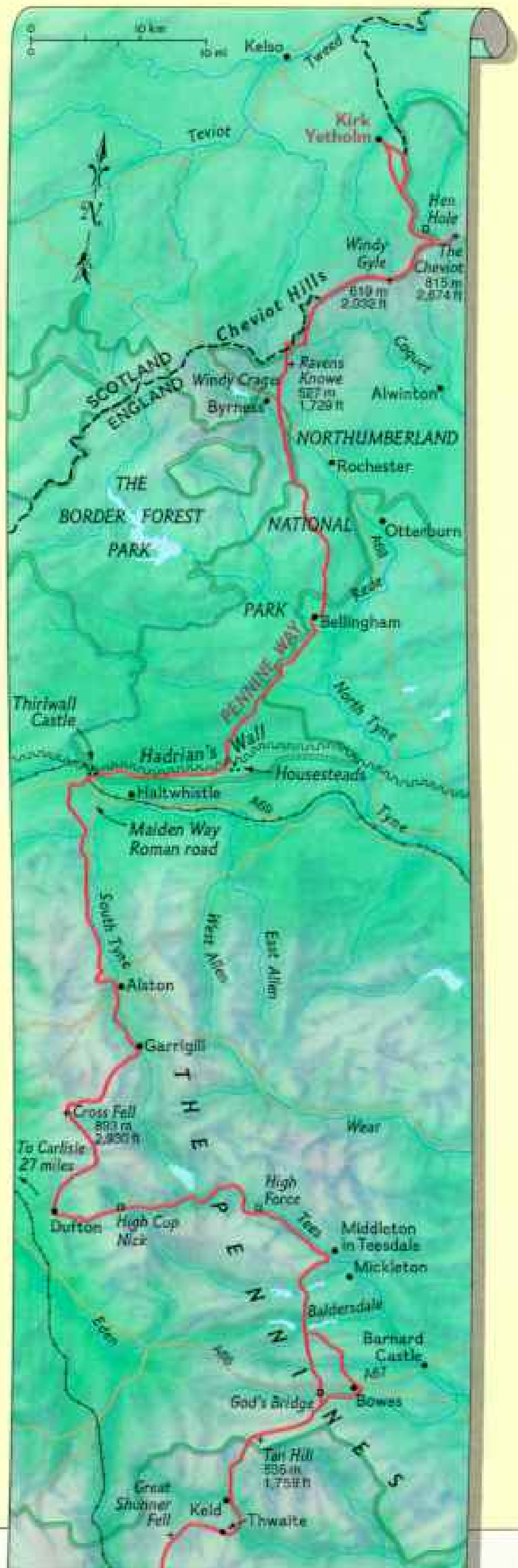


Pennine Way

One man's dream — Tom Stephenson's in 1935 to set a hiking trail along the spine of England — became reality 30 years later.

Flanked by industrial towns in the south, the way traverses uplands eroded by rivers running east or west. Much is over rough, desolate terrain. Map, compass, stout gear, and warm clothes are required. Barry Heavens and his nine-year-old son, Philip (below), plan to walk the 270 miles in stages over three years.





HDG CARTOGRAPHIC DESIGN
 DESIGN: CHRISTOPHER A. KEENE
 DESIGNER/ARTIST: PAULINE
 PRODUCTION: ROBERT W. COCHRAN
 MAPS: J. SALTER, OS/ANDRUS BACHY

*Fallow deer gather at dawn
under an oak on the Duke of
Devonshire's estate near Bakewell.
They are not native to England,
nor is the name "Pennine," derived
from an 18th-century hoax —
a bogus history of Roman Britain.*

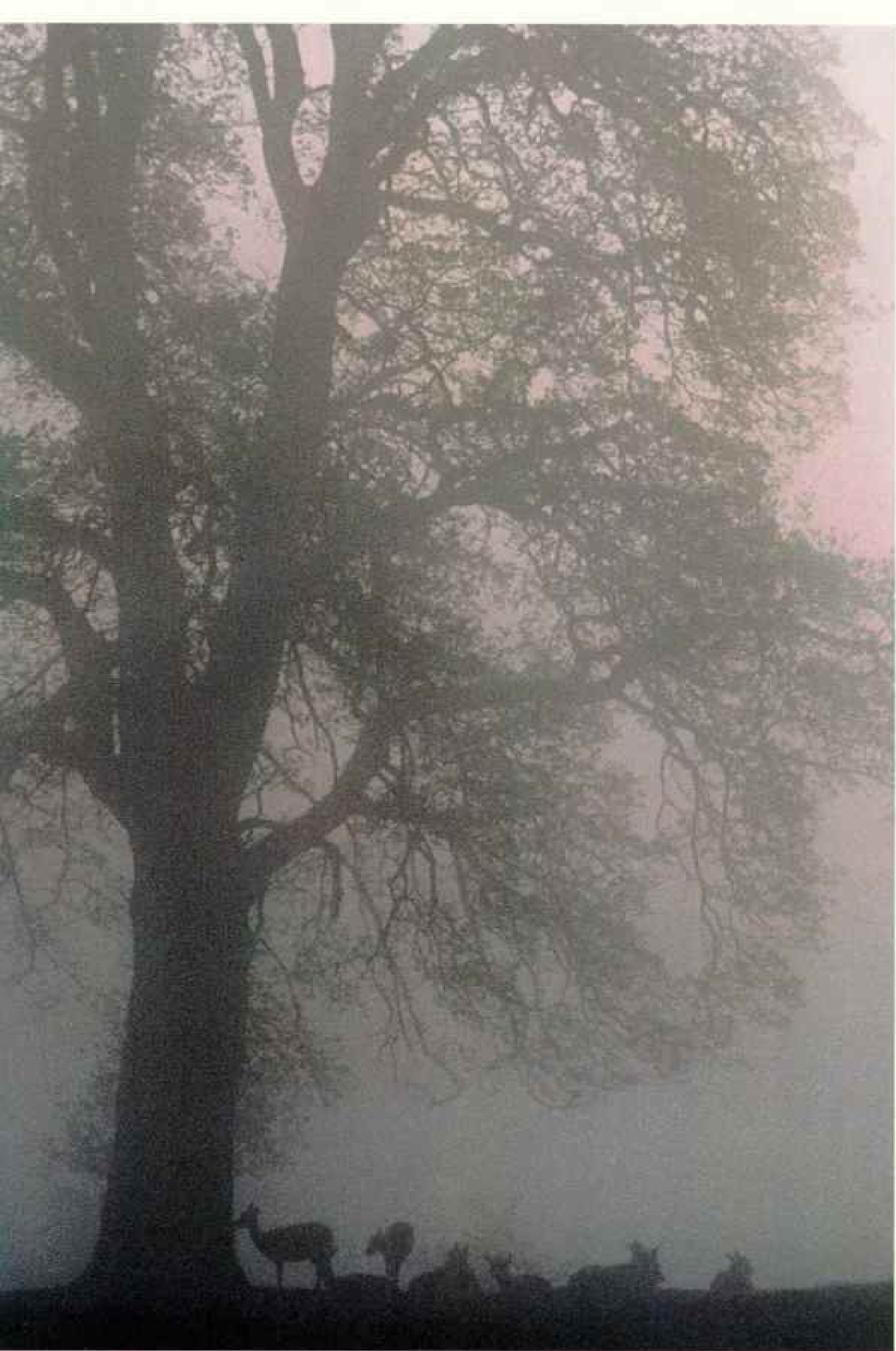
Ramblers' Association and the original proponent of the footpath.

This is definitely not the picture-postcard England of quaint thatched cottages and downy woods. The melancholy novels of the Brontë sisters are set in this bleak region. Yet, while the distant plains lie sniffing under blankets of fog and drizzle, sunlit swaths of purple heather gleam like regal cloaks on the fells, and the air is as crisp as the crust on a well-baked Yorkshire pudding.

Indeed, the spirit of Yorkshire permeates this landscape—the rough, thick dialects of the dale villages, the pride in ancient traditions and folklore, the sound of brass bands in the tight valleys, and the company of blunt-speaking farmers in rural pubs.

"It's such fine country," I was told by Arthur Gemmell, a cheerful elderly architect, walking enthusiast, and creator of a series of footpath maps for the Pennines. "You can see just about every phase of history in these hills: remnants of Iron Age hill forts built around the first century A.D., Roman roads and Hadrian's Wall from the second century, farms and villages started by Anglo-Saxons in the seventh century, remnants of the 12th-century Norman feudal system, particularly those superb abbeys and priories on the edge of the dales—Fountains, Bolton, Jervaulx, and the others. The church was all-powerful in those days. The monks ran huge sheep farms in these hills, but the Scots kept coming down and stealing the livestock and the women, so the barons built castles in the main market towns along the Pennines—Richmond, Barnard Castle, Skipton, Clitheroe, Middleham, Penrith. They're still here—some of them a bit battered. You slice right through the past two thousand years of English heritage when you walk up here."





WILD GAME

MOORES

Prime Fish
And
Poultry



MY BOG was in the first—and worst—stretch of the walk, over the grim plateaus of Derbyshire's Peak District. In Edale, a small huddled hamlet, scores of hikers, from tiny cub scouts to gritty "bog trotters" with formidable boots and enormous framed rucksacks, gathered at the Old Nag's Head Inn.

In company with other hikers I climbed over Kinder Scout and Bleaklow across an undulating ocean of ooze, swapping tall tales of hiking exploits. Then one of the girls fell and twisted her ankle. "Clouds are comin' down. It'll mist up, sithee [Yorkshire dialect for "see you" or "mark my words"]," said one of the group. The others decided to turn back.

But I had been taking the tussocks with the best of them, and in a surge of folly decided to go on alone. The error could have been fatal. An hour later the mist crept in, thick and chill. The path vanished, and I meandered through the mud in bad-tempered circles, all sense of direction gone.

I gave up hope of leaving the moor that night. It became much colder, and I cocooned myself in a survival bag, an enormous bright-orange plastic sack that folds to the size of a sardine can. It had been a joke gift from my sister, Lynne. "You'll never need it," she'd laughed. "You'd never be daft enough to get lost on the moors!"

By dawn the mist had lifted into ponderous low cloud, and I felt that I was the only survivor in a dead world. Then two silly sheep popped up from the heather and looked so startled to see me that I bellowed with laughter, and the day became promising again—except for a head cold that was the souvenir of my carelessness.

At Blackstone Edge, thin streams slipped through the grasses and chattered over rocks in the shadows. Water frothed from the spongy hills all around, and peewits whirled overhead like confetti. A haze of heather flowers floated over the moors. I peered out over the Lancashire countryside. Manches-

ter and its satellite cities sprawled across the plain far below, and the somber bulk of Pendle Hill crouched on the horizon. Generations of children in villages around the base of Pendle Hill have trembled in their beds, warned that mischief would result in speedy dispatch to the Pendle Folk—a motley bunch of 17th-century witches whose antics are the stuff of legend hereabouts.

I crossed over the remnants of a stone-paved packhorse trail thought to be of Roman origin. It was such routes as these that carried trains of tough packhorses from town to town and formed the trans-Pennine trade networks before the industrial revolution roared into these quiet valleys in the 19th century, leeching the people from the land and carrying them away into the crowded new mill towns.

On the long descent into the Calder cleft near Hebden Bridge, the whole profile of that rapid transformation can be seen in a single glance. High on the fells are the ancient Norse-style farms—long low meldings of house and barn, nearly windowless, sunk heavily into hillsides. Then the dry stone walls begin, wriggling down past black stone cottages with long sets of upper-story windows that once let in the light for weavers of Pennine wool.

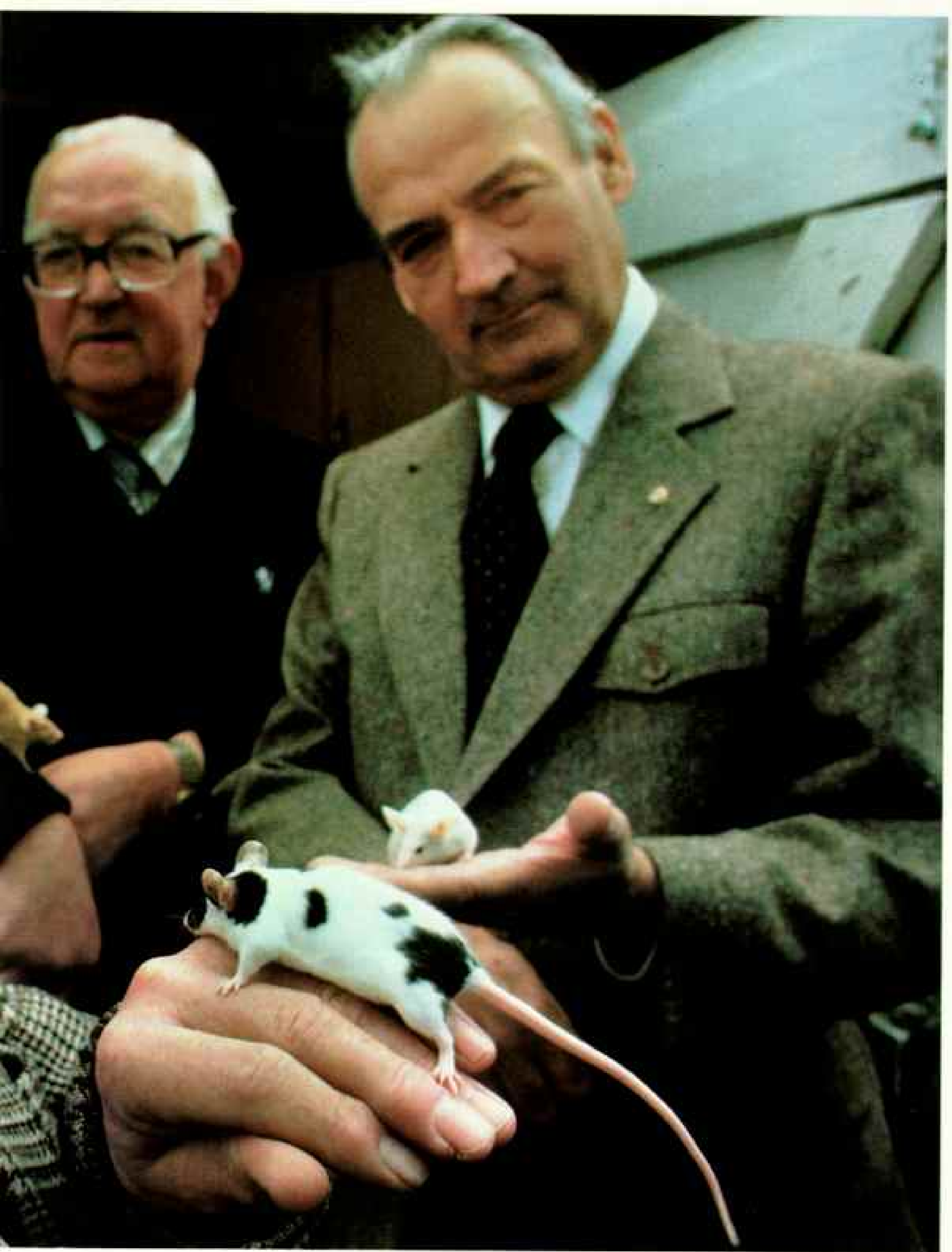
"Everything was nice and orderly until the early 1800s," said Roland Wright, who, with his wife, Jean, runs Sutcliffe's Country Hotel on the moors high above the Calder Valley. "Then it all happened—new spinning and weaving machinery, factories, turnpikes, canals, railroads. These tranquil valleys became long strips of mill towns feeding down into the rapidly expanding cities on either side of the Pennines. And all in less than 50 years!"

FOR ALMOST a century the valleys' economy flourished on British monopolies in the cotton and wool trades. Then, between World War II and the early 1960s, came empty mills and dwindling

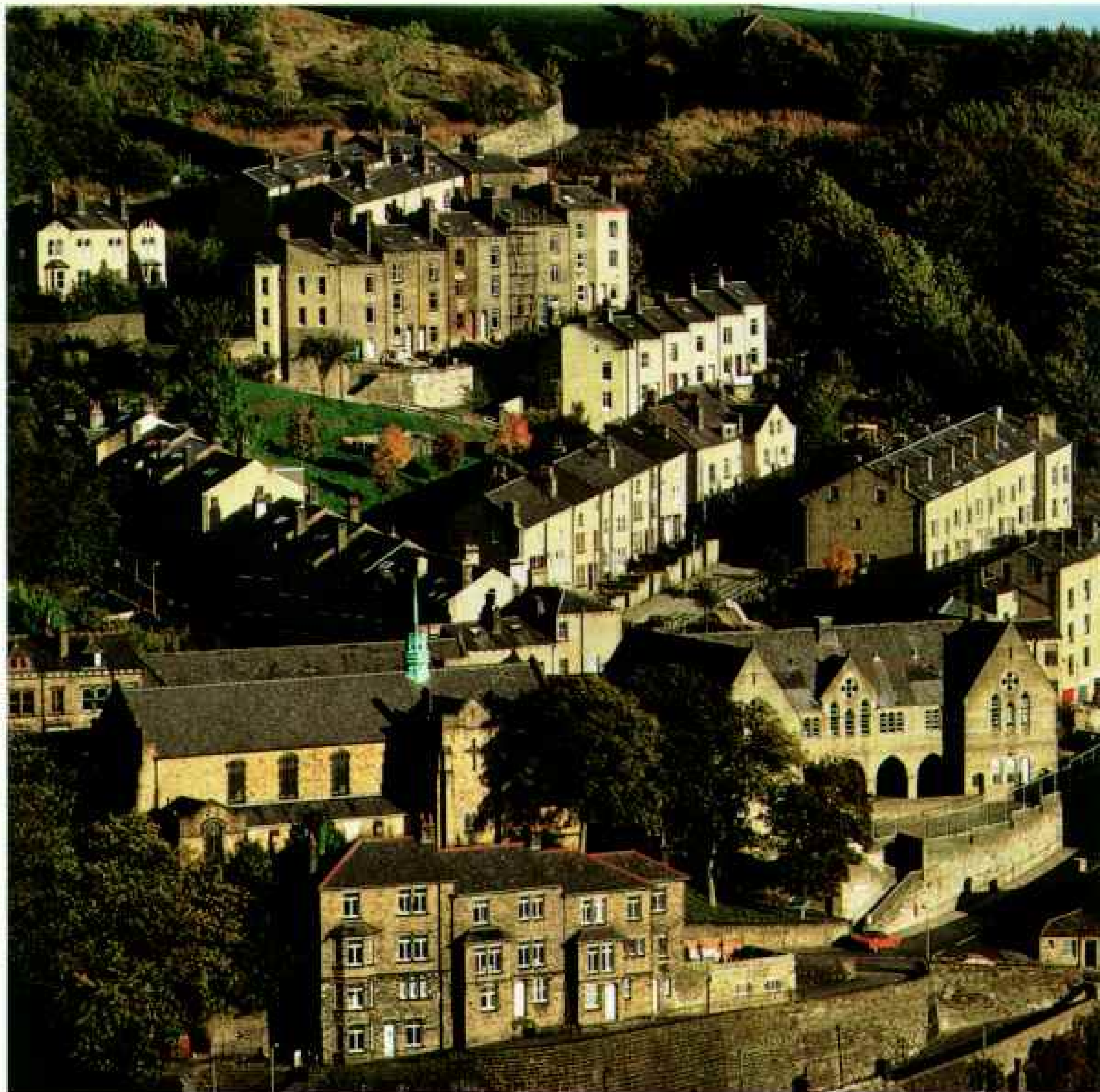
Makings of rabbit stew and fruit salad advertise Skidmore's grocery in Bakewell. Supplies may be bought en route in villages, and pubs and inns offer respite from trail food, the elements, and sleeping in "stone tents," camping barns reserved for hikers.



Members of the Calder Valley Mouse Club—one of Britain's oldest—Jack Wormald, Edward Longbottom, and Ken Pridgeon display their stock. Judged for such desiderata as long in



body, long in tail, tulip-shaped ears, bold eyes, and correct color markings, mice have a 10-to-12-month show career and are bred with as much attention to lineage as are racehorses.



population. Only recently has economic vitality returned to the valleys. The powerful beauty of the setting, coupled with low rents and property values, attracted artists, writers, and craftspeople. They gutted and refurbished their stone row houses, washing the blackened millstone grit back to its original golden color.

John Taylor, secretary of the Calder Valley Driving Club, a society for lovers of horse-and-trap travel, is amazed by all the recent activity: "It's come back fast in the last ten years. There's so much going on now—the pigeon racers, mouse fanciers, clogmakers and clog morris dancers, the

Bradshaw Mummers, dock-pudding competitions in Mytholmroyd, faith healers, the medieval Pace Egg Play, the rush-bearing festival. They even revived the old game of knur and spell—a sort of poor man's golf."

I arrived in late August—just in time for the procession of the Sowerby Bridge Rush-bearing, a 17th-century festival, recently reborn, celebrating the distribution of fresh rushes for the earthen floors of churches. The 14-foot-high thatched ark containing the rushes was pulled by 40 men in morris-dance costume, led by women in golden dresses carrying hoops of flowers. A nervous "queen" sat on top of the ark, clutching at



Hebden Bridge stacked its "top and bottom" houses on steep hills during the early industrial revolution, when it prospered as a textile-mill town. Lately artisans and small businesses have helped revive its economy.

original of the Earnshaw house in *Wuthering Heights*.

The wild country for miles around abounds with Brontë associations. In Haworth, where Charlotte, Emily, Anne, and their wayward brother, Branwell, lived with their parson father, devotees of the gifted sisters sip ale at one of Branwell's favorite inns, the Black Bull, and tiptoe through the genteel rooms of the parsonage museum.

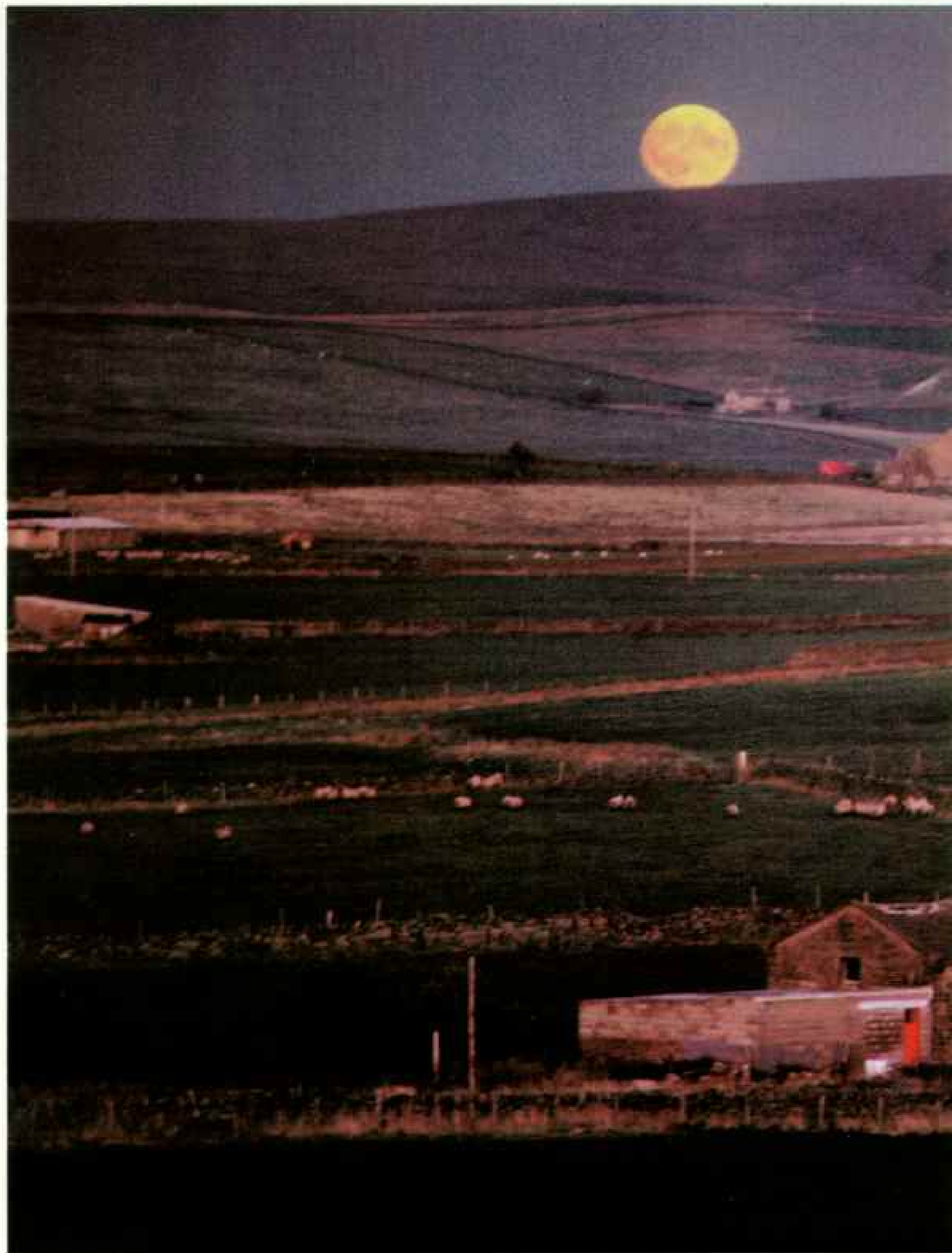
With no regrets, I sang farewell to the soggy tops and descended through gentle valleys and little rounded hills of glacial debris known as drumlins into the broad Aire Valley, finding velvet meadows, winding streams, and a canal lined with vacation boats and barges. After Malham, a village approached along the youthful River Aire, one moves deeper into limestone country with its white, dry stone walls, white farms, and towering white crags. This is a magical land. Starting at the 240-foot-high rock wall of Malham Cove, a dramatic landslip along the major Craven fault, and the waterfalls of the Gordale Scar canyon, I soared up through dry valleys where the water runs underground through intricate systems of caverns, across strange limestone "pavements" cut by deep fissures known as clints and grikes, onto lonely domed hills where the silence seems to go on forever. There were few walkers about, and fragments of rainbows ("glints") floated in cirrus clouds high above the still surface of Malham Tarn.

The moor was all mine, and I became a born-again walker striding across the limitless tops with their faraway hazy horizons. Below lay remnants of hut circles and irregular field patterns established by Iron Age settlers. Down from the gusty summit of Pen-y-ghent, sheep shone like scattered salt on emerald pastures among yawning potholes.

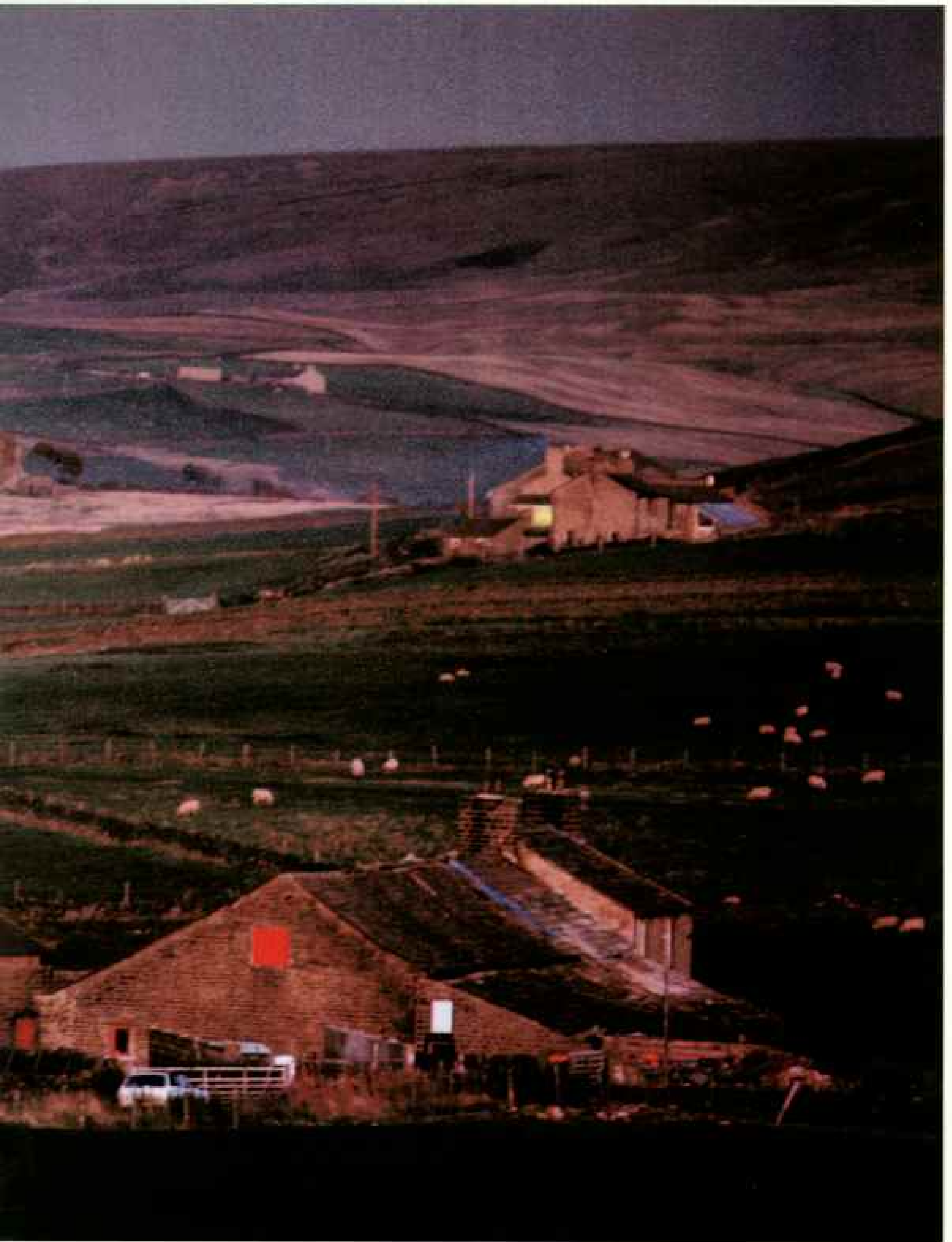
anything secure as it wobbled along narrow country lanes, pausing at pubs and churches for dancing and "largesse, beer, and spirits."

When the weary caravan finally eased into the town of Ripponden at the end of the journey, the local junior brass band played, the morris men danced again, and the people gorged themselves on pork pies and ice cream, frolicking on into the lively night.

THE PENNINE WAY climbs steeply past Heptonstall, a black, tight-knit weavers' village set high on a hilltop, and enters Brontë country by the roofless walls of Top Withens farm, said to be the



The moon rolls up-horizon above stolid farmsteads near Wadsworth Moor. In the 1930s "ramblers" first sought access across private lands, leading to clashes and arrests.



Landowners and ramblers came to accommodation, and among the rules followed by the latter are: "Keep to the paths across farmland. Fasten all gates. Respect the life of the countryside."

Limestone "pavement" near Malham (right) seems a mock desert.

Where water bores through the stone and gushes into a falls, as within Gaping Gill (below), a giant cavern draws exploration by "potholers."

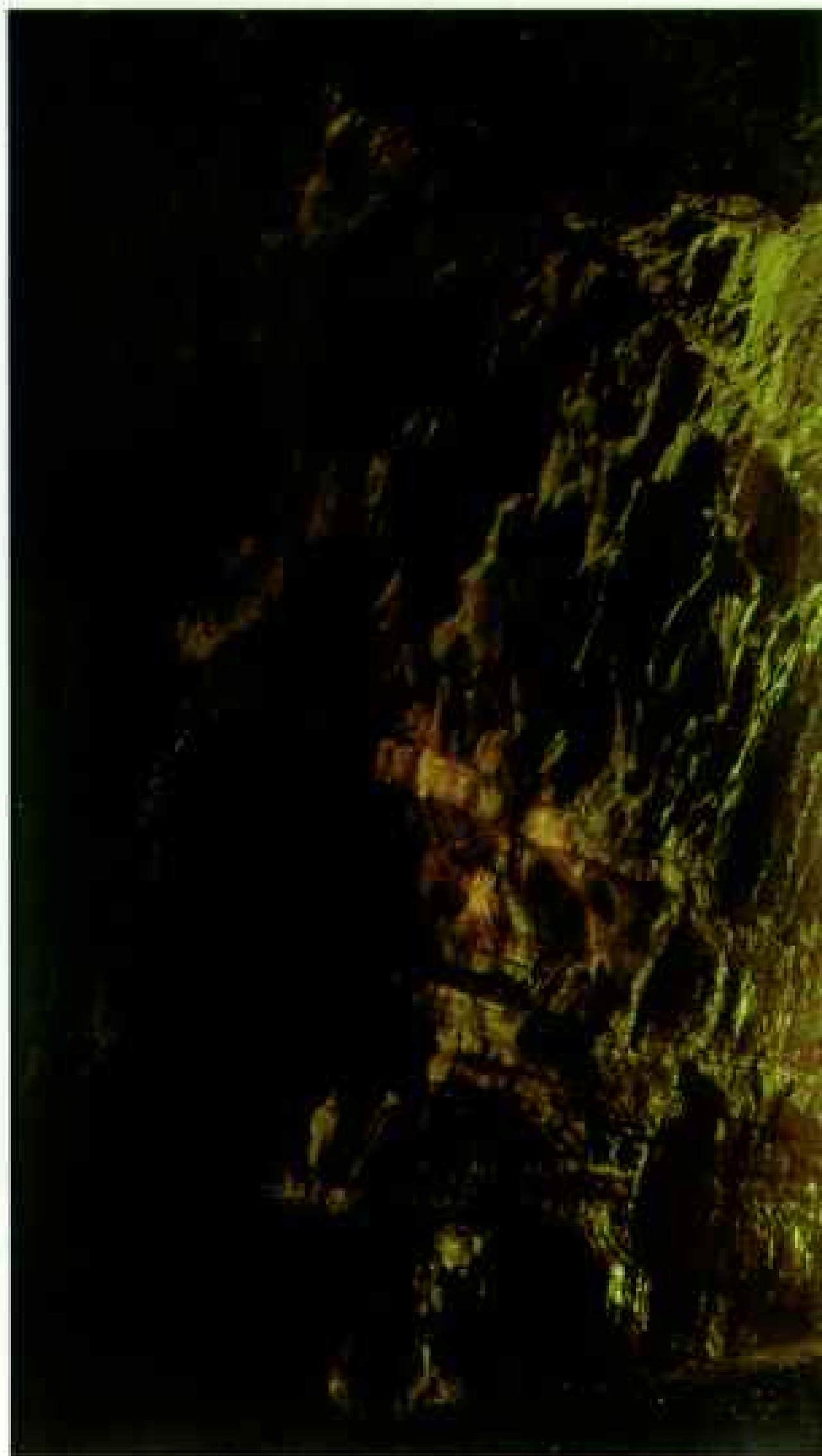
Some 20,000 walkers pause at Peter and Joyce Bayes's Pen-y-ghent Café every year to drink pint mugs of tea, leave cryptic comments in the Pennine Way book, or sign on for the local 25-mile Three Peaks Walk up the nearby mountains of Pen-y-ghent, Whernside, and Ingleborough. "They're supposed to do the walk in 12 hours," Peter told me, "but we always wait up till they get back. One fellow last week staggered in at 4 a. m. demanding his certificate."

The village also serves as host of a Three Peaks Race for runners in April and a cross-country bicycle race over a similar route in September. "The bike race started to get fancy, with big sponsors and all that," Peter explained, "but it's a bit more local now, and we all like it better that way."

After Pen-y-ghent I began the long descent into Wensleydale, famous for cheese, sheep auctions, and dairymaids. The charms of the last were apparently so compelling during the Middle Ages that abbots who administered vast monastic estates in the Pennines gave strict instructions that the only acceptable candidates for employment were "old and ill-favored females."

"You'll be lucky to find any dairymaids nowadays," Alice Alderson told me as she trimmed the grass on her husband's grave in a small cemetery overlooking a waterfall. "A few of the lads stop on at t'farms, but the girls generally go away. I've heard tell of a couple of lady shepherds up in t'Scottish border country, but they're both married."

Coming down to Hawes through the hunched hamlet of Gayle, I met the "old men on the bridge" and heard the real dales dialect for the first time. They were lined up along the parapet, watching Duerley Beck cascade over a series of stepped rock ledges. The brown water frothed and foamed; Eddie, the most vocal of the group, explained: "It's bin a bit clashy an' floudby [stormy and







cold] on t'tops recent' but river's bin reet down—just drippin' off t'rocks in summer—nobbut nearly dried out it wa'."

I asked if he thought the unsettled weather would improve for the day's big event in Hawes, the Great Annual Sale of Mule Gimmer (crossbred female) Lambs. "Alopod [I'll uphold] tha'll be alreet, lad," Eddie assured me with easy authority. "It's when th'can't see yon moor tha'll have rain—when it's packy [cloudy] an' t'mists rollin' abart."

And he was right—the day turned out just fine. As the local saying goes, "T'old men on t'bridge know before thee knows."

THE FELLSIDE at Hawes was one enormous parking lot for Land-Rovers and sheep trucks, and the aroma of bacon butties (sandwiches), hot meat pies, mushy peas, and fish-and-chips fried in beef fat rolled up the hill. Farmers and shepherds in flat caps, deerstalker hats, and rubber boots clustered around the pens, discussing, with almost biblical reverence, the merits of the lambs.

The auction room was crowded and distinctly muttoney. The sale had started at 9:30 a.m. sharp, and now, at noontime, the auctioneer was hoarse. His pretty female



Cycling as a genteel pastime helped open Pennine country to tourism early in the century. Now contestants in the Annual 3 Peaks Cyclo-Cross charge up slopes, toting bikes over stiles and along ridges (left), and roar down the far sides to collapse exhausted in the name of sport (below).



assistant, recording sales in a large brown register, seemed far more interested in the contents of her Cornish pasty lunch than in the subtle nose-scratching, chin-tickling bidding signals of the various Pennine lineages of Crabtrees, Pratts, Baineses, Masons, Beresfords, and Metcalfes, ranged in tiers on backside-polished benches.

Hawes itself has a hard, gray charm that brightens on market days, when the broad main street is lined with stalls selling horn-handled walking sticks, Wensleydale cheeses from the creamery just up the hill, and hand-knit sweaters using wool from

valley sheep. The pubs are invariably filled with red-cheeked farmers sipping pints of strong Old Peculier ale from Theakston's small brewery down-dale at Masham.

I wandered across the road into Kit Calvert's one-room shop of secondhand books looking for "the complete dalesman," as they called Kit locally. I'd met him here in the past, when he entertained customers from his battered armchair, telling tales about the old life in the dale he loved while puffing on a white clay pipe. But things had changed since my last visit. Kit had died a few months previously, and someone

else was running his bookstore now.

I hitched a ride down Wensleydale to Bainbridge, built by foresters around a broad green in the 12th century. Here, every night at nine o'clock from September 28 to Shrovetide in February for the past 700 years, a member of the Metcalfe family has sounded three long blasts on a horn as a guide for travelers in the forest. The forest has long since vanished, but ten-year-old

Alistair Metcalfe keeps the tradition alive, stepping onto the village green each 9 p.m. to blow resounding bellows on a three-foot-long Cape buffalo horn.

Alistair's great-uncle, Jack Metcalfe, who died in 1983 after 36 years of horn blowing, was once asked if it was true that a good blast could carry more than three miles. "I don't know," he replied like a true Yorkshireman. "I'm at this end."



When shooting parties engage the hospitality of the Earl Peel on his 36,000-acre estate, retired farmer Arnold Alderson (facing page) may be on hand to help beat the red grouse (above) into the air.

AT THE RESERVOIR in Baldersdale I celebrated the Pennine Way midpoint with handfuls of ice-cold springwater, and then—just as my ankle gave way for the third time that week after another tumble on the tussocks—came Hannah (page 416).

"You've gone and hurt this-self, then?"

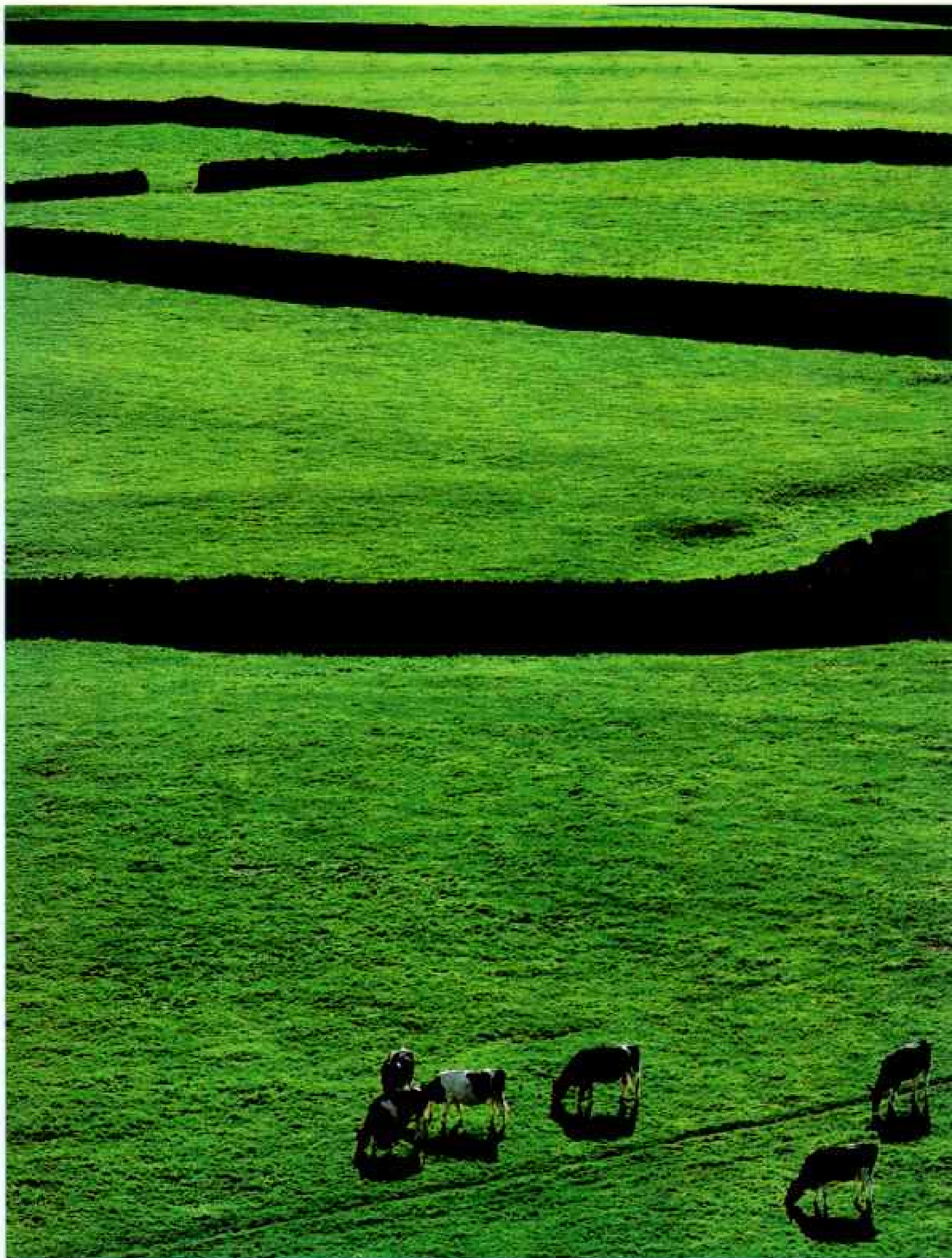
A middle-aged woman in a tattered purple pullover and baggy black trousers tied with a piece of string, she stood with a shovel in a pile of manure. Her cheeks were as bright as holly berries; her hair, a gleaming silver halo.

"Come 'n' sit thisself down a bit please," said Hannah, indicating a tiny milking stool in the cow byre. "Just give me a minute. Puddles's got excited. I'm a bit particular, and I hate walk-in' in cow clarts. If there's one clart about, you carry it around all day."

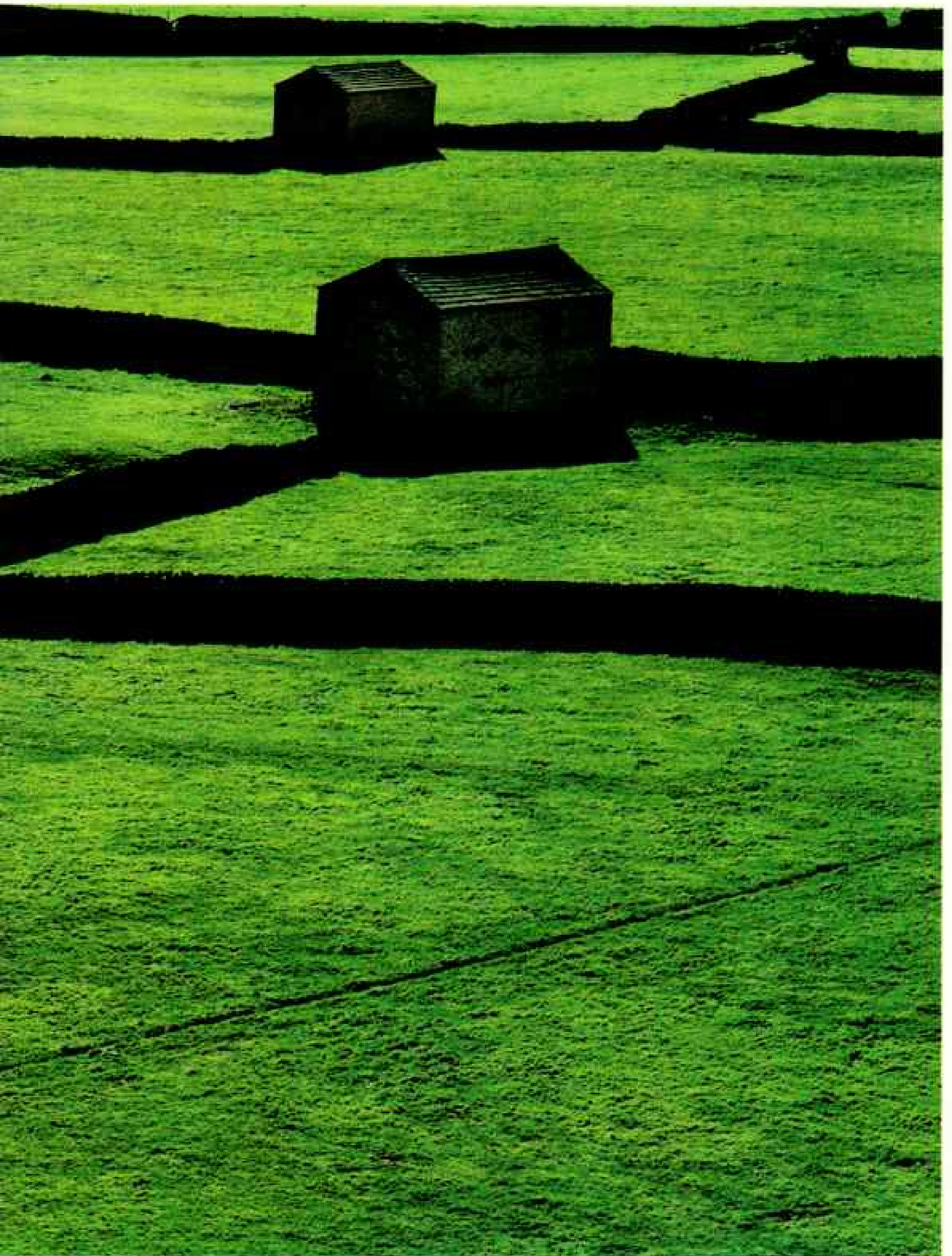
She cleaned up meticulously and led me into her dark farmhouse, where she'd lived alone since her mother's death in 1958. The kitchen was crammed with cardboard boxes piled halfway to the ceiling, and it was only later that I found out what they contained. We huddled around a tiny electric heater, and she served me glasses of fresh milk while her nervous Jack Russell terrier, Tim, pranced about trying in vain to get a sip.

Did she ever get lonely in her little valley? "Oh never, never. I've so many things I





Field barns on the Norse pattern stand amid running walls near Thwaite. The fells and dales of the Pennines have known many newcomers, from Stone Age hunters through



*Celts and Romans to Anglo-Saxons, Norse, and Normans.
Once the land was mainly thick with forests; now it is
commonly open in moors, new wilderness following old.*



want to do. There's the wallin', slatin', there's weedin', there's muckin' out. I'm going to make jam, I used to make butter too. I can still hear that sound when it 'broke'—a lovely slushin' sound as it got thicker. Oh no, I'll never catch up with myself. Some folks free themselves up, and they've got lots of time and no idea what to do with it!"

Later that night the barmaid at the Rose and Crown Hotel in Mickleton told me I'd just spent the afternoon with Hannah Hauxwell, whose happy face had become famous in the early 1970s owing to a television documentary on her life.

And the cardboard boxes? "Oh, they're full of letters," the barmaid said, "from people all over the world. She's living in a house bursting with love."

After High Force, where the narrow River Tees tumbles dramatically over an outcrop of dolerite, rare plants—spring gentian, bird's-eye primrose—grow on a

band of limestone. I hiked up to High Cup Nick, where the hills end abruptly at an arc of brittle cliffs and the land drops away into the broad Vale of Eden, edged on the far horizon by the burly peaks of the Lake District. There I sat in a patch of wild thyme and watched the weather—five simultaneous patterns, from valley mists to thunderstorms; lightning played over the hills like snakes with snapped spines.

The following day I climbed alone in a drizzle that became pitchfork rain as I reached the open moor. Then on the summit of Cross Fell, at 2,930 feet the highest point in the Pennines, the clouds suddenly became icy tentacles, and I was swallowed up in the first snowstorm of the season—a howling white fury accompanied by stinging hailstones.

I could see only a few feet ahead, and the path became confused with sheep tracks. Even my compass failed to reassure me. I



felt frozen to the marrow on this Fiends Fell, said to be its ancient name until St. Augustine brought his Christian influences here in the sixth century and chased out the bogeys by planting a cross on the summit. There was a hiker's hut for emergencies like this, but I never found it, and, looking like some kind of snow monster, I burrowed behind a wall until the squall eased.

Hours later I reached the George and Dragon pub in Garrigill. The mood was distinctly morose. A group of grouse-shooting "guns" sat around a roaring log fire in high-back chairs conducting a grumpy postmortem on the day's activities.

One stout gentleman wearing knee breeches and a tiny deerstalker hat explained, "I never shoot well when I have to look after others." The group nodded in unison and went on to bemoan wet shooting butts, slow beaters ("a bunch of lazy school kids"), wily ground-hugging packs of grouse

Never much needed to keep the Picts out of Roman Britain, nor later effective in containing the raiding Scots, Hadrian's Wall intersects the Pennine Way on its course across northern England.

that were hard to spot, and half-blind pickers-up who collected the bag. A gamekeeper sitting nearby had heard it all before and winked at the barman.

THE "GLORIOUS TWELFTH" of August—start of the grouse-shooting season—is a key date for Pennine landowners who depend on the substantial income from wealthy sportsmen (many from the United States, Germany, and Japan) to finance moorland management. Groups opposed to blood sports protest the closing of the moors for shooting, but as the Earl Peel, owner of a 36,000-acre shooting estate around Swaledale, told me: "Some people may not like it, but grouse shooting is an important part of the upland economy. The only other real contributor is sheep farming, and if overgrazing kills the heather, then all you have left is bare earth and nothing to hold it in place. Erosion occurs quickly and you can lose the moor—they've got a host of problems down in the Peak District with peat slides. It takes a lot of cash and know-how to keep this country looking wild!"

A few miles farther north along the gentle South Tyne Valley lies Alston, once known as "the town of widows" owing to the large number of husbands who perished in the local lead mines. Alston is the highest market town in England, built on a ridiculously steep hill—a lumpish, enduring huddle of bowed roofs and thick stone walls.

And Alston has surely needed endurance. A few years back the town's foundry, the major source of local employment, closed permanently with the loss of hundreds of jobs. But rather than dismay I sensed here some of the same optimism and determination that helped bring new life to Hebden Bridge and the Calder Valley villages. Small businesses seem to be thriving; there's a local cheese-making operation, the old



Congregational church is now a crafts gallery, and a narrow-gauge railway for tourists runs north alongside the beautiful South Tyne River toward the great bastion of Hadrian's Wall.

THIS ENORMOUS STRUCTURE, stretching 74 miles from the east to the west coast across the breadth of northern England, was ordered by the Roman Emperor Hadrian in A.D. 120 to mark the northern limit of his empire and to form a barrier against raids by Pictish tribesmen. Preliminary plans for a series of hilltop signal stations were soon superseded by a huge construction project in which the continuous stone wall, ten feet thick and as high as 20 feet, was protected by broad ditches on either side, by milecastles every Roman mile, and by 17 separate forts garrisoned by more than 5,000 cavalry and 13,000 infantry. Roman soldiers spent a decade building the wall, with much of the structure following the craggy undulations of the Whin Sill, a vast sheet of volcanic dolerite that emerges in a waved line of shattered cliffs more than 200 feet high in places.

Ironically, after all this effort, Hadrian's Wall was rarely needed as a defense line and became more important as a series of custom posts and produce markets for traders on either side of the border until the Romans left Britain in the fourth century. Generations of local builders scavenged the abandoned fortification for its cut stones, gradually diminishing it to the modest, but still impressive, remnant visible today.

Looking north from the broken Roman columns and walls of Housesteads fort, I could see little else but geometric groves of Sitka spruce massed along the ridges like legionnaires. I had reached the southern tip of the vast 300-square-mile border forests. Here sounds sink into thick carpets of pine needles, breezes sigh in the highest branches like an unseen ocean lapping on a lonely seashore, and hikers follow muddy

tracks through shadowy naves of conifers.

I arrived at the hamlet of Rochester just in time for the Upper Redesdale Show. Inside the main exhibits marquee, a dozen granite-faced judges were testing a wonderful array of homemade sausage rolls, scones, rock buns, slabs of treacle toffee, Swiss rolls, "edible necklaces," chutneys, and fruit wines, all made by local residents.

Up the hill, beyond sheep pens full of Swaledales and Roman-nosed Blackfaces bonned up for competition, the three judges at the sheepdog trial sat bunched in a horse trailer lurching on beer and hefty beef sandwiches. Six shepherds, leaning on crooks, awaited their turn in the pasture.

John Dixon, a quiet farmer, explained the essentials to me. "The shepherd stands by that post, and his dog's got ten minutes to get the three sheep around all the obstacles of the course and do a 'shed'—he gets the sheep facing all one way and sheds, or separates, the last one before taking them into the pen. Looks easy when it's done well."

It isn't easy. A shepherd became irritated by the erratic behavior of his dog. Whistles and angry commands of "come by," "way to me," and "stand there" seemed to make no difference; the dog failed to complete the course in time. The disconsolate shepherd, reluctant to blame the animal, explained that "that bloody Blackface had it in for us awreet."

Off in a corner of the field the ancient game of quoits was being played using 5¼-pound cast-iron rings to circle an iron post (hob) in the ground. The pitch was the traditional 11 yards in length, and a skinny teenager, David Milburn, was impressing the old-timers with his skill as a ringer and his ability to land the first of his two throws as a "gater," so as to block his opponent's quoit. He was modest about all the attention: "Jus' been gettin' th' hang of it this year."

Cumberland-and-Westmorland wrestling was the star attraction at the larger Alwinton Border Shepherds' Show I attended

*R*adiant sincerity and a small farm are what Hannah Hauswell has; she lacks merely material wealth and conveniences. When the author came by with a lame ankle, she cared for him and sent him off with a walking stick she'd "dressed up" from an ash branch.

a few days later in the eastern foothills of the Cheviot Hills. And here I made yet another mistake.

"We need more in the all-weights," said the tiny woman who kept the lists of competitors. So I volunteered. Only no one told me I'd be wrestling George Harrington, a famous champion.

"It's my first go at this," I said jovially as we walked to the arena ringed by scores of spectators.

"Makes no difference to me," said George.

And it didn't. I heaved and tugged and tried fancy footwork but was soon back in the changing tent, having been felled twice by this blond giant.

THE FINAL 27 miles of the walk are said to be the hardest and loneliest of all. Still, the first stretch of it seemed easy—I went up over Windy Crag and Ravens Knowe, and in no time at all arrived at the old wooden gate that marks the Scottish border. But by evening it was obvious I'd never make Kirk Yetholm. My knees had gone to jelly, and the sky was darkening rapidly. It was cold again too. A mile or so below the trail I saw a barn in the claw of a narrow valley and slept there among straw bales, lulled by the purring of two tiny black kittens.

At dawn the sun yolked out from behind clouds, and the mists slipped off the shoulders of the Cheviot, revealing a soft summit and the long slope downward through Hen Hole. So—full of tales and alive with lark song and the crisp Scottish air—I came into the pretty village of Kirk Yetholm, tucked away in a final fold of hills.

The bar in the Border Hotel was crypt quiet. Two old men, both with shocks of white hair, sat on stools sipping whisky and

murmuring together in an unintelligible Scottish brogue. They paid me no heed.

"A celebration pint, please," I beamed at the stoic barman. "I've just walked the Penine Way."

"Oh, aye."

"Took longer than I thought," I added, possibly with just a glimmer of pride.

"It can," said the barman, and slowly filled my glass. □



A glass of bitter is sweet ending for Arthur Read. His daughter Elizabeth had challenged him to the walk. After 19 days, both arrived in good spirits at the Border Hotel in Kirk Yetholm.

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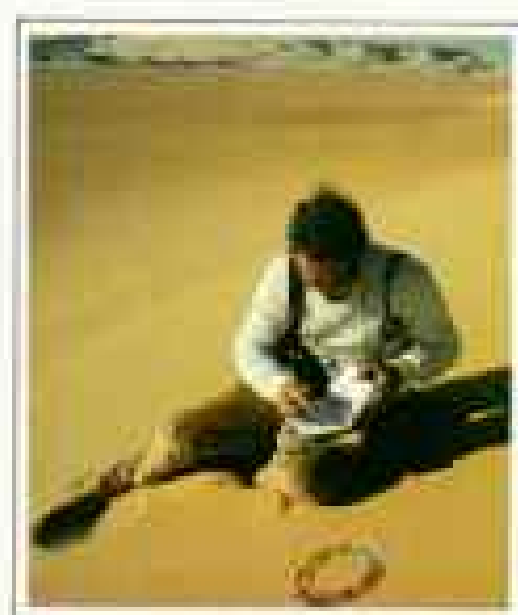
Over two-thirds of the world's surface are covered by oceans. One-fifth of the remaining land is desert. These figures are of special interest to Dr. Farouk El-Baz, whose native Egypt is 96 per cent desert.

Dr. El-Baz attempts to redress our limited knowledge of deserts – of their origins, their expansion, their possible reclamation. His task is enormous, for even a single desert cannot be covered in one researcher's lifetime.

But Dr. El-Baz, a geologist who emphasises the global picture, has aerospace technology on his side.

Indeed, it was photographs of the wind-swept surface

of Mars that first prompted Dr. El-Baz to say, "It looks like the desert of my childhood in Egypt." Poring over

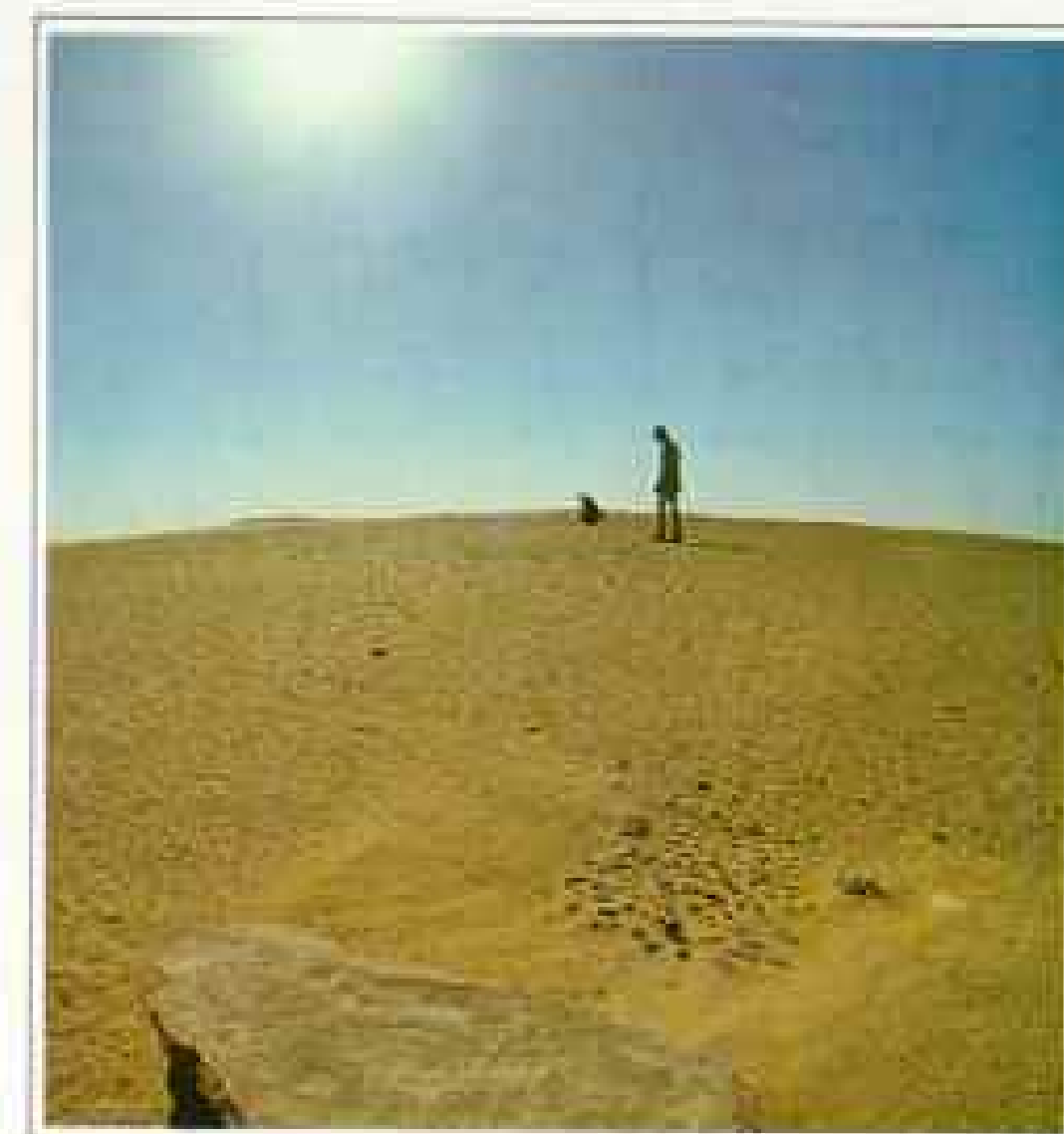


To investigate Earth's deserts, Dr. Farouk El-Baz began on Mars.

Sahara pictures taken from space, he found subtleties that the geological maps cannot show: three distinct bands of colour splitting the desert into different zones. One of these, an earthy-yellow zone, was good, fertile soil, ripe for reclamation – and undetected throughout 7,000 years of Egypt's history.

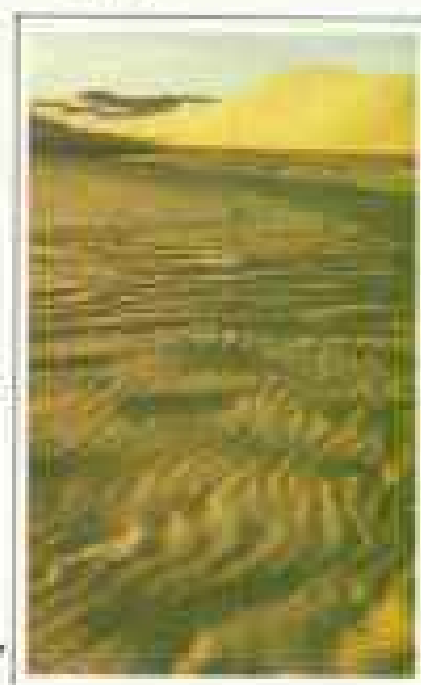
Again, comparing space pictures that were taken at ten-year intervals, Dr. El-Baz saw that sand dunes, like glaciers, have predictable movements – vital knowledge for siting often buried desert roads.

Analysis of global weather



PHOTOGRAPH BY GEORGE ORNSTEIN

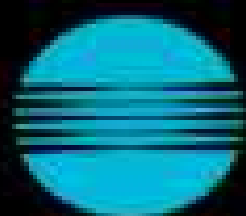
patterns and regional topography has led him to state, quite simply, "Deserts are not caused by goats eating the shrubbery. It's lack of rain coupled with wind erosion that we should be blaming. It's scientifically evident that desertification is more affected by solar cycles than by man."



After many expeditions his understanding is growing. Aerospace technology is helping him uncover the mysteries of the past. As for the present, he depends on the precise technology of Rolex.

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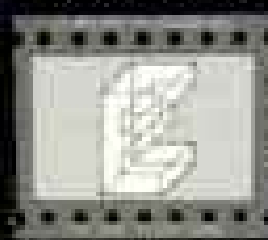
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Why? Because this lottery is the 76th Super Money Game run by the famous **NORTH-WEST GERMAN STATE LOTTERY**. Which means that everything is government controlled. The draw. The prize money paid out. The rules – and the chances.

With a sound basis like that, it's not surprising that this lottery has been so popular for such a long time. And it's created lots of happy millionaires!

More chances to win a million than ever before! Total prize money now

169.667.000 DM!

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Believe it or not – total prize money has been increased for the 76th lottery. **NOW THERE ARE 200.000 WINS AND 500.000 TICKETS!** And total prize money has gone up to **169.667.000 DM**. Best of all – **YOUR CHANCES OF WINNING A FORTUNE ARE BETTER THAN EVER BEFORE!** And it's the chance of winning a super money prize that really counts.

Our biggest prize money ever!

● **Top prizes:**
2 x 2 MILLION DM.

● **You could also win a million:**
Every class starts with the chance to win a million. And every Friday a



1 MILLION DM JACKPOT

– or 10 x 100.000 DM will be drawn. Plus – over 200.000 prizes of up to 80.000 DM!

● **Not only are the chances of winning a super prize excellent, almost every second ticket is a winner! And it's all government controlled.**

We'll start making millionaires as from April 4th.

Why wait? Join in now! The game runs over a period of six months (one class per month)! There are 4 draws in each class – and 6 draws in the sixth class. So every ticket has several chances of winning in its class before it is drawn. And remember – each draw is held in public under government supervision! Your chances increase class by class because more prizes are available in the sixth class. It's in your own interest to stay in the game!

Why not join in now!

Whether you buy a full ticket, a 1/2 ticket or a 1/4 ticket, your chances of winning are the same. But, of course, the bigger the stake, the bigger the win. Order your ticket on the coupon below. Within days you'll receive the ticket, together with a personal statement of account and the official schedule of draws, as well as all the relevant rules and regulations. Include payment with your order. Or you pay after receiving your statement of account by personal cheque, traveller's cheque, bank transfer or in cash via registered air mail (at your own risk).

Worldwide service included!

Every month we'll send you the latest official winning list, together with your ticket for the next class and your personal statement of account. And – if you're a winner – we'll inform you personally.

Notification is in strictest confidence – you just have to tell us how you want the money paid out! Tax-free!

NORTH-WEST GERMAN STATE LOTTERY



State-licensed lottery agent
HANS HERZOG
Alsterdorfer Str. 326
2000 Hamburg 60
West Germany

WHAT?



Give luck a chance! 76th lottery of the "Staatliche Nordwestdeutsche Klassenlotterie", beginning April 4th, 1986! Please fill in number of tickets you want to order:

	DM	US \$*	£*
1/2 ticket	741.00	310.35	258.00
1/4 ticket	381.00	162.15	110.45
1/8 ticket	201.00	85.55	58.30

Prices cover all 6 classes and include charges for airmail postage and the official winning list. There are no additional charges. * Prices in US Dollar and £ (sterling) are variable due to changes in the rate of exchange.

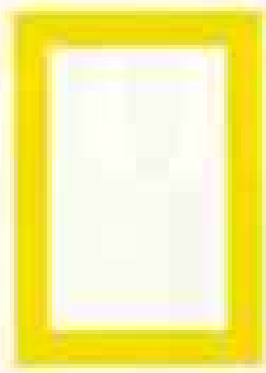
Return coupon to:



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Alsterdorfer Str. 326
2000 Hamburg 60
West Germany

Please write in: German <input type="checkbox"/> English <input type="checkbox"/>
76/86 Mr. <input type="checkbox"/> Mrs. <input type="checkbox"/> Miss <input type="checkbox"/> Please print in block letters.
First name
Surname
Street
PO. Box
City
Country

Valid only where legal.



The flight of Rodney the Jazz Bird

ON NOVEMBER 11, 1935, after waiting for 124 days, the huge balloon of *Explorer II* was filled with helium. It lifted the gondola with Capts. Orvil A. Anderson and Albert W. Stevens (below right) aboard out of a circle of cliffs in South Dakota's Black Hills and into history.

It was a moment and an achievement still green in the memory of our Society—at 72,395 feet high, man's highest reach into the heavens, far into the stratosphere, out where the stars cease to dance. The record stood for 21 years, until Lt. Comdrs. Malcolm D. Ross and M. Lee Lewis soared to 76,000 feet in 1956. Their flight came only months before Sputnik's famous *beep-beep* sounded the fanfare for the race to the moon.

Spurred onward by Ed Yost, a ballooning pioneer and historian who still holds the record for the longest time aloft (NATIONAL GEOGRAPHIC, February 1977), we decided to commemorate the event with a 50th-anniversary race of 11 helium balloons from that same spot, the Stratobowl outside Rapid City, South Dakota.

We soon discovered why *Explorer II* had to wait so long, but the jealous gods of the sky overdid it this time, dumping the heaviest snowfall ever recorded on November 9, scrubbing an event that had drawn balloonists from all over the country.

It became a matter of pride to Ed and to all of us to try to launch at least one symbolic balloon in the face of howling winds, blowing snow, and icy mountain roads.

The big helium trucks worked down the drifted switchbacks, and somehow John Shoecraft inflated his big red balloon, *Rodney the Jazz Bird*. While Captain Shoecraft waited on the weather (top), he gave tethered short flights to Ruth Stevens, widow of Captain Stevens, then to me and my son Graham—in hopes Graham will remember it in 2035.

When it cleared briefly, John launched. The sight of that lone red sphere rising against the snowy pines and rocky cliffs reminded me of the business we are in—pushing back the frontiers of knowledge often in the face of adversity. The hundreds of scientists who labor each year on Society grants—anthropologists and archaeologists, geographers and oceanographers—are moving into new territory in uncertain weather.

Sometimes the goal is reached only after disappointment; sometimes it is not reached at all. Either way, the trials and tribulations are not a part of the scientific record—and sometimes what is going on is not connected with winning or losing but only with having the right stuff to persist either way.



THE PHOTOGRAPHERS OTTE IMBODEN (TOP) AND RICHARD H. STEWART (ABOVE)

Silbert A. Browner

PRESIDENT, NATIONAL GEOGRAPHIC SOCIETY

Swiss Achievement



THE
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Registered models

Longines Conquest VHP (for Very High Precision):

Suddenly watchmaking takes 3 giant strides into the future.

Stride No. 1: unprecedented precision.

Longines Conquest VHP may well be the world's most advanced wrist watch. Its accuracy is five to ten times that of an ordinary quartz watch. Expect Conquest VHP to vary by as little as one minute in five years.

Stride No. 2: unprecedented battery life.

Conquest VHP is equipped with a third-generation lithium battery (mercury was first, then came silver oxide). Lithium means a battery life span of five years—three times that of a conventional watch battery.

Stride No. 3: unprecedented finish.

The silky finish of case and bracelet is due to blasting with man-made sapphire pellets. The case metal is an extremely hard XI alloy. The distinctive grey tone is due to finishing with even harder titanium carbide.

Conquest VHP comes as men's model only. Other Conquest models, ladies' and men's, in a wide choice, all with classic quartz movement, sapphire glass, and water-resistant to 30 metres depth.

LONGINES



Timekeeper to the world of sports

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NO ONE
WANTS
TO
INHERIT.

It's incurable, progressive, and usually terminal. There are no beneficiaries of this bequest. Muscular dystrophy leaves only casualties. It's a group of genetic diseases that weakens muscles and finally destroys them.

The recipients are primarily children. Yet, it doesn't exclude adults. Any member of the family can get it, at any time.

We at MDA are in constant search of cures or treatments for muscular dystrophy. It's one group of the 40 neuromuscular diseases we cover. The legacy we strive to leave is one of hope and good health. We'll need your help to succeed.

MDA

Muscular Dystrophy Association, Jerry Lewis, National Chairman

Put more muscle behind it.

Members Forum



Early Man

Great praise for your recent article on human prehistory (November 1985). It was a brilliant summation of the evidence of human evolution. It should be included in high schools to supplement courses on biology. The holographic Taung child conveyed the awesome sense of actually handling the fossil of our ancient forebear.

Dennis M. Robbins
Delmar, Delaware

The theory of evolution is probably the biggest hoax ever foisted on intelligent people. Even though it is a widely accepted theory, it is held mostly by those who have already rejected a belief in God. I cancel my subscription.

John A. Jones
Lubbock, Texas

Objections to our Early Man article had brought more than 100 letters of resignation by year's end.

As a second-grade teacher, I appreciate the Society's ongoing attempt to educate members with the latest research. And I appreciate the piece in lieu of the nagging textbook controversy as to whether or not evolution should be included in our teachings. Our ancestors have proven the ability to adapt to the reality and truths of their times. I hope "modern" men and women will continue this legacy.

Sherri Rieck
Austin, Texas

I have a problem with the running hominids in the bipedalism sequence (pages 574-7). Why does this series get progressively lighter? I know that the present species shows varied colors, but most of earth's *H. sapiens* retain darker skin tones.

John Buckley
Hanover, New Hampshire

Since a skeleton used in the article was from a female, why not use a female in the bipedal sequence?

Taree Morgan and Andrew Muller
Boulder, Colorado

*Since early species males seem to be significantly larger than females (sexual dimorphism, see page 601), the artist chose to portray males for consistency and to make comparison easier. Regarding skin tone, as the text states, there is no evidence of such secondary characteristics. Since the three *H. sapiens* variations depicted were based on ancient fossil evidence in Europe, Mr. Maternes gave them a lighter tone.*

Why insist that Africa alone is the cradle of the human race? Isn't it possible, even plausible, that human life evolved independently elsewhere, even though glaciation and differing climatic conditions may have obliterated the evidence?

Miller Swaney
Spring Hill, Florida

A single species cannot have independent lines of origin. So far, the only fossil evidence for human origin comes from Africa. Until such evidence is found elsewhere, scientists have no choice but to conclude that Africa was the birthplace of humankind.

"The Search for Our Ancestors" was brilliantly written and the photographs were fascinating. I read my GEOGRAPHIC from cover to cover, throwing housework to the winds. As much as I enjoy the magazine, there is one subject that has never been touched on: I would love to see some articles on Jesus Christ, His time on earth, etc.

Eve Hannah
Essex, Maryland

Among our past articles on biblical subjects are "The Land of Galilee," December 1965; "Where Jesus Walked," December 1967; "The Mystery of the Shroud," June 1980; and the book Everyday Life in Bible Times, 1977.

Your article enhanced my belief that God did actually create man in both his uniqueness and unity. In particular, your map shows that all existing men belong to *Homo sapiens*, irrespective of former hominid species. On the other hand, I cannot escape the feeling that this Latin designation of "wise man" is somewhat ludicrous in light of his deeds up to now. What about "dinanthrope," deriving from *deinos*—"terrible"—also found in dinosaur?

Georges-André Cuendet
Geneva, Switzerland

November Cover

My seven-year-old son, Adrian, and three-year-old daughter, Stacy, were so excited with the hologram. Thank you for making this magazine so inviting to read; the excellent cover makes the children more curious and ask questions.

Patty Patterson
Bakersfield, California

I think you made a poor choice of items for a holographic image. The skull has been a symbol of religious cults and Satan worship through the ages.

W. Terry Whalin
Costa Mesa, California

Pondering the November 1985 cover, I'm left in awe over the significance of life. Africa's Taung child could not have imagined how it would be

remembered more than a million years later. Each of us is important, whether we realize it at the time or not.

Joe Norris
Halifax, Nova Scotia

Editor's Page

As the fossil record grows, the understanding of many Bible-believing Christians and Jews also reaches new levels. Wilbur Garrett's introduction to the November issue states this understanding beautifully to those who see evolution as God's mechanism for creation. Perhaps those who find insult in our relation to the apes are afraid to realize that they cannot understand God's incomprehensible purpose and reasoning. We are an intimate part of the physical world, and we should have a healthy respect for the animal descendants of our common ancestors. I applaud NATIONAL GEOGRAPHIC's open-mindedness and quiet brilliance.

Robert S. Christ
Austin, Texas

English Country Houses

Enthralling article (November 1985)—power, people, and prestige—but surely there was never a more reluctant visitor to Berkeley Castle in all its long history than the unhappy King Edward II, who was murdered there in 1327 with appalling brutality. We saw both the death cell and dungeon last October.

R. R. Mester
Machynlleth, Wales

My disappointment on discovering an article in NATIONAL GEOGRAPHIC glorifying English land barons and their conspicuous-consumption lifestyles, all founded on the equivalent of slave labor, only adds to my concern about the usefulness of the American media. Unless I have forgotten my history, the revolutionaries who fought against the British Empire for freedom from colonialism did so because they did not want to be the beasts of burden of the landed gentry of England.

Kathleen L. Kashay
Austin, Texas

My complete respect and admiration go to the builders, tradesmen, and landscape gardeners who created these awesome structures.

Bob Jones
Glen Arbor, Michigan

I found the article on English country houses especially interesting. Recently a "cousin" from Australia told me of her ancestors who were "gardeners of high esteem." George John Ricketts worked at Blenheim Palace as head gardener. He later became a sea captain and settled in Australia in 1859. Since I wanted a photograph of

Blenheim, your article, map, and picture arrived at a perfect time.

Robert D. Ricketts
Danville, Virginia

Kluane

Kluane and Wrangell-St. Elias should be combined and extended southward on both sides of the border to unite with Glacier Bay Park. This whole vast wilderness park should then be administered jointly by the United States and Canada as a limited-access park. No tourists, no mountain climbing, no hiking, no hunting or fishing or exploitation by resource-hungry corporations. To know it's there as an unspoiled legacy to the unborn generations of the future should be its *raison d'être*.

Joseph N. Schauenberg
Jarvis, Ontario

I certainly enjoyed your excellent article (November 1985). The park must remind one of the primitive uninhabited earth as it was millions of years ago. It is ironic that your description of the moose locked together strongly reminds me of the conflict between the United States and the Soviet Union.

William Vigor
Lakewood, Colorado

Canada Map

Can't help wondering why you chose to include "The Maritimes" as a section of interest, when you could have used "Atlantic Provinces," which would include Newfoundland.

Willard Ash
Vacaville, California

To have used the "Atlantic Provinces" in order to include Newfoundland would have reduced the inset's scale so greatly that only minimal information could have been shown.

As a genealogist, allow me to commend the members of the Cartographic Division of the Society for their fabulous series "The Making of America." The historical information and demographic statistics, illustrated so clearly, have been very valuable in my work. Each sequence of maps brings a tangle of abstract historical facts into harmonious focus within a visual geographic setting. "Atlantic Gateways" was especially useful for my workshop on researching ancestors in ships' passenger lists.

John P. Colletta
Washington, D. C.

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



Photographed by Rod Morris. **Kakapo:** Genus: *Strigops* Species: *bobhriptilus* Adult size: 55-63cm bill to tail Adult weight: Male, 2-2.5kg; female, 1-1.5kg Habitat: Forests, scrub or grasslands, from sea level to 1,200m on Stewart Island, Little Barrier Island and Fiordland, New Zealand Surviving number: Fewer than 100



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

Active only at night, the kakapo is extremely shy and rarely seen. Critically endangered, this flightless bird continues to decline rapidly. The kakapo does not breed yearly, and in addition it is exceptionally vulnerable to predators. The kakapo neither attacks nor retreats from its enemy, and remaining motionless is its only defense.

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

Field studies are helping researchers learn more about the kakapo's unusual social behavior and food requirements. Photography is invaluable both as a research tool and a means of promoting a better understanding of this endearingly unique bird.

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

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Give full rein to your creativity with the Canon T70. Eight exposure modes, three AE programs, instant information readout, dual metering system —all at your fingertips.



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Our innovative technology helps us keep all sound under close control. Both when you want to hear it, and when you don't. In washing machines, for example, silence is golden. A rule we take very seriously.

Our experts found that the use of electronic control of our unique permanent magnet motor allowed us to make our washing machines much, much quieter.

At the same time, we added special shock absorbers to keep vibration down to an absolute minimum. The results are certainly worth hearing. Where music is concerned, we also make sure you hear what you want.

Right up to the new F455 HiFi system, which incorporates our latest CD 150 Compact Disc player.

Giving you all the pure, perfect sound of this advanced digital audio system, with complete freedom from background noise.

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This attractive audio midi system has an automatic linear-tracking record player, a 2 x 40 Watt digitally controlled class G amplifier, an auto-reverse cassette deck, with Dolby B/C noise reduction, and a PLL Quartz digital tuner with 19 stations memory. Plus the convenience of a single, full-function remote control.

So you can enjoy exactly the sound you want to hear, from the comfort of your armchair. Even if your washing machine is running at the same time.

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Welcome to Germany.



Lufthansa



Introducing the multi-mode camera that doesn't outmode your present system.

The selection of programmed cameras available today is quite extensive.

But not the selection of programmed camera accessories.

You see, the special mechanics of these cameras often requires the use of special lenses and other components. Buy the camera and you may have to build your system from scratch. From what's often a limited choice of add-on equipment.

That's where the new Olympus OM-2 SPOT/PROGRAM is uncompromisingly different. It's specifically designed to provide full compatibility with the vast OM System of lenses, flashes, motor drives, you name it. So if you already own OM System pieces, you've already begun building your OM-2 SPOT/PROGRAM versatility.

And versatility is truly this camera's specialty. It's the only programmed 35mm offering built-in manual Spot Metering — for pinpoint exposure control and unlimited creativity.

Then, for unmatched convenience, simply switch to the fully programmed or aperture



preferred modes. Either way, precise results are assured with Olympus' exclusive TTL Direct "off-the-film" Light Measuring.

And for shining in the dark, there's a choice of two flash modes: "OTF" Program Flash and "OTF" Auto Flash.

So whether you're looking for a camera to grow with or take it easy with, go with the Olympus OM-2 SPOT/PROGRAM.

You'll not only start out ahead, you'll stay ahead.

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On Assignment

WITH A RIVER-WIDE SMILE and exuberant wave, *Carolyn Bennett Patterson* commands a houseboat that carried her for her coverage of the Tenn-Tom Waterway. Balky motors and sudden summer storms slowed but did not dissuade her from her plan to transit its length. Typically she met setbacks with a “You can do anything” optimism that has never flagged during a memorable 36-year career at the GEOGRAPHIC that ends next month.

There were no women in the highest echelons of the magazine when Carolyn arrived, and very few ranking women in all of journalism. Steeled by her experience as the first woman police reporter in New Orleans, Carolyn worked her way up and into the hearts of her colleagues, writing for the News Service, the magazine articles staff, and the Legends Division. Her positive attitude also carried her through unusual situations abroad: She has faced down deadly snakes in Tasmania’s wilds, ducked the spears of Indian tribes in Brazil, and allayed the suspicion of police in Poland.

As a Senior Assistant Editor, she developed the craft of caption writing to an art

form and along the way nurtured new talent. Many writers at the GEOGRAPHIC owe their career starts to her perceptive instincts. If indeed the greatest talent is that of pinpointing talent in others, then Carolyn leaves not just the legacy of her own passion for excellence but has also ensured its perpetuation in others.



BOTH BY SANDY FELLENTHAL