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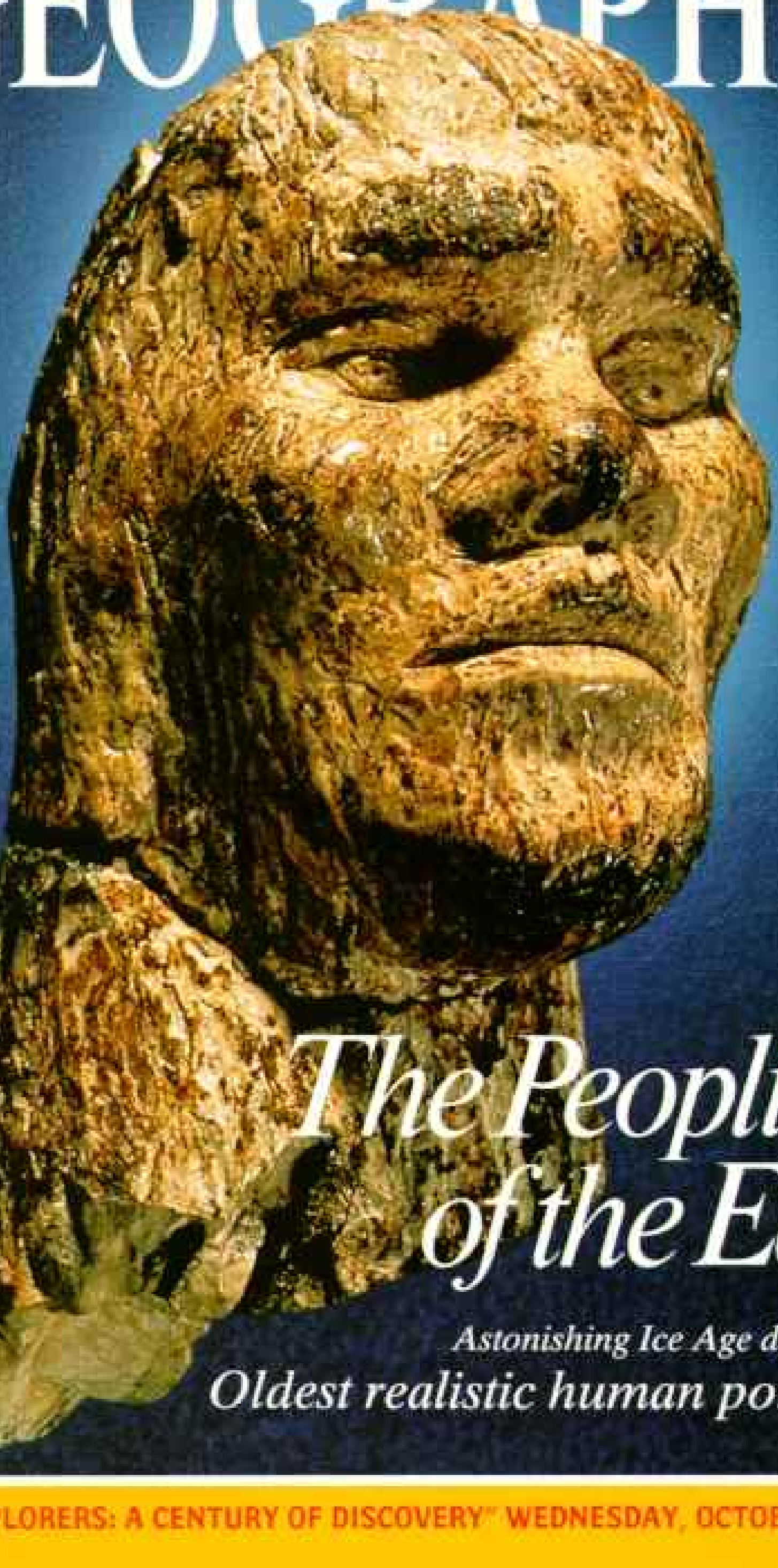

The Peopling of the Earth

Astonishing Ice Age discovery:
Oldest realistic human portrait?

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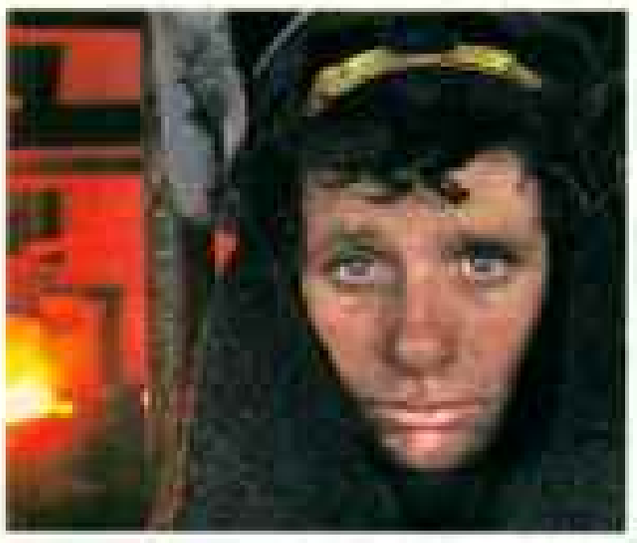
NATIONAL GEOGRAPHIC

OCTOBER 1988

ICE AGE CARVING

LASCAUX CAVE PAINTING

MOCHE EAR ORNAMENT



AFRIKANER STEELWORKER

HMONG CHILD IN CALIFORNIA

COVER: *A carving on Ice Age mammoth ivory may be the oldest true-to-life human image ever found. Photograph by Alexander Marshack.*

"Where Did We Come

WHEN AS CHILDREN we asked, "Where did I come from?" our parents might have hedged a bit on explaining the birth process, but not for lack of knowing. When adults ask, "Where did we come from?" the answers can be as varied as the number of religions and cultures on earth—but in truth no one knows.

And it's not for lack of caring. I suspect no question has been asked so persistently over the eons, and no answer has been so elusive to so many. But every culture has offered at least one pat answer.

If you were born a Haida Indian, you would have been told that mankind came out of a clamshell discovered by the Raven. The Hopi hold sacred a small hole in the floor of the Grand Canyon from which, their legends say, man entered this earth from the underworld. At Angkor Wat a Hindu myth carved in stone shows a tug-of-war between gods and demons with a serpent as the rope. A sea of milk is churned by the action, and voluptuous women called apsaras take flight from the froth like bubbles from champagne.

There are as many different creation myths, such as the Judeo-Christian story of God creating first a man and then a woman in the Garden of Eden, as there are ancient cultures. Scientists dismiss the myths, but a recent theory does suggest that we're all descended from one African "Eve" who lived some 200,000 years ago.

Until recently the dearth of evidence made offering a scientific answer to the problem of origin comparable to throwing a dozen jigsaw puzzles on the table and producing a single coherent picture without knowing what it should look like. But sophisticated dating techniques combined with brilliant interdisciplinary detective work are slowly finding the missing pieces and giving shape to the picture.

A team of editors, photographers, artists, and writers has traveled the world and drawn from hundreds of experts to produce our lead article on what is known of the origin of modern man and of the great artistic explosion known as the Upper Paleolithic—two epochal events that mark all our lives.

Alexander Marshack's cover story directs our imagination back to Paleolithic times. He gives us a first look at an astonishing find—a truly ancient bust carved in mammoth-tusk ivory by and of one of our Ice Age ancestors. So hauntingly well-done is the carving that Marshack—asked to authenticate it—suffers the torment that it is too good to be true, despite positive readings of great age by every test to which it has been subjected.

And then there is the art in the cave of Lascaux in France. As one of the few in recent times privileged to visit the cave—closed to the public in 1963 to save it from further deterioration—I can say that if Paleolithic man ever needs a reference to justify his inclusion in the family of modern man, the 17,000-year-old paintings stand as the ultimate testimonial. If a picture can be worth a thousand words, Lascaux speaks volumes. Whoever painted or directed the painting of the murals stands forever as an Ice Age Leonardo da Vinci. The photographs by Sisse Brimberg and Norbert Aujoulat and the words of Professor Jean-Philippe Rigaud pay proper homage to this wonder of the prehistoric world.

Whether driven by fear, hunger, curiosity, sense of destiny, or a mix of all, mankind—then as now—has continually migrated, as if to fill every void on this planet.

From?"

By WILBUR E. GARRETT EDITOR

Scientists generally agree that man drifted north out of Africa to Europe and eastward to Asia. Millennia later, with the appearance of modern *Homo sapiens*, the great migration pushed on to Australia and the Americas.

The great glaciers of the Ice Age captured and held so much water that ocean levels dropped hundreds of feet—exposing land bridges that tied Asia to Australia (except for narrow channels) and Siberia to North America with a continent-wide land we now call Beringia. At its widest this "bridge" stretched 1,000 miles north from the present-day Alaska Peninsula—a tundra land that must have been sliced by roaring salmon streams and scoured by bitter winds. It's a pity we still know so little about those tenacious and clever Asian migrants who shared this Ice Age world with mammoths, saber-toothed cats, and giant bears.

And, of course, they did discover America some 12,000 years before Columbus was born. Warming periods—the last beginning about 13,000 years ago—melted the glaciers and put Beringia back under the Bering Sea. Those people isolated to the east became the first Americans. Cut off from the rapidly growing sophistication of the rest of mankind as it moved through the Bronze and Iron Ages, they developed their own unique cultures.

A recent discovery of a Paleo-Indian site in an apple orchard near East Wenatchee, Washington, containing the most magnificent collection of their spearpoints ever found, is already adding to our scant knowledge. Just in time for this issue, Dr. Peter J. Mehringer, Jr., brings us his report on the points. They are the nearly 12,000-year-old trademarks of the oldest technology yet positively dated in North America—named Clovis for the town in New Mexico where such points, perhaps the first major invention in the Americas, were earlier identified.

Older dates in South America—all suspect still—indicate there may have been migrations into the Americas 30,000 to 40,000 years ago—possibly during an earlier glacial age and possibly via other routes. Again there are more questions than answers. But the tomb excavation reported on in this issue by archaeologists Walter Alva and Christopher B. Donnan—the most spectacular unlooted pre-Columbian site yet found—leaves no doubt that the Moche people along the Peruvian coast had evolved some 1,500 years ago into a talented and sophisticated culture unlike any so far discovered in North America.

As part of a small reverse migration I recently crossed the Bering Sea (page 504) with the first party of American Eskimos allowed to visit Soviet Eskimo friends and relatives since the "ice curtain" closed in 1948, in the Cold War chill between the Soviet Union and United States. Now both sides express optimism that the summer of 1989 will see regular tourist flights between Alaska and Siberia.

From half a world away in South Africa, the distinguished Afrikaner writer André Brink brings us the story of his people, "the white tribe of Africa," a group symbolic of the massive European colonization of Africa that began in the 16th century. Unlike other Europeans, the Afrikaners have refused to leave or blend with indigenous cultures.

The age of European discovery and colonization that began in the 15th century made dramatic changes in the mix of peoples worldwide, but never before in history have so many humans been on the move as in this century. It is estimated that more

SCANDINAVIA
Settled by modern *Homo sapiens* starting some 12,000 years ago

SIBERIA
Peopled perhaps 30,000 years ago by modern *Homo sapiens*

Malta, U.S.S.R.
Modern *Homo sapiens*
15,000

Ondrejov, CZECHOSLOVAKIA
Modern *Homo sapiens*
33,000

ASIA

Isernia, ITALY
Homo erectus (?)
700,000

Ubeidiya, ISRAEL
Homo erectus
1,000,000 (?)

Tighenif, ALGERIA
Homo erectus
700,000

Qafzeh, ISRAEL
Modern *Homo sapiens*
92,000 (?)

Narmada, INDIA
Homo erectus (?)
500,000 (?)

Zhoukoudian, CHINA
Homo erectus
450,000

Lantian, CHINA
Homo erectus
700,000

Liujiang, CHINA
Modern *Homo sapiens*
67,000 (?)

JAPAN
Peopled by modern *Homo sapiens* some 30,000 years ago

Mariana Islands

PEOPLING OF EURASIA
Beginning perhaps one million years ago ***Homo erectus*** became the first hominid to leave Africa—ultimately reaching Europe and eastern Asia.

Tabon Cave, PHILIPPINES
Modern *Homo sapiens*
30,000

AFRICA

Lake Turkana, KENYA
Oldest *Homo erectus* sites
1,600,000

Lake Baringo, KENYA
Oldest hominid site
5,000,000

AREA OF HUMAN ORIGINS

Laetoli, TANZANIA
Evidence of hominids walking upright
3,700,000

Makapansgat, SOUTH AFRICA
Evidence of hominids in southern Africa
3,000,000

INDIAN OCEAN

MADAGASCAR
Peopled about 1,500 years ago

Java

Sangiran, INDONESIA
Homo erectus
800,000 (?)

Huon Peninsula, PAPUA NEW GUINEA
40,000

AUSTRALIA

PEOPLING OF AUSTRALIA
Modern ***Homo sapiens*** reached Australia some 50,000 years ago from Asia, possibly using simple rafts and a forested land bridge with New Guinea.

Border Cave, SOUTH AFRICA
Modern *Homo sapiens*
100,000 (?)

Klasies River Mouth, SOUTH AFRICA
Modern *Homo sapiens*
100,000 (?)

Upper Swan
38,000

Lake Mungo
38,000

○ Sites show earliest evidence of peopling by early hominids, *Homo erectus*, and modern *Homo sapiens*

Site date in years before present

(?) Date or species identification questioned

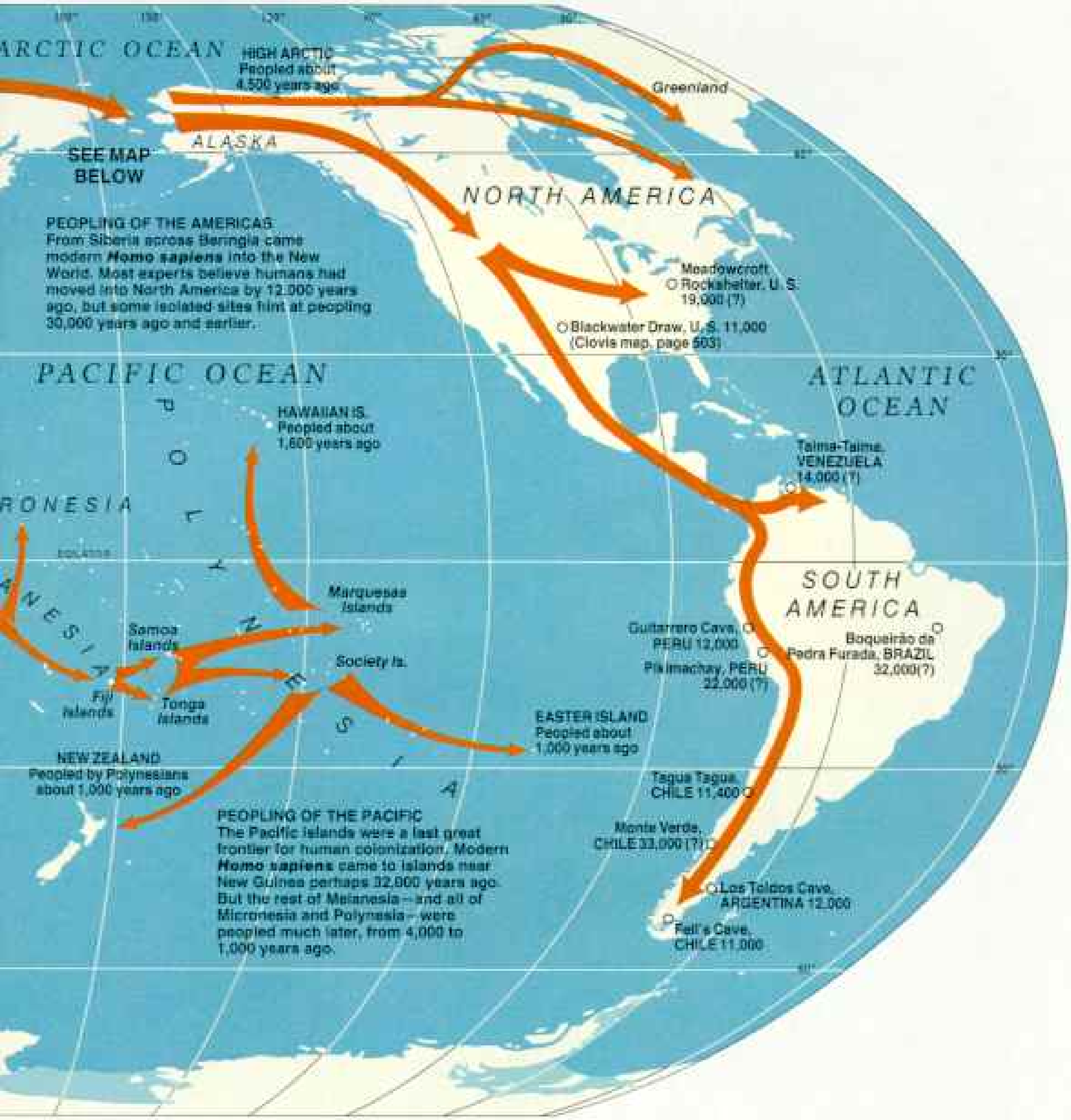
0 2000 km
0 2000 mi
SCALE AT EQUATOR
SUBMOOCH PROJECTION

Peopling of the Earth

THE DISCOVERY AND DATING of fossils and stone tools have expanded the story of humankind. Yet many regions—India, central Asia, West Africa—have not been intensively investigated. For now, it appears that the earliest hominid to leave Africa, the homeland, was Homo erectus, *a million or so years ago. One theory says modern humans evolved from this early species in different locales. But an increasingly accepted hypothesis says modern* Homo sapiens *arose in Africa some 100,000 years ago, and made a second great outward migration, peopling the entire world.*

NGS CARTOGRAPHIC DIVISION DESIGN: CHARLES BERRY, RESEARCH: KAREN ALLEN, DAVID MILLER, ANN PERRY; PRODUCTION: BARBARA CARRIGAN, VICTORIA MCKELLER

MAP DATA PROVIDED BY: PATRICK KIRCH, THE BURKE MUSEUM, ALAN MANN, UNIVERSITY OF PENNSYLVANIA; ALAN G. THORNE, AUSTRALIAN NATIONAL UNIVERSITY; FREDERICK H. WEST, PEABODY MUSEUM OF SALEM, MASSACHUSETTS



immigrants—legal and illegal—will have entered the United States in the 1980s than in any other decade in our history. Symbolic of the millions of refugees who have fled violence or starvation in the world since 1940 are the Hmong of northern Laos. Once famous as the tough core of the CIA's secret army in Laos, their lives and their life-style were placed in jeopardy when the United States pulled out of Vietnam. Now some 75,000 have been allowed to migrate from refugee camps in Thailand to the U. S. In a lifetime they have been catapulted from a near Stone Age existence to a high-tech urban life. Like the first humans who came out of Africa, they will survive by adapting to their new environment.

Each of these stories, complete in itself, is but a fine thread in the millennia-old and continually changing tapestry of the peopling of this planet by its dominant mammal—man. In the issues ahead we'll look at the price exacted by our successes. □

The Search for Modern Humans

In shadowy caves and on open plains across four continents, archaeologists seek clues to the rise of Homo sapiens. A fragmentary modern skull, found here in South Africa's Border Cave, has been tentatively—and controversially—dated back to 100,000 years ago, one of the oldest known.

By JOHN J. PUTMAN
SENIOR ASSISTANT EDITOR

Photographs by SISSE BRIMBERG and IRA BLOCK
Paintings by JACK UNRUH

An early representation of a human, this male with a mobile arm—carved about 26,000 years ago from mammoth ivory and touched with ocher—was discovered in Brno, Czechoslovakia. About 35,000 years ago, for reasons unknown, scattered hunter-gatherer groups in Europe and Asia underwent a cultural revolution. For the first time, humans began to create symbols of themselves, of the animals

around them, and perhaps of the passage of time.

The incised dots on this 15,000-year-old ivory plaque, excavated at Malta in Siberia, are surely more than idle doodles. Do the spirals reflect pleasing design, ritual symbol, or a record of the passing days?

IRA BLOCK (PRECEDING PAGES); PLAQUE (ABOVE), PARTLY RECONSTRUCTED WITH WAX, 14 CM LONG, PHOTOGRAPHED AT THE HERMITAGE MUSEUM, LENINGRAD, BY SOBOL GRIMBERG; FIGURINE, 25 CM, AT THE ANTHROPOS INSTITUTE, MORAVIAN MUSEUM, BRNO, CZECHOSLOVAKIA, BY IRA BLOCK

WE PULLED ON COVERALLS, put on hard hats, checked our lamps, and entered the cave. As daylight was blotted out behind, our eyes sought to adjust to the darkness and the slender beams of light. I bumped into rock walls, slipped on mud. We seemed in the coils of some great and dark time machine—and indeed we were. Before we reached the end of this 200-meter-long cave in the French Pyrenees, we would be vaulted back 14,000 years into the past, into the lives of our prehistoric ancestors.

I was beginning a journey that would extend over two years, plunge me further back in time, lead me from Europe to Africa, Asia, Australia, the edge of the Americas. I was in search of the first modern humans—those who were anatomically like us and who first demonstrated the curiosity, creativity, and organizational skills that mark our lives today.

Science labels these humans *Homo sapiens*, "wise man"; they first appeared perhaps 100,000 years ago, and they have left tantalizing traces for us to ponder through much of the world.

I wanted, as much as possible, to look into their minds, to see how they lived. I wanted too to learn their origin and how they spread around the world. Human ancestry goes back two million years—but our earlier forebears, found in Africa and Asia, had been smaller, different in stature and dexterity. They had smaller brains and more robust bones, and showed little innovative ability.*

I was beginning in France because its limestone caves and rock-shelters had protected for thousands of years an incredible hoard of art, tools, human fossils, and campsites. The first of these was discovered in the mid-1800s. Today hundreds of sites have been identified, thousands of objects unearthed. Studying them, scientists are now able to throw brilliant new light on Europe's Upper Paleolithic age, from 35,000 to 11,000 years ago.

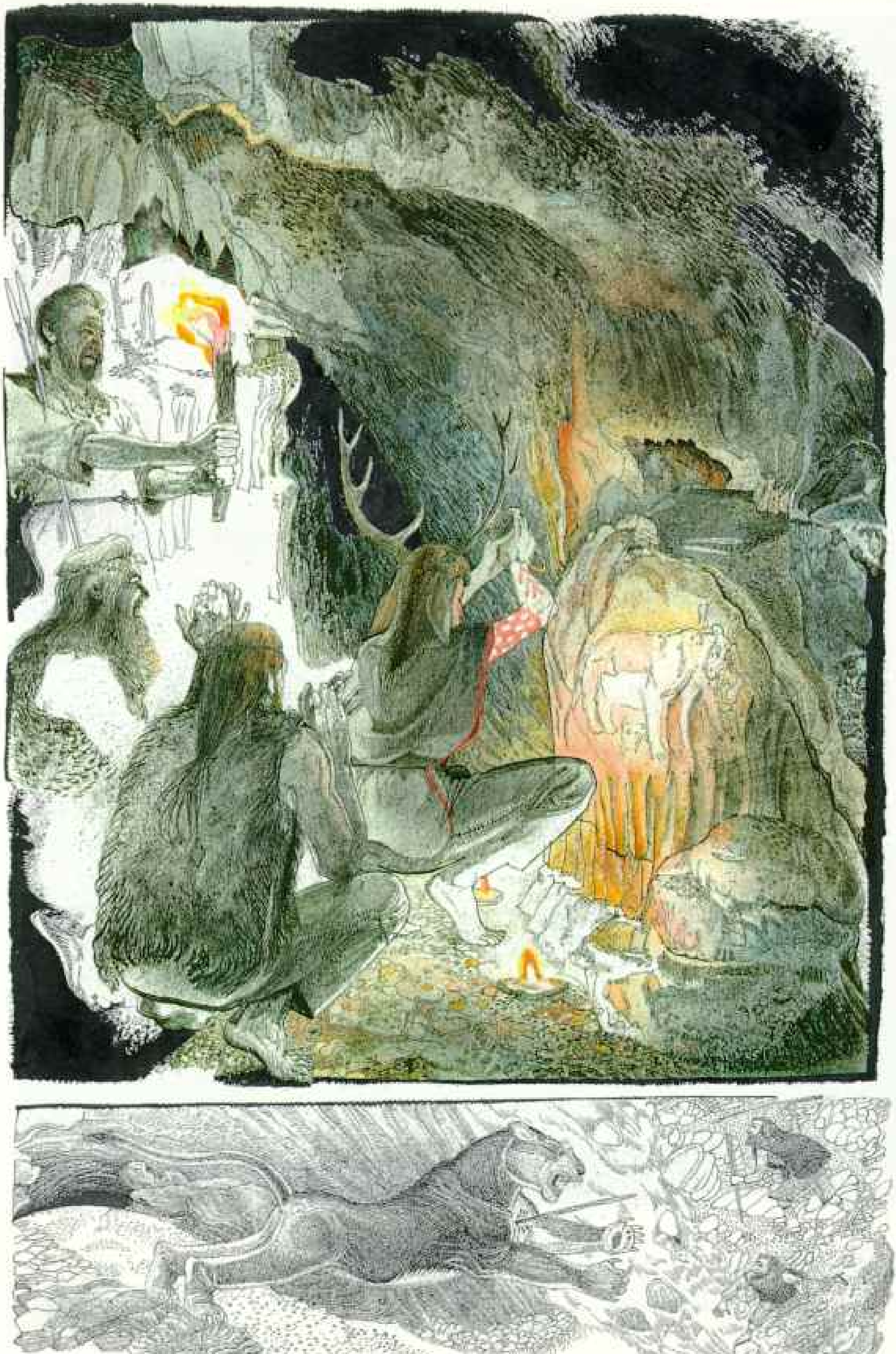
"It was a cultural explosion," Professor Randall White of New York University had told me. "Suddenly, all these things—people painting, carving, wearing everything they could get their hands on." There were exquisite tools shaped to please the aesthetic sense as well as for utility; great paintings that covered cave walls and

*See "The Search for Our Ancestors," by Kenneth F. Weaver, NATIONAL GEOGRAPHIC, November 1985.

Deep in the subterranean recesses of the French Pyrenees, unknown hands shaped bison from moist clay 14,000 years ago. The early artists negotiated a river at the cave's entrance, then walked and crawled a kilometer to reach this secret place. From a clay deposit the sculptors cut

DIDIER DESCOUENS

a slab about a meter wide, leaned it against an outcrop, and modeled a male and a female bison, along with a miniature bison since removed. Heel prints in the clay nearby were left by Ice Age youths, possibly in ritual dance. Tuc d'Audoubert cave was discovered in 1912.



ceilings; bones marked with dots and lines in such a way as to suggest counting sticks or even lunar calendars; shell beads that adorned both the living and the dead.

At that time a great ice sheet embraced northern Europe, advancing, retreating, at times moving as far south as the approaches to today's London and Hamburg. More animals than humans roamed the continent; in France the human population numbered in the tens of thousands, organized in small bands.

"WE KNOW THEY CAME THIS WAY," said my companion, Dr. Jean Clottes, director of prehistoric antiquities in the French Pyrenees, as we went deeper into the cave named Enlène. "They left bones and tools all over."

The beam of his lamp played around a chamber. "Here!—a fireplace. Wood was scarce; they used it to start the fire, then fueled it with bones. The smoke and stench must have been terrible.

"Here we found spearheads, pendants made of horse teeth, a spear straightener made from a reindeer antler, on which had been carved a beautiful salmon. We know it was a male salmon in early winter. The upper jaw overlaps the lower, very characteristic of a male salmon during the spawning season. It is exhausted, thin."

In another chamber, fissures in the wall were jammed with hundreds of broken animal bones. "A mystery," Dr. Clottes said.

We reached the last chamber. Scores of bones were stuck upright in the earth—another mystery. Small sandstone slabs covered parts of the floor. "Brought in by man, tons of them. We think they were used as pavement and as lamps. You put fat and a wick on top, replenish them occasionally, and they could burn for hours."

There were refuse holes, hearths. "We found tools, flakes from knapping flint, and several hundred pendants, some not completely perforated. Lots of activities took place here. I see maybe 25 people at most. They didn't stay here all the time, maybe just at night. But they must have come here repeatedly for a thousand years."

I thought of the smoke and the stench, the hunks of charred meat, and that beautiful carved salmon—surely here our ancestors were striding from that primitive past toward our own age.

Over several days Dr. Clottes led me into other caves, each revealing a facet of how prehistoric humans thought.

In the cave of Niaux he guided me to a painting of a bison. "It tells us how their minds worked. They went along these caves with their lamps flickering and casting shadows. The chap went along here and caught the shadow or shape of this rock. It looks exactly like the profile of the back of a bison. He did not put any painting here, he left it natural; but he drew a bison all around."

In the cave of Trois-Frères we paused in a sacred place, a place for ritual, the Chapel of the Lioness. A cave lion had been engraved on a stalagmite. It showed the marks of having been repeatedly hit with stones, "as if they wanted to kill it."

Farther on, in the same cave, Dr. Clottes instructed me to crawl up a narrow ledge, its wall covered with engravings of animals. I looked down on an image, painted and engraved, that seemed to dance on a wall three and a half meters above the floor. It was the "Sorcerer," half man, half animal. It dominated the chamber as a cross or crucifix dominates a church sanctuary, or an image of Buddha a temple. I studied the fading lines, especially the almost

Fearsome carnivore, a cave lion engraved on a stalagmite (painting, facing page) bears pockmarks as if struck with a blunt tool; a stone pick lies nearby, along with seashells and torch fragments, in Trois-Frères cave adjacent to the clay bison site. In this modern artist's view, a sorcerer in antlered headdress attacks the image in the flickering torchlight. Such sympathetic magic might aid in killing the lion.

A male figure (above) reaches toward a bear paw in a carved bone fragment excavated at Mas-d'Azil, France. The scene may represent the ceremonial killing of a bear, a springtime rite enacted in the Pyrenees even in historic times. Men occasionally were portrayed with strange faces, possibly masks used in rituals.

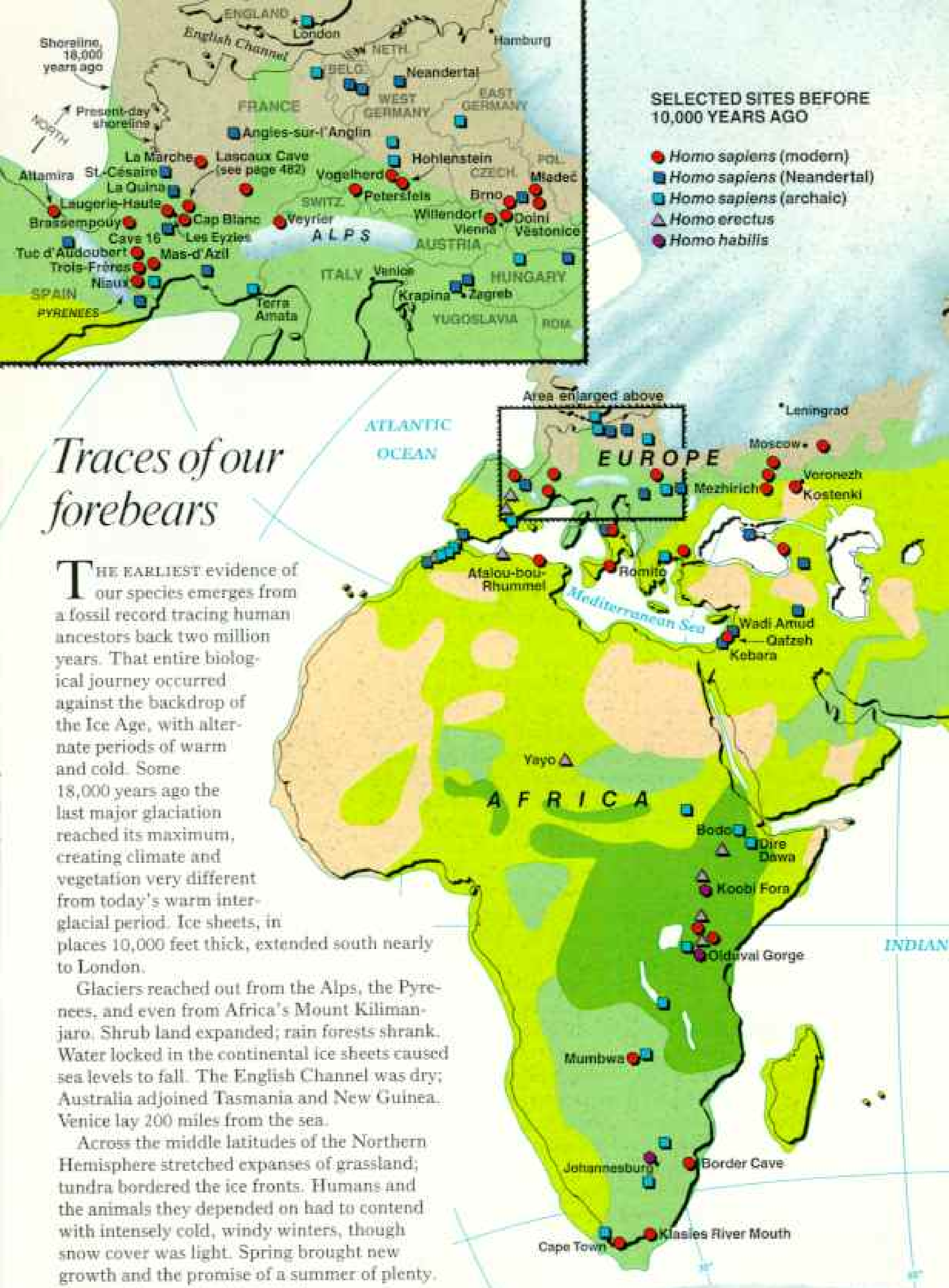
PLAQUE, 8 CM, AT MUSÉE DES ANTIQUITÉS NATIONALES, SAINT-GERMAIN-EN-LAYE, FRANCE, BY SISSE BRIMBERG. PAINTING BY JACK UNRUH

Traces of our forebears

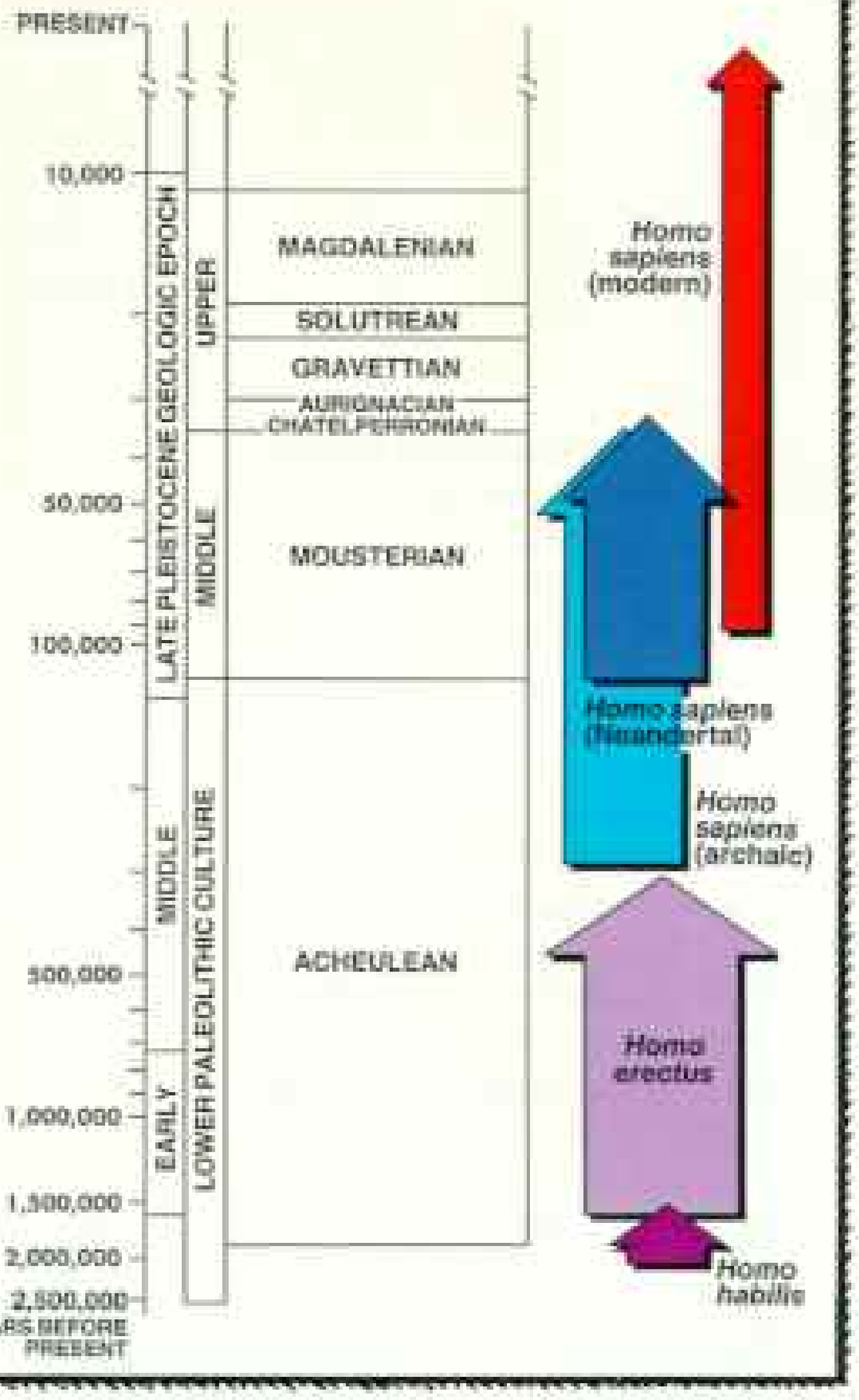
THE EARLIEST evidence of our species emerges from a fossil record tracing human ancestors back two million years. That entire biological journey occurred against the backdrop of the Ice Age, with alternate periods of warm and cold. Some 18,000 years ago the last major glaciation reached its maximum, creating climate and vegetation very different from today's warm interglacial period. Ice sheets, in places 10,000 feet thick, extended south nearly to London.

Glaciers reached out from the Alps, the Pyrenees, and even from Africa's Mount Kilimanjaro. Shrub land expanded; rain forests shrank. Water locked in the continental ice sheets caused sea levels to fall. The English Channel was dry; Australia adjoined Tasmania and New Guinea. Venice lay 200 miles from the sea.

Across the middle latitudes of the Northern Hemisphere stretched expanses of grassland; tundra bordered the ice fronts. Humans and the animals they depended on had to contend with intensely cold, windy winters, though snow cover was light. Spring brought new growth and the promise of a summer of plenty. Humans learned to plan ahead.



Paleolithic age



Sites on these maps have yielded evidence of early human presence—bones, tools, weapons, ornaments, cave art. The names of cultural periods (chart above) derive from sites in western Europe where Paleolithic remains were first identified.

VEGETATION 18,000 YEARS AGO

- Glacier, perennial sea ice
- Tundra
- Desert
- Grass, shrub, dry woodland
- Open woodland, forest
- Rain forest

ICE AGE VEGETATION ADAPTED FROM A GENERAL CIRCULATION MODEL DESIGNED TO REFLECT GLOBAL PATTERNS RATHER THAN SITE-SPECIFIC INFORMATION.

AZIMUTHAL EQUIDISTANT PROJECTION CENTERED ON EQUATOR AT 110° EAST

NGS CARTOGRAPHIC DIVISION
DESIGN: ROBERT W. TOPE
RESEARCH: MARGUERITE B. HUNTSBERGER
PRODUCTION: RAMSEY MURRAY
MAP EDITOR: THOMAS L. GRAY

vanished head with its great antlers. Was this the god of the hunt, a sacred symbol beneath which boys were initiated into manhood, or a vision sacred to men and women alike? The answer is not known.

Dr. Clottes believes that groups of hunters and their families congregated at times for some special ceremonies, perhaps to exchange mates, perhaps for rituals in such painted caves.

"Each group had its own territory, maybe hunting the ibex in winter at one particular place, the bison in summer at another. We know they traveled or traded," he said. "We are 125 kilometers from the Mediterranean and 250 from the Atlantic. And in these caves we get shells from both. These people had the same potentials as we have and were as clever. No less, no more. They had fine artists and, we believe, an articulate language. But what was it like?"

Soon after, I visited Professor Jean-Philippe Rigaud, director of prehistoric antiquities in Aquitaine. He was excavating Cave 16 in the Dordogne and analyzing with computers the evidence from this and other sites to discover possible interrelationships between the hunting bands who occupied them.

As he talked, I could sense, almost feel, in this beautiful region of France—limestone plateaus, green valleys, meandering rivers, forests—the presence of prehistoric men and women. "They knew how to sew, because we have their needles and tiny little tools for cutting and making holes in the hide. From engravings it looks like people were wearing some kind of parka made of animal skin. Probably they wore moccasin-like shoes, but we cannot say."

His findings presented a picture of populations rising and falling through the millennia, of some people who mysteriously went away and new populations coming from the east.

He envisioned the region inhabited by small hunting bands, each requiring a territory with a radius of 30 to 40 kilometers to supply their food. "The next group would be 40 to 60 kilometers up- or downstream. But these groups were not living isolated as if on islands; they had relationships with each other."

He provided a final insight. "We will be working for years; there is so much to learn. But there is one strange thing. We have no evidence of fighting among the groups. They buried their dead, but the remains of dozens of individuals show no sign of people having been killed on purpose. This suggests a certain peaceful organization, a certain agreement on the way to use the landscape."

I traveled on to the Soviet Union, took the overnight train from Moscow south to Voronezh, then motored to the village of Kostenki. It sits quietly by the River Don: There are green apple trees and hollyhocks, the cries of birds and roosters, a black soil called chernozem that when wet builds and builds around your boots.

Elegant elongated profile, interpreted as that of a youth, was found with several thousand engravings at La Marche, a 16,000-year-old living site in France. Most portray animals, but about a hundred show humans. Many are so overmarked with fine-line scratches on the rough limestone as to be nearly invisible. So odd are they that the first scholar to describe them, in the 1940s, was accused of fakery. They represent a major puzzle of the Paleolithic.

Another great Upper Paleolithic culture had once stretched from Austria and Czechoslovakia deep into the Soviet Union. "France has the tail of the dog," University of Illinois archaeologist Olga Soffer had cautioned me. "The head lies to the east."

The village of Kostenki abuts the archaeological site of the same name, first excavated in 1879. Twenty-nine more digs had followed, but the great treasure was not yet exhausted.

Professor N. D. Praslov of the Academy of Sciences in Leningrad led me to the newest dig, 130 square meters, filled with mammoth bones (pages 472-3). In it students and professors worked with trowels, knives, scrapers.

"We opened it last year," Professor Praslov said. "We found a series of pits around a central open space with hearths—the remains of shelters built with large mammoth bones, partly underground for warmth. Low walls separated each shelter from its neighbor. This dates from about 23,000 years ago."

Paleolithic man had chosen the site, he explained, because the landscape held sheltering gorges and water resources; there was game in nearby hills, and herds of mammoths, horses, and bison moving along the valley.

Professor Praslov's team had found four human burials, animal bones mysteriously packed with a dark clay, many signs of ritual. "We found two musk-ox skulls atop a collapsed shelter, but no other musk-ox remains; we think the skulls served as totems. There were two types of female figures: one of limestone, painted red and apparently intentionally broken; the second of ivory, painted black, all in good condition. This is a mystery. But we think maybe they are associated with the shelters because their makers thought of woman as the keeper of the hearth."

They had discovered bones with engraved lines in a particular rhythm, necklaces of arctic fox teeth, and four slender headbands of mammoth ivory. The professor held one to his brow. "It comes partly around the head, then there are two holes so you could attach a thong to complete it."

He paused. "You know we always thought about these people as nomadic hunters. But you see, they constructed settlements to last for ten years or more. They had a lot of meat, skins, and time for art and ritual. If we speak about the level of thinking, we are not far from them. You see, if we just increase the quantity of our knowledge, it's only a lot of technical games. We know airplanes, we know automobiles, but they knew nature very well. That's something we have lost."

About 20,000 years ago, the people moved away. "The glaciers were coming south again," Professor Praslov said, "the climate turning colder. I think they migrated to warmer areas, and then the culture changed."

I looked again at the ivory headband with the holes at the back for attaching a thong. Had it adorned a lovely face? Was it given, I wondered, in hope or in pride?

Exquisite ivory head, about 25,000 years old, known as the Venus of Brassempouy for the site of its recovery in France, bears distinctive facial features and coiffure. Although unequivocal human representations make up a minute percentage of Paleolithic artwork, they range from realistic to abstract, even to grotesque, sometimes in the same excavation.

Instruments like this 25,000-year-old bird-bone flute are the earliest evidence of music.

ENGRAVING, 18 CM HIGH; VENUS, 4 CM; FLUTE, 9 CM; ALL AT MUSÉE DES ANTIQUITÉS NATIONALES. BY SISSE BRIMBERG

BY NOW PALEOLITHIC EUROPE no longer seemed to me a blank space inhabited by nameless, furtive creatures. It was instead rich in life, full of human drama. Archaeologists had even named some of its people. There was the Frogman of Veyrier,

Land of game and honey, France's Dordogne Valley provided a larder of meat for thousands of generations. Some groups sheltered in caves in Le Conte cliff, background, where excavations have uncovered such items of personal adornment as this 28,000-year-old ivory bead or button (below). The cliffs offered sweeping views of horse, bison, and ox

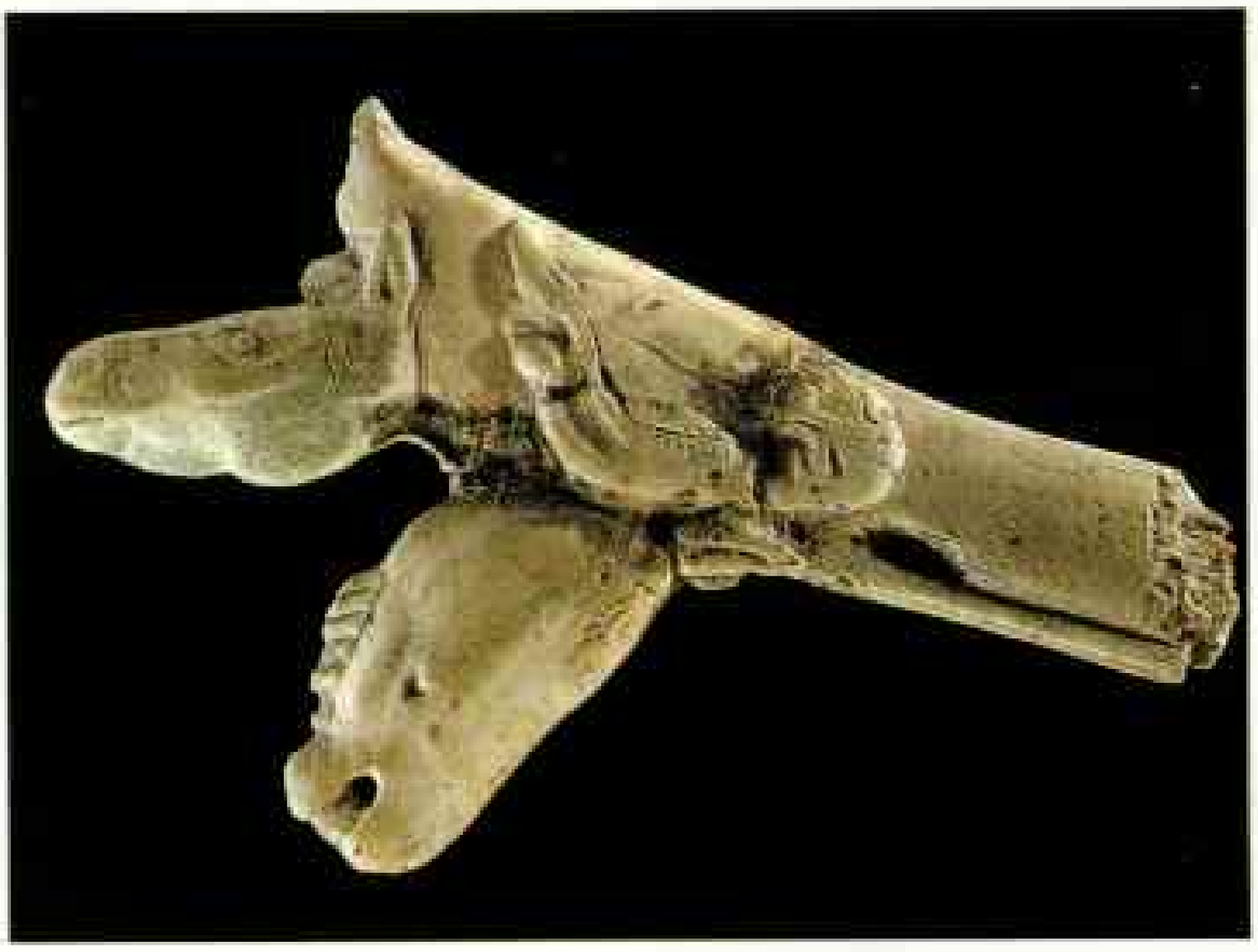
herds. At fords like this site at the fork of the Dordogne, hunters may have surprised reindeer.

Innovations in weapon design accelerated. Invented about 20,000 years ago and later beautifully decorated, the spear-thrower, illustrated in use on pages 454-5, extended the marksman's reach. In one curious example (bottom, middle), a young ibex on a horn spear-thrower looks back at birds on its own feces. Harpoon heads (far left), in use by 11,000 years ago, were hafted to wooden shafts and easily replaced. Indentations may be decoration or grooves for poison.

One of the earliest ornaments, an ivory pendant strung by a hole at the narrow end, bears rows of dots—a common motif 32,000 years ago.

HARPOON HEADS, 13 TO 18 CM, AND SPEAR-THROWER FRAGMENT, 8 CM, AT MUSÉE DES ANTIQUITÉS; PENDANT, 4 CM, AT LOGAN MUSEUM, BELOIT COLLEGE, BELOIT, WISCONSIN; BY IRA BLOCK (LOWER RIGHT) AND JESSE BRIMHALL

Favorite of hunter and sculptor alike, a bison (opposite) emerges in bas-relief from a 16,000-year-old limestone slab found in a shelter at Angles-sur-l'Anglin, France. Was it created for beauty or for necessity—



as a mythic story figure or as sympathetic magic for the hunt? Such sophisticated carvings found in living sites, along with wall paintings discovered deep in caves of southern France and northern Spain, point to the passing of artistic conventions from generation to generation.

Three heads on the top of a horn staff from Mas-d'Azil portray two live horses—possibly a male and a female—and a dead one with a flayed skull and closed eyes. This unique piece may represent the cycle of life and death.

STAFF. 17 CM; BISON CARVING, 35 CM; BOTH AT MUSÉE DES ANTIQUITÉS, BY SISSE BRIMBERG

found near Lake Geneva with 12,000 bones of frogs and toads (had he traded those tasty morsels with nearby hunting bands?). There were the two Petersfels children, discovered in a West German forest with fox paw bones suggesting fur wraps. And there was Romito 2, the dwarf, from a cave in Italy's Calabria region.

Dr. David W. Frayer of the University of Kansas told me his story. "He lived about 11,500 years ago, and he suffered from a form of chondrodystrophy, a lack of normal cartilage growth. When he died at 17, he was no more than four feet tall. It shows that Paleolithic people tolerated individuals of abnormal size and proportion. He was much shorter than his peers, could not have been a good hunter. He must have been supported by the group from the time of his birth."

He had been buried with an old woman, possibly his mother, Dr. Frayer said. "Perhaps the tolerance of the dwarf lasted only so long as she lived."

I sat in silence a moment, a vision forming in my mind of Romito's terrifying last day. But now it was time to seek the origin of these modern people, *Homo sapiens*. Their appearance marked the last great step in the story of human evolution.

IN A SMALL ROOM in the Croatian Natural History Museum in Zagreb, Yugoslavia, Professor Erik Trinkaus of the University of New Mexico sat surrounded by nearly 900 pieces of human bone—the remains of some 80 Neandertals found at Krapina at the turn of the century. "A jumble," he said. "We're trying to sort them out, pair them up."

Before the appearance of modern humans in Europe, the continent had been occupied by Neandertals, named for the German site where their remains were first identified in 1856. They appear also in the Middle East. Professor Trinkaus sees the Neandertal as the end of a long sequence of archaic members of the genus *Homo*. He held up a bone. "If you found this at Lake Turkana in Africa, you would say it is an early *Homo erectus*. It's that similar."

Homo erectus, "upright man," dates from at least as far back as 1.6 million years ago and had a brain capacity of some 1,000 milliliters, compared with our own 1,400. He was the first to control fire and to move out of Africa into Europe and Asia.

"The Neandertal had a great browridge too," Professor Trinkaus said. "But the distinctive thing about the Neandertal is the shape of the face, which protrudes, and big front teeth. He used his teeth as a third hand, holding things, pulling things.

"His brain was just as large as ours. He appears to have buried his dead, kept injured people alive for long periods, had very simple personal ornamentation. But he was less well organized, more opportunistic; he did very little planning, a lot of scavenging."

Professor Trinkaus began to pick up pieces of bone. "The shaft of this tibia, or shinbone, is thick and flattened; this happens when people habitually squat rather than sit. This shoulder blade is very wide; it indicates tremendous muscularity. They must have been accomplishing things by the strength of their arms. Striking, throwing, climbing. Look at this cross section of a thighbone [page 464]; the cavity is only a quarter of the whole, in modern man it is about half. It indicates they were hyperactive. Bone, like muscle, builds up in response to activity."

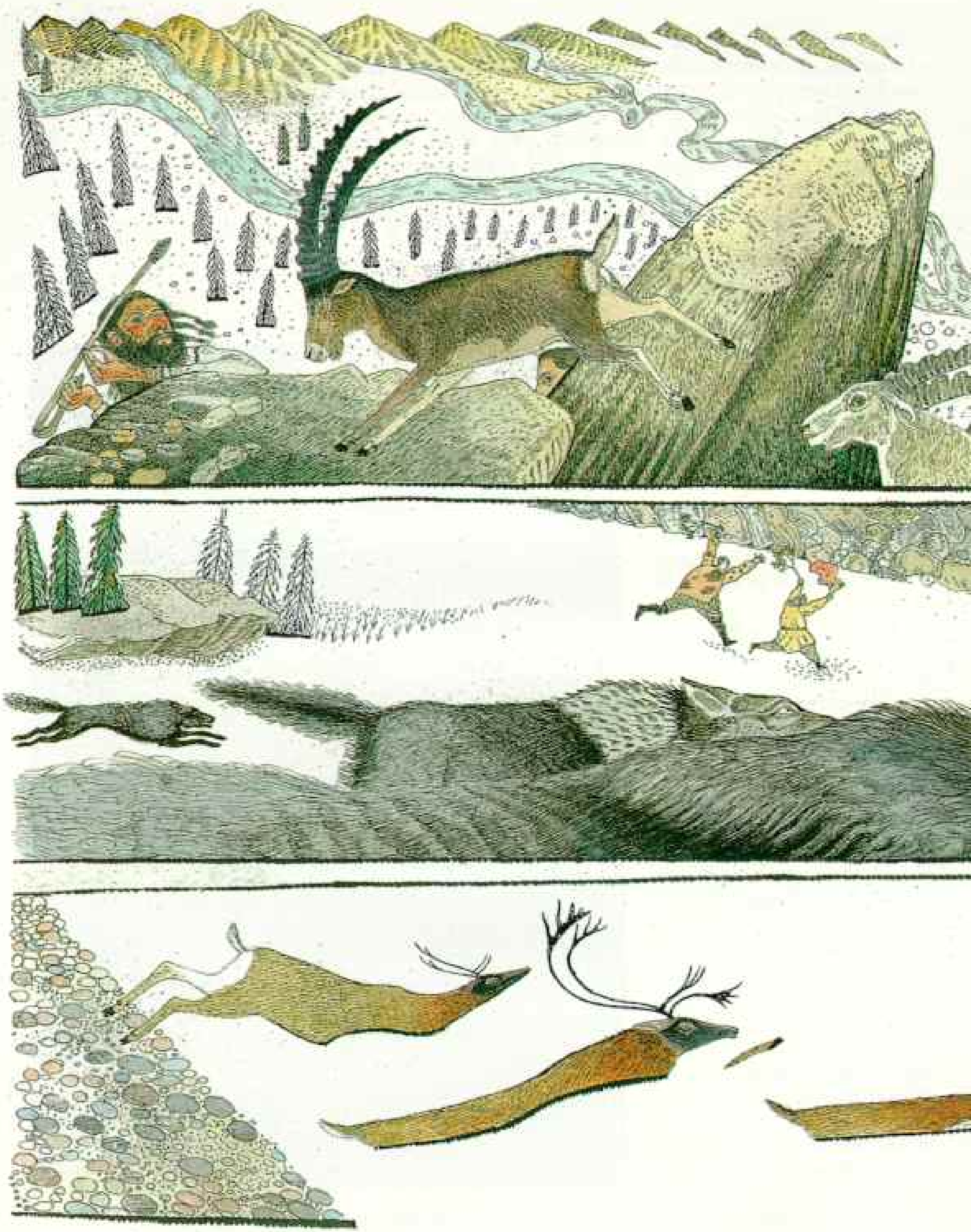
A toe bone was wider than high, the opposite of those in modern man. "That means more side-to-side mechanical stress. They were doing a much more irregular kind of movement, climbing over things, a sort of broken-field running." A little finger bone resembled a spatula. "It could support a lot of nail and flesh. The reason for such fingers was the stress on them. If you hold a big scraper between the tips of your fingers and you scrape, it pushes things obliquely across the fingers. They were doing so with a lot of force.

"With the appearance of modern humans, there was a change in technology; you get many hafted points, handles on things. This transferred the generation of force, changed the fingers."

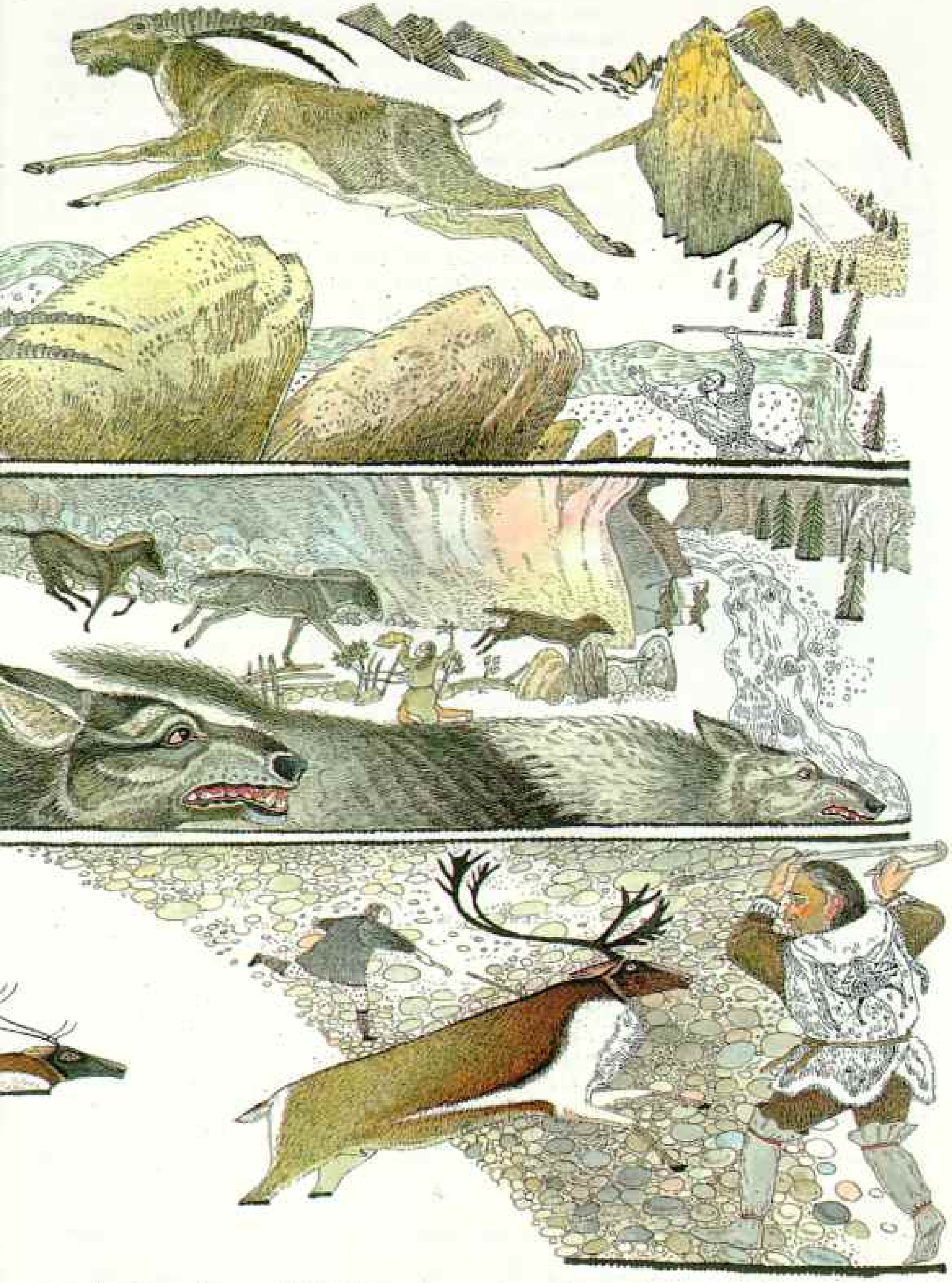
Another perspective on the Neandertal was provided by Dr. Arthur Jelinek of the University of Arizona, excavating at La Quina in France. The site lay under a cliff and was rich in bones. It is believed that Neandertals drove a few animals over the edge at a time to kill them. "Their tools are incredibly monotonous," Dr. Jelinek said. "They stayed the same for at least 100,000 years. This indicates there was a fundamental difference between them and us, a fundamental difference in innovation."

What was the relationship, I wondered, between the Neandertal and modern man? Was he in some way an ancestor?

Dr. Chris Stringer of the British Museum (Natural History) in London is among many who think not. "We can say pretty certainly that the two lived at the same time in Europe—not in the same valley necessarily, but in Europe for several thousand years—so one most probably did not evolve from the other.



Early hunters knew their quarry well and developed diverse techniques to outwit different prey, as portrayed by artist Jack Unruh. Fleet ibex descending from mountaintops in fall probably met a single huntsman armed with a spear-thrower (upper panel). Teamwork was required in corralling wild horse herds to



spear them in a cul-de-sac (middle). Always humans hunted in competition with wolves and other carnivores. Observing the seasonal migration of reindeer, groups lay in wait at shallow river crossings (lower). Such coordinated kills imply a high degree of social organization, a way of sharing meat, skins, and bones.

"Also you have a record in Europe that seems to show that the Neandertals were gradually evolving from about 300,000 years ago to 35,000 years ago. And then suddenly, within 5,000 years, they were gone. Such a difference, the way they got established, the way they disappeared. I do not think one can achieve that level of change except through replacement—one population taking over from another. And I see no sign of hybridization."

These observations had led Dr. Stringer to look elsewhere for the origin of anatomically modern humans. In time he had found a more plausible ancestor:

"I would postulate the origin of modern people in Africa more than 70,000 years ago; then a gradual spread, first to the Middle East, then probably into Europe and to the other end of the world, to the Far East and Australia and America. In my view, all living people have a common ancestor who lived within the past 150,000 years. And it looks like that common ancestor lived in Africa."

It was a stunning hypothesis: Exotic, precise, and consigning the Neandertal to the ash can of evolution. I wanted to see that African evidence.

Male Atlantic salmon, hook-jawed on their run to upriver spawning grounds, entered the Dordogne by the millions 25,000 years ago. Some swam up a tributary, the Vézère, where a carver near Les Eyzies shaped this likeness on a rock-shelter ceiling. The border was chipped by salvagers, stopped in the process of removing the piece in 1912.

Just downriver, excavation of a shelter called Laugerie-Haute inspired this re-creation (facing page) of a Paleolithic salmon fishing camp. Several groups likely came together for massive harvests 18,000 years ago. Stone weirs may have guided salmon to a pool for spearing; sun drying the fish would assure a winter food supply. Thousands of fish bones have been found in excavations in the area.

SALMON BAS-RELIEF, 105 CM; BY SUSIE BRIMBERG

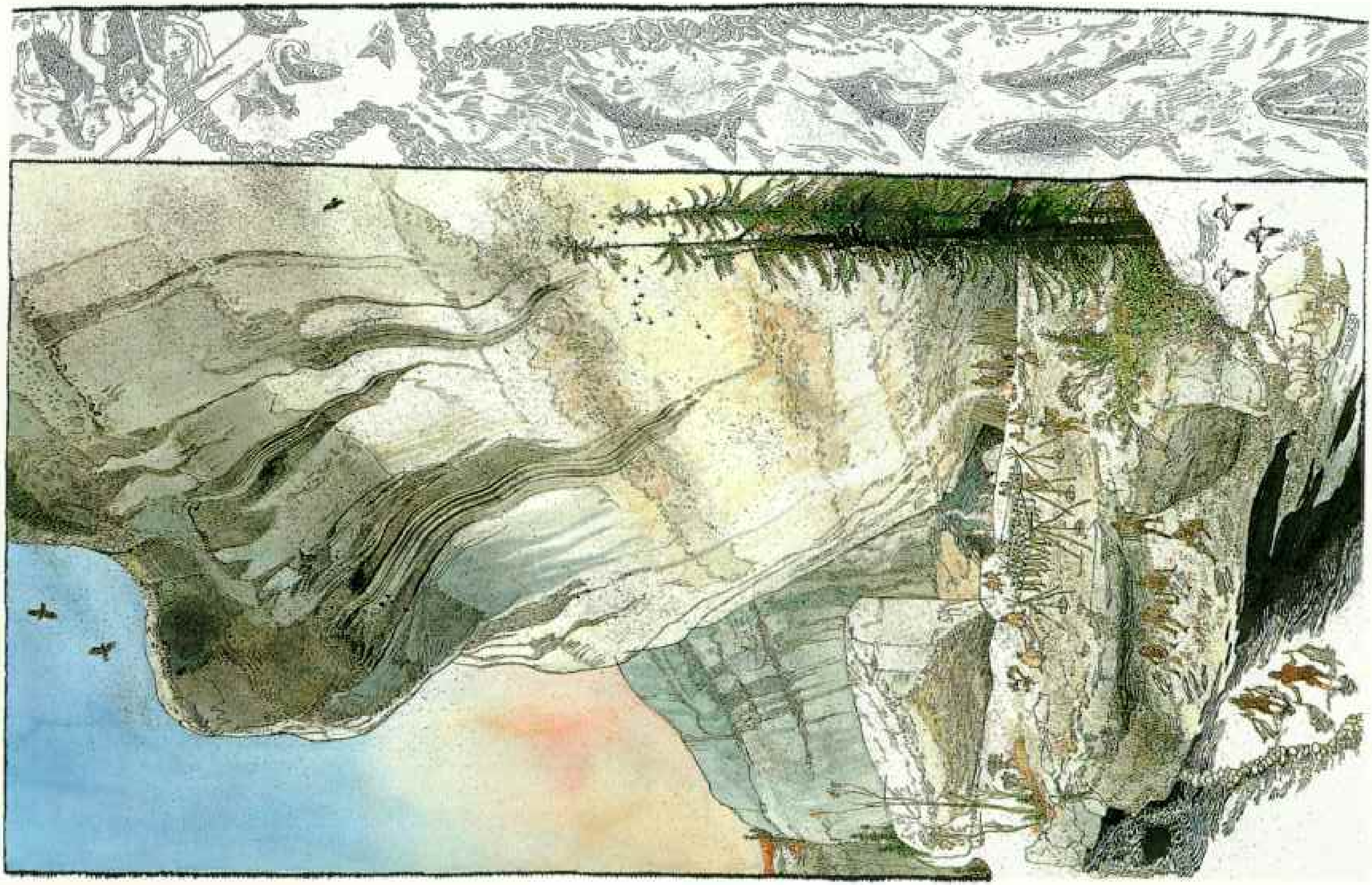
ARCHAEOLOGIST Graham Avery of the South African Museum in Cape Town held up a mandible and a piece of skull in their proper relationship. Other pieces of bone lay on the table. The Klasies River Mouth fossils were indeed, as one anthropologist had put it, "miserable fragments, no complete skull, bits and pieces."

Yet they were among the evidence that first suggested that modern humans were present in Africa about 100,000 years ago. Mr. Avery sought to explain the fragmented state of the bones, the large proportion of mandibles. They had been found in caves in a bluff overlooking the Indian Ocean on the southern tip of the continent. The remains were scattered within the deposits, and there was no evidence that the bodies had been formally buried.

"When a scavenger animal begins to eat another animal, including a human," Mr. Avery said, "it goes for the meaty parts. You have the brain, and the face is quite soft so they can chew that off quite easily. And the throat is of course a very nice soft place. So if the scavenger goes in from the throat and the back of the skull and leaves the nonmeaty bits, it is the mandibles and such that one might expect to find."

Although fragmented, the fossils indicated early modern man—the browridge is very limited in its pronouncement, the mandible has a kind of chin. They are believed to be between 70,000 and 100,000 years old, but the dating is indirect, not perfect.

Last year, however, came new evidence strengthening the idea



BAS-RELIEF, 42 CM, FROM LAUSSEL, FRANCE, AT MUSÉE D'AQUITAINE, BORDEAUX, FRANCE, BY SUSAN BRYNGERS

15,000-YEAR-OLD IVORY FIGURINES, ABOUT 9 CM, FROM MALTA, SIBERIA, AT THE HERMITAGE MUSEUM; BY DISSE BRINKERS

LIMESTONE VENUS OF WILLENDORF, 11 CM, AT NATURAL HISTORY MUSEUM, VIENNA, AUSTRIA; BY IRA BLOCK

OLDEST KNOWN BAKED CLAY FIGURINE, 25,000 YEARS, 11 CM, FROM DOLNÍ VĚSTONICE; AT MORAVIAN MUSEUM; BY IRA BLOCK

BROKEN CALCITE FIGURE, 9 CM, FROM SIRGOL, FRANCE, AT MUSÉE DES ANTIQUITÉS NATIONALES; BY DISSE BRINKERS

Sometimes called Venus figures and fertility symbols, the dozens of known female sculptures seem to portray several stages of womanhood—from pubescent, to pregnant, to aged. Usually featureless, they often display belts, jewelry, and suggestions of elaborate coiffures.

Distinct as cake layers, occupation levels excavated at Klasies River Mouth, South Africa, indicate that humans lived here from 120,000 to 60,000 years ago. The caves

ALL BY IRA BLOCK

overlook the sea, with fresh river water and quartzite deposits for toolmaking nearby. Excavators say fragments of modern human bones here are 70,000 to 100,000 years old, a claim disputed by others.

of an African origin for modern humans. Molecular biologists at the University of California, Berkeley, expert at unraveling the genetic codes found in human cells, applied their arcane skills to the puzzle of modern man.

They collected tissue specimens from the placentas of 147 women of different racial backgrounds. They concentrated their analysis on the DNA, or genetic code, of a part of the human cell called the mitochondrion, which is inherited only from the mother. It had proved useful in tracing family trees.

Comparing the genetic material, they found that it divided into two main groups, one of which consisted exclusively of African samples. That group contained the most variations, and the researchers concluded that it therefore represented the most ancient branch of the family tree. They deduced an African "Eve," the ancestor of every living person, who lived some 200,000 years ago. Her descendants, they theorized, carried her DNA to the rest of the world.

Then this year an Israeli-French team working in a small corner of Israel announced further evidence to diminish the role of the Neandertal. They had sought an answer to an old puzzle: Different caves there had yielded Neandertals and early modern humans. What was their relationship in time? Which came first? Did they cohabit?

The fossils were too old to be dated by radiocarbon analysis. The team used a technique called thermoluminescence. They took burnt flint from fireplaces from the same levels where the fossils of the modern humans had been found and measured the amount of light emitted when samples were gradually heated. This light represents the energy of electrons trapped inside since the flints were burned—probably they fell into the fire as someone sat by it, knapping tools. As the rate of electron trapping is known, the measurement of the light emitted provides the date of the burning.

Results showed that the early modern humans from Qafzeh cave dated back 92,000 years; a Neandertal from Kebara cave was a mere 60,000 years old. The team concluded that the two populations may have coexisted at one time and that a close phylogenetic relationship between them was therefore improbable. The Neandertals, they opined, "were a stock of European origin and arrived relatively late in southwest Asia."

As for the early modern specimens—do they represent an

Shellfish in unlimited supply, gathered at low tide, may have prompted settlement of the Klasies River Mouth caves. Remains of cooked brown mussels prove shellfish entered the human diet early. Then and now, turban shells (below) proved a tasty meal and were regularly collected, as were these excavated limpets and periwinkles (above). The chemical composition of turban shells from different occupation levels reflects fluctuations in ocean temperature, a clue to the changing environment. The caves have also yielded bones of elands and other antelopes, hippos, seals, and penguins.

At an ancient crossroads in the Middle East, Kebara cave—now overlooking an Israeli banana plantation—was home to robust humans known as Neandertals and later, by perhaps 30,000 years ago, to anatomically modern humans, the expected sequence. A Neandertal burial here has been recently dated to 60,000 years ago.

IRA BLOCK (ABOVE AND ABOVE RIGHT)

evolution in the Middle East? Or do they represent, as many are now coming to believe, descendants of that mitochondrial Eve, coming out of Africa on their way to replace all existing people and populate the world we know today? The evidence is weighty, cumulative; but not all scientists agree—not by a long shot.

IT WAS ONE of those great, melancholic stone buildings sitting wearily on Vienna's Ring Road, symbols of empire lost. Outside were fountains with fish and nymphs, shaped hedges, a monument to Maria Theresa. Inside the Natural History Museum was a great room, its walls lined with glass cabinets holding skulls. Hundreds of pairs of empty eye sockets seemed to stare down on the proceedings below. In one corner a Viennese scholar probed the effect of burning on bones; in another a Czech scientist worked on blood-typing techniques with ancient Nubian skulls, some with hair still attached, one blonde.

In the center of the room Dr. Milford Wolpoff of the University of Michigan sat hunched over a small sandbox; with toothpick-like struts and Duco cement, he was reassembling pieces of an early *Homo sapiens* skull. "I wonder if we shouldn't try it with a mandible. This looks so nice—see how nicely it comes together. Super!"

Wolpoff, a bearlike man, the son of a Chicago taxi driver, was studying early modern fossils from central European sites—the remains of those who came after Neandertals but before fully modern humans. In boxes around him lay the bones of some 15 individuals

discovered between 1881 and 1904 at Mladeč, in what is now Czechoslovakia. The fossils had been freshly cleaned, and Wolpoff wanted to reassemble as many complete skulls as possible. "They should tell us something about the origin of modern Europeans; they are the ancestors."

Dr. Wolpoff did not agree with those scientists who believe that there was a migration of modern humans out of Africa 100,000 years ago, nor that "those people were so superior to the indigenous populations elsewhere that they replaced them—bludgeoned them to death, wiped them out, or whatever. It goes against all historical evidence of migrations.

"Look," he said, "everybody knows that all humans alive today have a common origin. And everybody agrees that in some fundamental way that origin was in Africa. No doubt about this. Our closest relatives are chimpanzees. There's only a one or two percent genetic difference. We're more closely related to chimpanzees than any two frogs you see are probably related to each other.

"All the arguments boil down to *when* was that common origin? Was it when humans and chimpanzees diverged, about eight million years ago? When people left Africa a million or so years ago as *Homo erectus*? Or was it when modern *Homo sapiens* appeared?

"I'm one of many who conclude that modern humans originated in areas all over the world—after *Homo erectus* had populated that world and provided the basis for further evolution. And that, basically, modern Africans originated in Africa, modern Chinese in eastern Asia, modern Europeans in Europe. And this happened to some extent because all these populations were interconnected by a flow of genes. People were coming and going, exchanging wives, and so on. We think all humanity was interconnected this way. Everywhere you get bigger brains, smaller teeth, all the peculiarities of modern people. How does this happen if there's not an exchange of genes all through human evolution?"

As for the theory of a mitochondrial Eve, he thought it flawed. "You cannot ignore the male role in heredity. It is men who make invasions, kill the defenders, seize their property, take the women as wives or concubines."

In the skulls of the early modern Europeans he was studying, Wolpoff saw no signs of African morphology; he saw instead evidence pointing to a link with Neandertals. There was above all else the nose—"What a schnozzle," Dr. Wolpoff said. "We still see it in the Europeans of today."

The debate over the origin of modern humans was the sharpest in the anthropological arena; yet the resolution was not in hand. I had now to travel eastward to a far corner of the Old World, in search of those modern men who emigrated to new worlds.

Mimicking early food gatherers, Dr. Romana Unger-Hamilton harvests wild wheat, barley, and oats with a modern bone sickle similar to one found in Kebara cave (below), fitted with razor-sharp flint blades. She studies scratches made by the different grains to identify those on the original blades. Thus she can draw conclusions about the diet during the Natufian cultural stage, about 12,000 years ago, just before the domestication of plants and the spread of settled farming groups. Natufians were the last group to occupy Kebara cave for a long period.

SICKLE, 33 CM, AT ISRAEL DEPARTMENT OF ANTIQUITIES, JERUSALEM, BY SUSSE BRANDES

THE GOOD SHIP *Academician*, 21 meters, diesel powered, slipped out of Yakutsk and northward down the Lena. It's a great river, feeding into the Arctic Ocean, at places 20 kilometers wide with islands in the middle. On each side larch forests stretch to the horizon. Now and then a cargo vessel passed, or we passed a village perched on a bluff, like an old Mississippi River town.

The muscularity of Neandertals is clear in skeletal remains excavated at Krapina, Yugoslavia. A fingertip bone (top, at left, beside a present-day one) indicates a powerful grip. The density and thickness of a femur (middle, at left) is far greater than that of a modern weight lifter.

Some Neandertal incisors exhibit a shovel shape, a trait seen frequently in Homo erectus fossils from China.

"The most beautiful time," the captain said, "is spring; every sunrise is different. First come the cranes, then ducks, geese, swans, sea gulls, and also very small birds. You hear the honking of the geese, and you go out of the pilothouse to look." I thought of those wondrous Paleoarctic carvings in Leningrad's Hermitage Museum . . . birds with wings spread, as if frozen in flight.

I had come to Siberia to pick up the trail of man's journey from Asia to the Americas. Dr. Yuri Mochanov was an authority. He had 20 years earlier discovered on the Aldan, a tributary of the Lena, a rich Paleolithic site, Diuktai Cave. Excavating it, he found stone tools—leaf-shaped spearpoints and wedge-shaped cores—similar to those found in Alaska and western Canada. He had dated the culture at 35,000 to 10,000 years ago.

I was in for a surprise. We reached Dr. Mochanov's new excavation the next day, and he came aboard with his archaeologist wife, Svetlana. They were a handsome couple and promptly led me atop a cliff where a bulldozer and students were at work.

"We were exploring a burial here and found some tools," Dr. Mochanov said. "Such tools were found only in Africa and are comparable to the Olduvai culture of two million years ago. We have 2,000 stones processed by man. Anvils, hammers, choppers. I think this is the very beginning of the story of man.

"Me and Svetlana, it was as if we had been punched. People were shocked—that maybe the cradle of humanity was not under an African sun, but under the polar lights."

He reflected: "You see, I had been working in Siberia for about 30 years. I thought that we knew just about everything, that we should only find some new details and retire. And now you see, we should start everything just from the beginning. And we became younger, you see. . . ."

The *Academician* turned south, and we were again surrounded by forest. I felt regret that Dr. Mochanov had abandoned his earlier work on Paleolithic man to pursue a line that most anthropologists thought incorrect. I took consolation in the thought that his work would be productive in one way or another, and that I had after all touched a way-stop on man's route to the Americas. For not only archaeological but also dental evidence indicates that a people passed through the Lena basin during one of the great migrations to the New World. It was time to go to the probable source of that migration, to northern China.

THE BUILDING in Beijing was braced with scaffolding against old earthquake damage; outside were ranks of black bicycles and young staffers playing badminton. Inside the Institute of Vertebrate Paleontology and Paleoanthropology of the Chinese Academy of Sciences, Dr. Wu Xinzhi sat in a small office with papers, books, skulls. He is a short, slight man with a gentle manner.

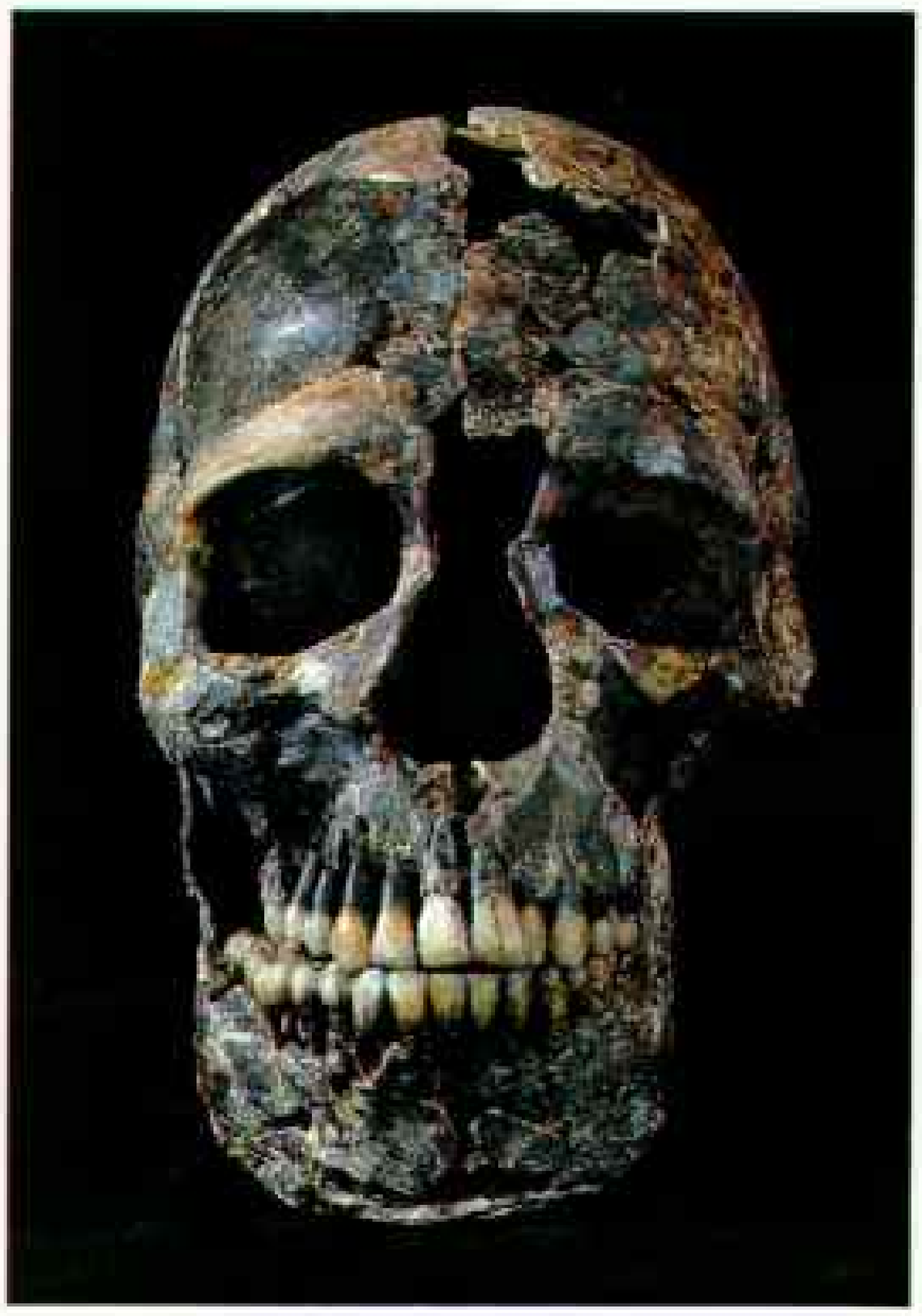
We looked at Chinese fossils, among them one named Maba, a skullcap at least 120,000 years old, beautiful in its way, like ivory, with black spots from iron or manganese leaching while in the earth. There was an elegance and lightness to this skull.

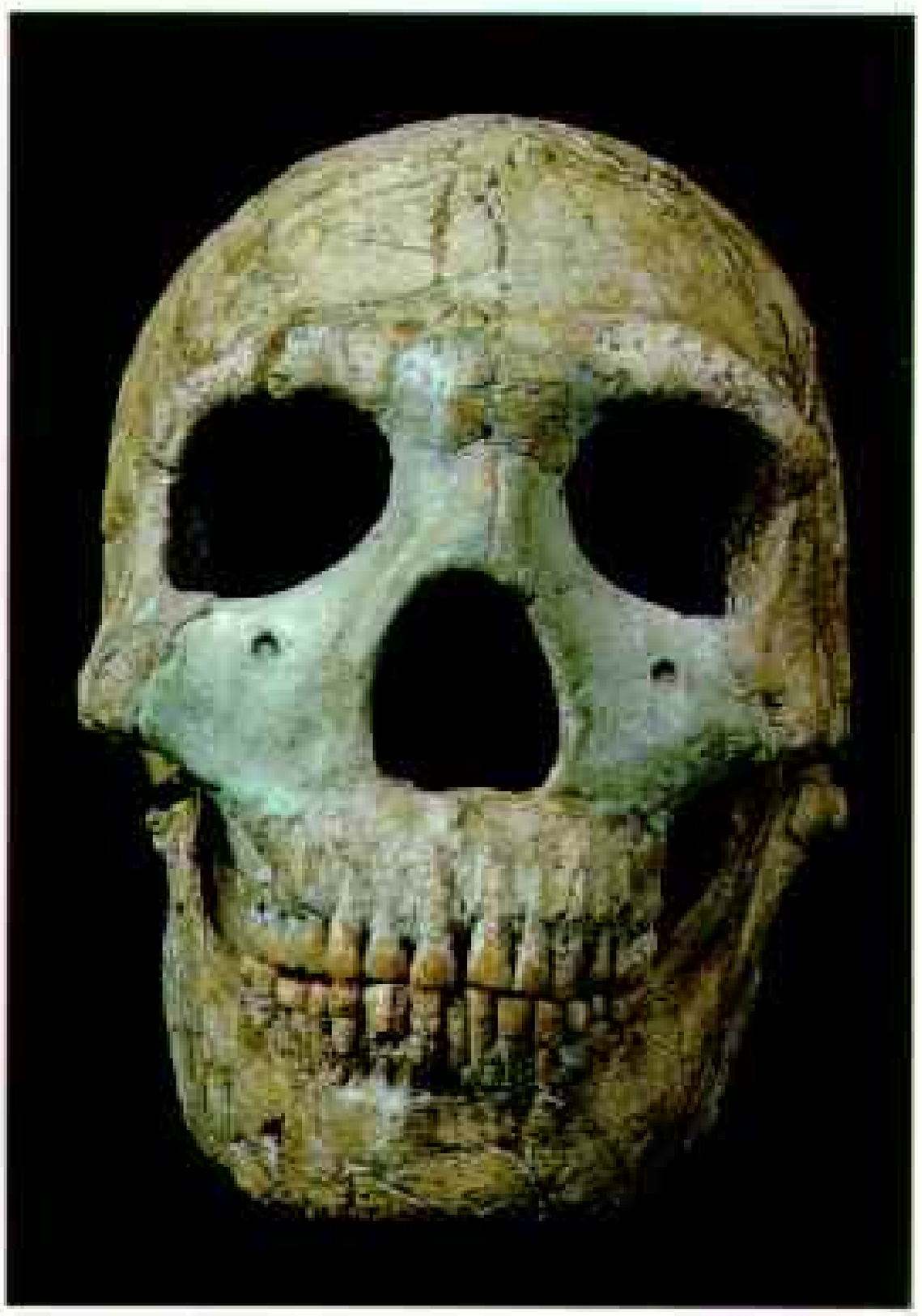
The early Chinese fossils—such as Peking man, from the nearby site of Zhoukoudian—represent *Homo erectus*. I asked Dr. Wu the history of man in China. "Before *Homo erectus*, nothing yet. As for

the origin of *Homo erectus* in China, we cannot say firmly. There is insufficient information. Maybe he came from Java, maybe Africa, maybe a native ancestor. Maybe human beings originated in Africa and then passed through western Asia and divided into two branches. One migrated southward to Java, another eastward to southern China, then northward to Zhoukoudian. A reasonable hypothesis."

Dr. Wu is among those who believe that modern man originated not in one place, but several. "We have many types of *Homo erectus* all over the world, and all have fundamentally the same basis for evolving into modern *Homo sapiens*. So the appearance of modern man could occur in several places."

We touched now on the question of regional differences, or race.





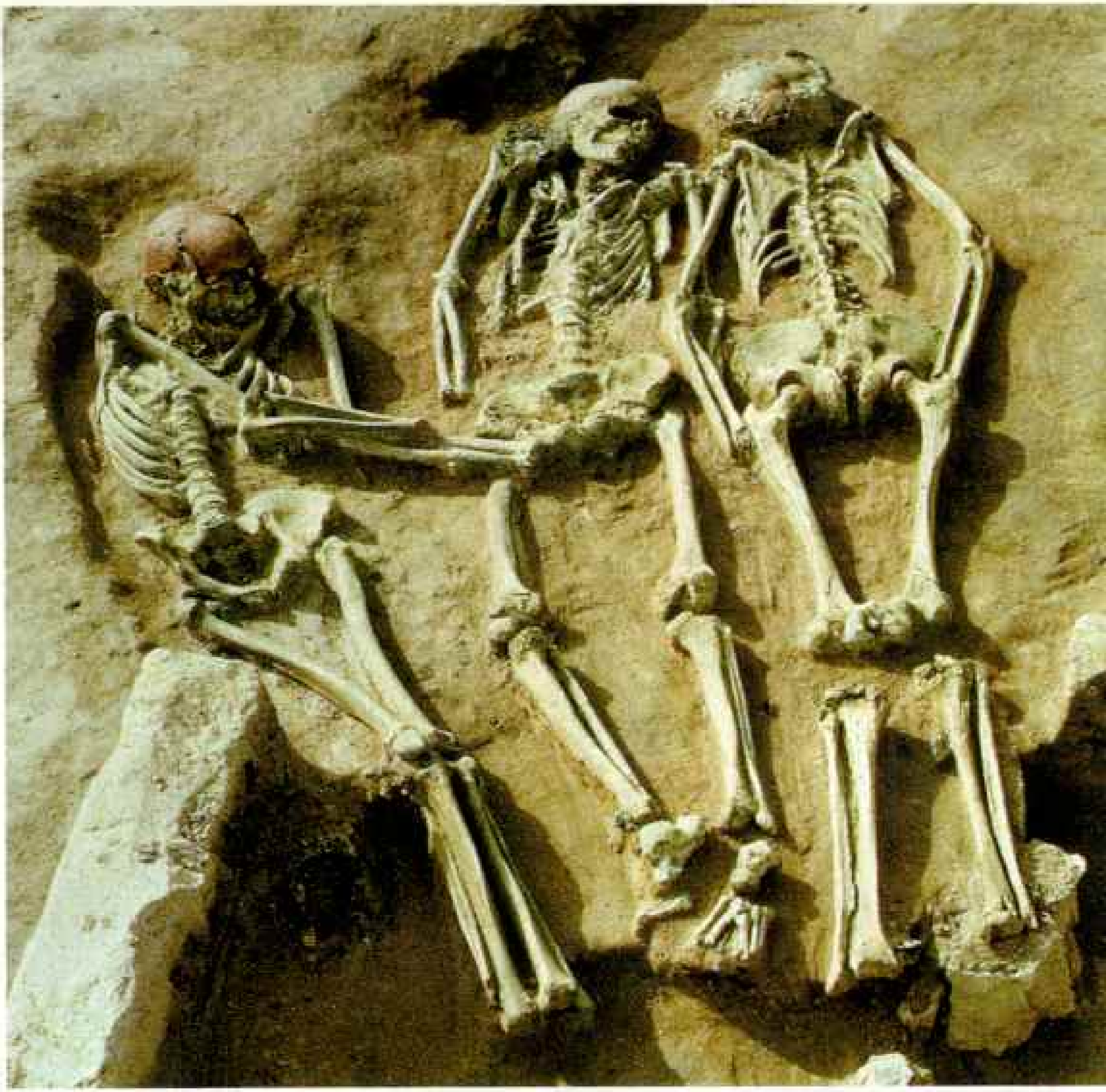
Where did anatomically modern humans originate and how do they relate to the Neandertals? A dating technique called thermoluminescence has recently added to the puzzle, suggesting an age of 92,000 years for Qafzeh 9, a skull (left) from Qafzeh, Israel, one of the oldest modern humans yet found. The Neandertal (right) from nearby Wadi Amud, probably more than 20,000 years younger, exhibits a pronounced browridge, sloping forehead, and broader face (reconstructed). Yet the two used the same type of tools. Neandertals disappeared by 30,000 years ago, and the humans remaining adapted to ever changing environments by accelerated cultural innovation, rather than slower biological evolution.

ALL BY IRA BLOCK

"These differences," Dr. Wu said, "were caused mainly by the different circumstances, the environment.

"In *Homo erectus* in China you have already a clear Chinese type of person. All through our fossil record you have these common features. Mainly the flatness of the face, especially of the upper part and of the nasal saddle. And also the morphology of the area at the junction between the cheekbone and the maxillary bone. And the shovel-shaped incisor. The shovel-shaped incisor has a very ancient history but was retained in China in high frequency—nowadays you still find it."

That tooth appears in every Native American population and links their origin to north China. But China also supplied immigrants to another continent, Dr. Wu said. That involved man's first great maritime migration.



An extraordinary multiple burial emerged in August 1986 at Dolní Věstonice. In a pit grave near hearths carbon-dated back to about 26,000 years ago lay an individual of undetermined sex, center, who had spinal scoliosis, an asymmetrical skull, and an underdeveloped right leg. A male on the left, a stake apparently driven into his hip, reaches toward red ocher on the ground; a larger male lies face down. The male skulls were adorned with circles of arctic fox and wolf teeth and ivory beads.

BOHUSLAV KLIMA

THE HELICOPTER flew west from Hobart, across forested mountains, then picked up the tannin-dark Franklin River. We set down in a swamp, unloaded a rubber boat, backpacked it to the river. I was beginning my Australia visit in Tasmania because here had probably dwelled the southernmost inhabitants of the Paleolithic age. Don Ranson, state park service archaeologist, guided the boat to a bluff, led me up to a cave.

"Two hundred meters of passages, eight entrances," he said. "It was bones and stones and the charcoal from cooking hearths all over. We collected some material right off the top. The dates go from 19,800 to 14,800 years ago.

"The remains were about 90 percent wallaby; 8 percent wombat. Tools included large scrapers made from quartzite boulders from the river and small scrapers of Darwin glass—almost like an obsidian. It was formed when a meteorite hit about 730,000 years ago. The friction of it hitting made the earth go into glass, and it spread the glass out in a big splatter.

"We think this was a summer hunting camp, maybe for 20 people, hunting the local area out like a local supermarket, then moving on to another of the caves in the area. They came again and again, for 5,000 years.

"This would have been heath fields basically, with the odd tree. Glaciers on top of the mountains. The ice caps of the Antarctic just a thousand kilometers away, icebergs floating up.

"About 14,000 years ago, as the earth warmed, the rain forest came up," Don continued. "It pushed away the wallabies, the wombats, the possums, and so the people had to follow their food. They never returned. This site was vacant, if you like, for 14,000 years until we returned in the early 1980s."

That same warming trend brought a rise in sea levels. The Bass Strait formed, separating Tasmania from mainland Australia. "They lacked the maritime technology to join up again. You have here the longest period of human isolation in history.

"So that 350 years ago when Europeans first landed in Tasmania, they were in a way landing on a Paleolithic shore."

The people the whites found used four-meter-long wooden spears, the points sharpened, then fire hardened; *waddies*, or digging sticks, pointed at one end, also used for fighting; and stones, with which they could bring down birds in flight.

"From studies in northern Australia we think that they had an acute sense of direction, a different understanding of spatial relationships. They had many names for colors that were important to them, the colors of the earth—browns, reds, yellows.

"They had six or eight seasons, and different names for different types of winds, and many names for many types of weather."

But those first white settlers had little appreciation of Aboriginal skills. "The Aborigines here," Don said, "were almost totally destroyed by whites. Shot, raped, given poisoned flour. Not to mention the introduction of European diseases—smallpox, measles, influenza—against which they had no immunities. The last 150 or so were incarcerated on Flinders Island. The first concentration camp, I suppose." Tasmania's Aborigines barely survived. "Now about 6,000, racially mixed," Don said. "Many are fishermen."

HOW AND WHEN did humans reach Australia? For the answer I turned to Dr. Alan Thorne of the Australian National University in Canberra. "The first settlers," he said, "came at least 50,000 years ago. We know this because we have sites in the south well dated at 40,000 years ago, and it would have taken some time for people who landed in the north to reach the south."

They came, Dr. Thorne believes, in bamboo rafts from Indonesia and also from southern China. The sea level then was low: Australia was joined not only with Tasmania but with New Guinea. The islands of Indonesia were larger, closer.

"But no matter how low the sea level then, there were a number of water gaps, the largest perhaps 150 kilometers across," Dr. Thorne says. "I think what happened is that in this area at least 100,000 years ago people started messing around with the sea for the first time. They started to lash rafts together, probably on rivers, then estuaries, then maybe they started going up the coast a bit.

"The obvious material to use is bamboo: It's light, doesn't rot, is

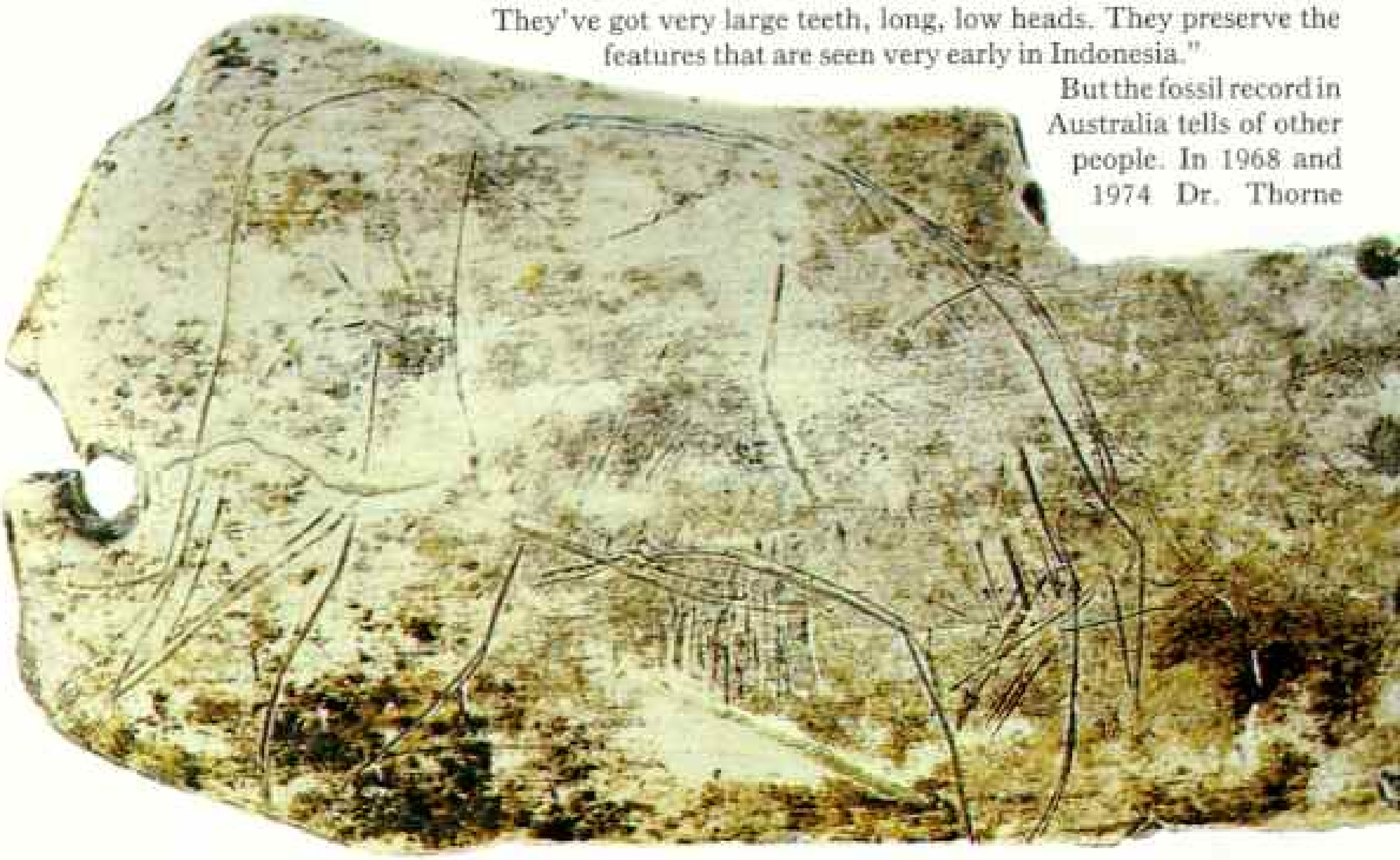
Carved body of a man—his arms bearing striations—was excavated in a 32,000-year-old level in a cave at Hohlenstein, West Germany. Years after the discovery museum officials were presented with an ivory lion muzzle found in the cave. It was a perfect fit. The world's earliest known anthropomorphic figure pushes back in time evidence of the human ability to create symbols; this may be an attempt to capture the animal's power.

29 CM. AT MUSEUM DER STADT ULM, WEST GERMANY. BY ALEXANDER MARSHACK

an inexhaustible resource in Southeast Asia. You can even carry water in bamboo. Take a section, cut holes in it, plug it, and you've got a bottle. I don't know about sails and masts, but the first person to stand up in a raft with the wind at his back made a sail."

The first people to reach Australia were probably from Indonesia. "Most anthropologists recognize the physical link between native Australians and ancestors in Southeast Asia, especially Java man," Dr. Thorne said. That worthy *Homo erectus* arrived in Java about a million years ago. Dozens of specimens have been found; they show, through the millennia, remarkably little change in morphology. "We don't know why, perhaps because change is slower in the tropics.

"Modern Aborigines, compared with people around the world, have big browridges, big faces; and these faces project forward. They've got very large teeth, long, low heads. They preserve the features that are seen very early in Indonesia."



But the fossil record in Australia tells of other people. In 1968 and 1974 Dr. Thorne found at Lake Mungo in New South Wales skeletons, some 30,000 years old, that are remarkably different from the Java types.

"They are gracile, modern looking." Dr. Thorne believes they came from China. "While *Homo erectus* in Java remained little changed, in China he showed a lot of change. And the voyage would have been no more difficult."

I had looked into the face of one of those gracile skulls, labeled Mungo One. A woman, she had been cremated, then smashed up, then thrown again into the fire. The scores of pieces, variously colored by the fire, had been painstakingly reassembled.

This type of burial persisted into historical times. Aboriginal people were known to put a body in a tree until the flesh rotted off, then to bury or burn the bones, sometimes smashing them first.

The remains of 75 individuals recovered at Mungo were now locked tight in a cupboard at the National University.

The study of fossils had virtually ceased in Australia. The

Aborigines were reclaiming their own: A red, black, and yellow Aboriginal flag had been draped in the Franklin River cave; the skeleton collections of the Victoria Museum in Melbourne now lay behind locked doors; a vault was to be built at Lake Mungo to house the fossils from there. While Aborigines debated whether white men could handle the bones of their ancestors, science waited.

I WENT TO SEE one of those Aboriginal leaders. Mary Pappin lives in a house on the edge of Balranald, near Lake Mungo. She was small, dark, with a round face, brown eyes. Five of her seven children were away at the town swimming pool. She was a Mutti Mutti. "It was a big tribe. They were stately marauders of the night. There's a marriage tree here where they used to make marriages, a birth tree where the women went to give birth, a place by the river where they trapped fish; my mother told me these things, she showed me."

But the Mutti Mutti tribe had been scattered: There had been massacres by whites, children had been sent away by the government, people went to other towns to work. There were only about 50 Aborigines in Balranald now, only one with a regular job. The others, like Mary, were on the dole.

Mary had eight years of schooling, remembered that time well. "I had to be shiny to go. If we weren't shiny, we were dirty, and we were sent away.

"I was frightened of the white man; the fear was sort of passed down from my mother, my father, my grandfather. Frightened to speak to them, just frightened. Even now I find it hard to mix with white people."

But Mary Pappin had always worked for her people. She was secretary of the local Aboriginal land council, a spokesman for the Mutti Mutti. She was now trying to get a "keeping place" to collect and display Aboriginal artifacts. Unlike many Aboriginal spokesmen, she wanted fossil research to continue. "We should know as much as possible about our ancestors.

"It hurts to think that we survived for 40,000 years and in 200 years nearly all died out. And the culture that we lost is heartbreaking." She had lost her Dreamtime, or creation story. "I haven't got it. It would put me in with the rivers, the trees, the land. Here I am an Aboriginal person, and I've lost my Dreaming." She had only fragments: "I think from my mother, something about a snake, something about a tree." Her family is now Catholic.

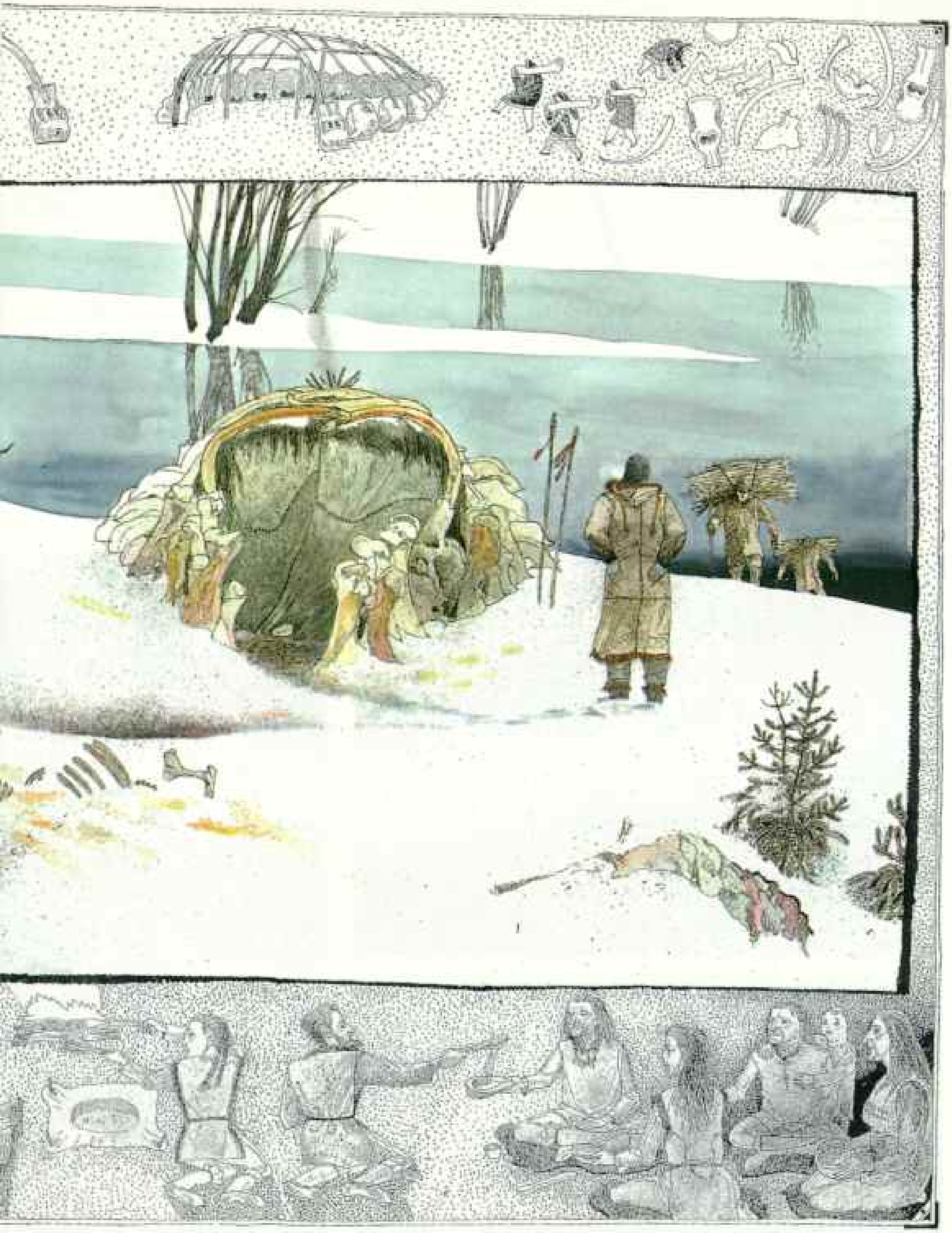
Mary mused: She had long been frightened at night. "I remember my grandfather telling us children, 'Go to bed now—the spirit is watching.' I always knew there was a spirit up there, and my ancestors knew about the spirit—it's just that somewhere along the way I learned that Jesus might have been a white man. Of course, Jesus loved all people whether they were black, white, or yellow."

That nighttime fear persisted; she often slept with the light on.

A mammoth etched on mammoth ivory may have been strung as a pendant or buckle, held by sinew through the hole at left. The engraver at Malta in Siberia had observed his subject well; discovery of frozen mammoths in modern times confirms its sloping hindquarters, long tusks, and shaggy coat. As glaciers advanced, the great five-ton pachyderms sought grassy meadows—the so-called mammoth steppe—across Eurasia, south as far as Spain and east across the land bridge to North America. About 10,000 years ago, as the climate warmed, increased rainfall, heavier snow cover, and boggy tundra intruded on mammoth habitat and probably speeded its extinction.

9 CM. AT HERMITAGE MUSEUM, BY SUSE BRINKERS

The most unusual architectural creations of the Ice Age—mammoth-bone shelters—have been discovered in more than a dozen excavations on the East European Plain. About 15,000 years ago humans foraged for the bones of dead animals; probably they also speared living beasts. Often mammoth skulls formed part of the foundation for the tusk, long bone, and wooden frame, covered



with hide. As many as 95 mammoth mandibles were arranged around the outside in a herringbone pattern. Ten men and women could have constructed this elaborate shelter of 24 square meters (258 square feet) in six days, using 21,000 kilograms (46,000 pounds) of bone. Before cooking pots, people made a nourishing fatty brew by boiling bone fragments with hot rocks in a pit probably lined with hide.

"It's maybe an instinct because our tribe went out and attacked at night, and I get the feeling that perhaps we'll be attacked too."

Mary's memories had linked me with the past, a way of looking at the world that has largely vanished. But there was another window on the Aboriginal soul.

THE HELICOPTER scudded across a sea of grass and trees, then climbed over the great sandstone escarpment. Its fortress-like walls were gray, layered, fractured, like scores of Indian stupas crushed together. Inside lay gorges, rivers, waterfalls, and a collection of art to rival that of prehistoric France. Here in Arnhem Land in northern Australia thousands of rock paintings—singly or in great jumbles—record thousands of years of the Aboriginal past.

My companion was George Chaloupka, who has spent 30 years discovering, cataloging, and classifying the art. The helicopter landed on ridge after ridge; we clambered up or down to the sites. Once a black wallaroo appeared as suddenly as a ghost, vanished as quickly. Another time we paused to watch two rare grasshoppers—bright orange, blue, yellow, rocking gently, mating.

Migratory water birds in flight, carved in ivory (below), were prominent images at Malta. One highly abstract rendition, a pendant, was part of a bead necklace (bottom) in a child's burial. Birds were not the primary food source for Siberian hunters, who relied mainly on mammals. Were the bird images, as Ice Age experts suggest, indicators of the arrival of spring and new life? Do they evoke further layers of meaning by their placement with the dead?

I was stunned by the abundance of subjects: There were kangaroos, crocodiles, barramundi, emus, the Tasmanian tiger, the rainbow snake—still a feature of Aboriginal rituals. There were spirit figures, yam-shaped figures, "X-ray" figures that showed the animal's spine and inner organs. There were warriors with elaborate headdresses, pubic fringes, fighting picks, boomerangs, spears and spear-throwers. And there were hands—outlined or printed, like those I had seen far away in the Pyrenees.

George had classified and dated the paintings according to style and subject: Some animals had vanished when the sea rose and separated Australia from New Guinea; new ones had come when the sea continued to rise and gave the area an estuarine character. George believed the paintings dated from 20,000 to 16 years ago. Other experts think the oldest to be 10,000 years old.

"There's no technical way to date them," George said, "because the artists didn't use any organic material in either the pigment or the fixative." But those mineral-base pigments had endured; they had penetrated into the matrix of the rock; then silica skins had formed over them, bonding them to the rock.

However old, there was in all the art a startling clarity, vigor,

From scattered mammoth bones, including a broken mandible (below, at far left), excavators at Kostenki along the Don River in the U.S.S.R. reconstruct the appearance of shelters built some 23,000 years ago. A wealth of ornaments, tools, and animal remains point to a complex life-style and plentiful game exploited by hunters who had adapted to the cold of windswept steppes and were not constantly on the move seeking food. Last year a mammoth-bone dwelling was excavated at Milovice, Czechoslovakia, the westernmost discovered so far.

BIRD CARVINGS, 9-12 CM., AND NECKLACE AT HERMITAGE MUSEUM, BY OLGA SOSNOVA; IRA BLOCH (ABOVE)

A stone spearpoint still comes in handy in Australia when an Aborigine runs out of costly ammunition for his rifle. The hunter hafts a flaked quartzite point to a wooden shaft with a waxed string. He may launch the weapon with a spear-thrower after sighting an emu, kangaroo, or wallaby in Arnhem Land, Northern Territory.

freshness, as if done yesterday by a people whose culture was at its height. At one site, crowded with images, George pointed to a stick-like figure. "A favorite of mine," he said. "A woman, standing upright, breasts high and out, digging stick in hand, a proud woman." She was indeed a striking figure, and my mind went back to Mary Pappin. The passage of centuries had taken much from the Aborigines, but not all. In her little house in Balranald, with the light burning at night, Mary Pappin remained not only a proud woman but a brave one too.

THE SMALL PLANE banked, and there below, locked in the ice of the Bering Strait, lay two islands, Big Diomede and Little Diomede. Only four kilometers apart, the first is Soviet territory, the second U. S. On the Soviet island you can make out a tiny guard post or two. On the American there is an Eskimo village of some 150 people, its little houses stair-stepping up the rocky hillside. It is possible that when humans first crossed from the Old World to the New, they came this way, where Asia and North America are closest, only 85 kilometers apart.

As the plane landed on the ice airstrip, I could see great walrus-skin hunting boats and polar bear skins drying in the wind. We were in hunter-gatherer territory—a physical setting and a way of life evoking the Ice Age of long ago.

Scientists debate when man first reached the New World, but perhaps most would accept a date of slightly more than 12,000 years ago. Soviet archaeological evidence indicates that by 14,000 years ago people in Siberia were within striking distance of North America. And that era marks the end of a very dry and cold period. If the 12,000-year date is correct, the land bridge linking Asia and North America—stretching a thousand kilometers or more north to south, filled with thaw lakes and game—would have been broken by a little strait, maybe 20 kilometers wide. It could have been traversed on foot when frozen.

Some scientists believe the immigrants came in three waves. Two moved inland, the ancestors of the Indians. A third wave, including Eskimos and Aleuts, rimmed the coast. The Eskimos, in their isolated villages, offer insights into the everyday life of their Paleolithic forebears.

Little Diomede had, of course, seen many recent changes. There was a fine new school on the island, a store, electricity, a new pump house for water, satellite television, one phone. The village council was now negotiating to put a telephone in every house and for a new multichannel cable TV system. But the past endured.

I visited Moses Milligrock, 65, a noted carver. He was slicing a walrus tusk with a hacksaw. "This part will be used to make four little boats. This will be two men." He said that all the men carve ivory in winter and that the practice went far back into the past.

"They have dug up here little ivory charms or dolls, maybe a thousand years old. They maybe were used for good luck or medicine. They looked like this." He sketched a simple figure in a parka, remindful of figures I had seen in the Paleoarctic collections in Leningrad.

Moses had boyhood memories of shamanism. "There was a man who sang and beat the drum and put a long knife through his body and pulled it out again, and he was unhurt. There was a man with a bowl, and he put water in it and you could see all over, like it was a radar. Lots of people lost in those days—and the witchcraft people saw in the bowl where the people were lost."

Such memories would not endure another generation, but there was another force from the past. I stopped one day at the little green house by the village store, where dwell two Little Sisters of Jesus. Sister Damiene is from France, Sister Nobuko from Japan. The order requires its members to live among and share the lives of the people they serve. It is a quiet and gentle presence. Sister Damiene said they had learned much in their years in the village.

They had learned to gather salmonberries, sour dock greens, Eskimo potatoes. They had learned too from the Eskimo women that if they disturbed the moss while searching for roots, they must put it back, close the hole, for life is fragile here.

They had learned that when the sun, in its annual peregrination, began to set just over the middle of Big Diomede, it was time for the birds to come. "Thousands and thousands and thousands of them—like a big cloud. The men catch them with nets, store them in the meat hole.

"Now the men wait for the beluga, the white whale. And there is the gray whale sometimes. And soon now the walrus comes. The men drag the boats south or north to open water, then take off for the ice floes where the walruses are. For maybe three weeks, the big hunting. Everybody busy, the women taking care of the meat."

How long, I wondered, would such a life continue? "The hunting will keep going," Sister Damiene said. "The young ones love it. They don't like to leave here, they want to stay. Because they know that here they are still master—in this little village they can still live the Eskimo way."

Engraved crocodile-like beast was created by spirits and used to work magic —thus an Aborigine related its origin to an anthropologist in the 1940s. Its date of execution is unknown, but it resembles rock engravings dating from more than 30,000 years ago. The 1.5-meter-long piece was found at Panaramittee, South Australia.

AT SOUTH AUSTRALIAN MUSEUM, ADELAIDE (ABOVE); BOTH BY IRA BLOCK

AS THE PLANE lifted from Little Diomede and my journey approached its end, I thought of the beginning, that dark cave in France, and of all I had seen since; and of how often I had seemed almost within touching distance of our prehistoric ancestors, only to sense them sliding away like chimeras, behind a veil of time. My mind came to rest on a conversation I had had with Professor Phillip Tobias of the University of the Witwatersrand in Johannesburg months before. It had been a sunny day: The results of final exams had been posted in the medical school, while across the street at the Sunnyside Park Hotel waiters were setting up tables under the trees for the graduating class party.

Professor Tobias had gone into medicine and human genetics because of his sister's death. "I was in high school. She had juvenile

A polar bear comes in from the cold after being butchered on the ice by Ron Ozenna. Like other Alaska Eskimos, he integrates the practices of early hunter-gatherers with 20th-century technology; he makes his kill with a rifle and carries it home by snowmobile. The Ozennas live on Little Diomede Island (above) in the Bering Strait. At left rises Big Diomede, U.S.S.R.; the larger island houses Soviet weather and listening stations. Eighteen thousand years ago these islands were exposed volcanic mountains on the land bridge used by successive waves of animals—and eventually humans—that walked east to populate North America.

BOTH BY IRA BLOCK

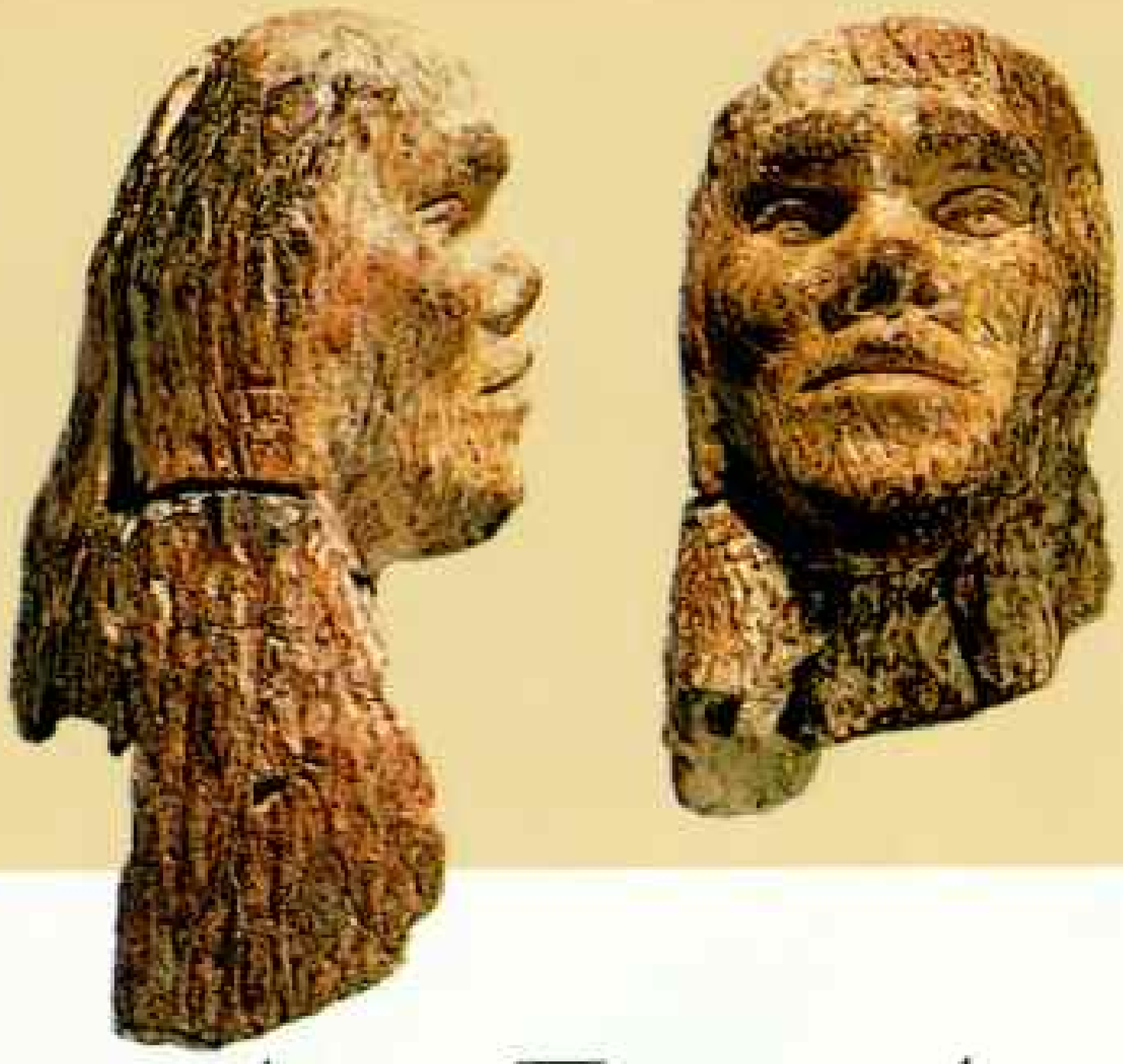
diabetes, which is inherited. I asked: 'How could it happen? Why did it happen?' " Later, as a physical anthropologist, he had been called on to describe fossils found in South Africa, and then by the Leakeys in East Africa. "For 20 years I devoted most of my research energies to describing all of the Leakey fossils from Olduvai. One after another as they came out of the ground, Louis or Mary would cable me down here—'Come quickly, extraordinary find, don't tell a soul.' "

From a lifetime of handling hominid fossils, he had a view about man's future: "We've hardly shown any anatomical changes in our bodies for 100,000 years. And I don't think we're suddenly going to start again showing anatomical change. I believe what has happened is that our physical and anatomical evolution has become less and less significant, whilst our cultural, behavioral, linguistic, and spiritual evolution has become more and more important."

He had offered one more thought: "I suppose there is no stronger argument against racism and in favor of the brotherhood of man than the evidence that we all come from one African ancestor, whether it is ancient *Australopithecus* or, possibly, the not so ancient proposed Eve. Whoever it was wasn't just the ancestor of African man, or just this man, or the other, but of us all."

The brotherhood of man? I looked out the plane window, at the frozen landscape stretching northward to the Pole, and whispered a belated "Amen." □

FIRST VIEWS—one appearing on our cover—of an eight-centimeter male head carved of mammoth ivory, recently dated at about 26,000 years, show exquisite detail. When the author, an Ice Age art expert, glued the lock of hair in place, he realized it curved inward. He speculates that the hair partly encircled the end of a staff, which may have been secured by resin.



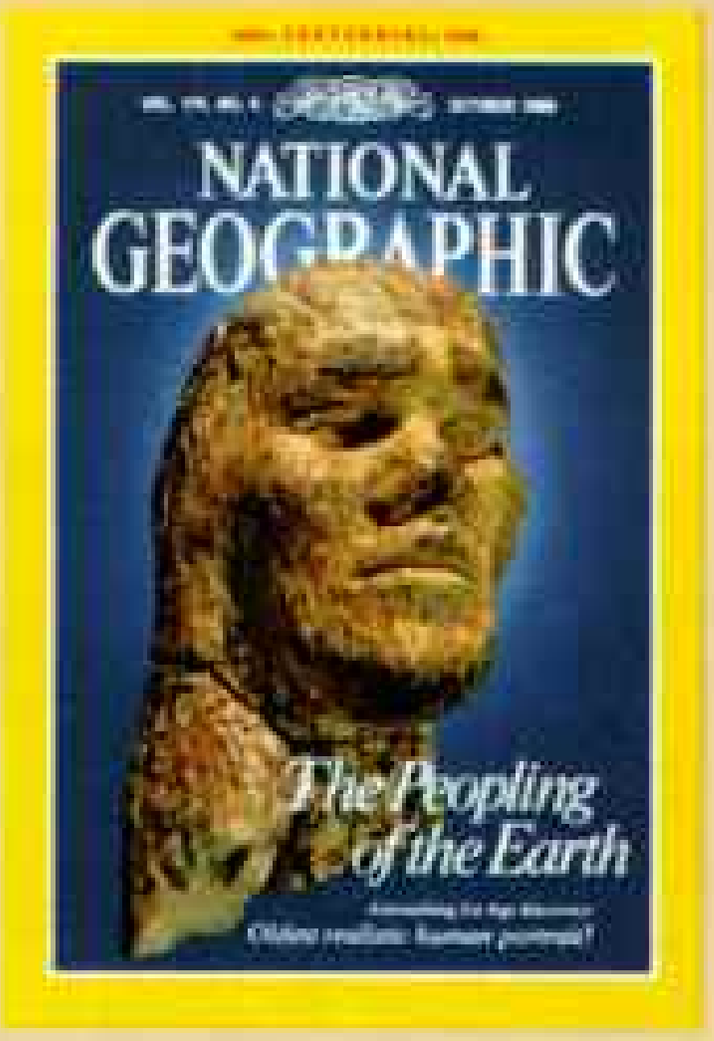
An Ice Age

3 CM, PHOTOGRAPHED AT THE MORAVIAN MUSEUM, BRNO, CZECHOSLOVAKIA (ABOVE); IRA BLOCK (FAR RIGHT); ALL OTHERS BY ALEXANDER MARSHACK

I OPENED the small battered candy carton with misgivings. Inside lay two pieces of ancient ivory, wrapped in gauze. I unwrapped the larger piece and came face-to-face with an extraordinarily powerful male head with staring eyes, pinpoint holes in the irises, heavy brows, a strong upturned nose, a beard, and long deeply incised hair. The smaller piece was a lock of longer hair. If the carving was from the Ice Age, it was too good to be true. Nothing of this realism or power had ever been found from that distant era.

A Czech family living in Australia, who prefer anonymity, had brought the carving to New York for me to study. I had been recommended because I knew firsthand the Ice Age carvings in almost all the museums and collections in Europe, including those from Czechoslovakia. This bust, I was told, was discovered in the 1890s in a field near Dolní Věstonice, a village in which archaeologists, beginning in the 1920s, had found Ice Age works of art; excavation continues there today, directed by Dr. Bohuslav Klima (right, conferring with the author, seated, in Dolní Věstonice). Expecting to find evidence that the head was a fake, I agreed to examine it under the microscope.

What I saw presented an intriguing series of puzzles and raised so many questions about the object's possible validity that further study was required. I began a search that would take me from my microscope to specialists at the Peabody Museum of Harvard University and at the British Museum, to Czechoslovakia, and finally to a high-tech nuclear-dating laboratory in Kansas. The investigation unfolded like a detective story, step-by-step, with no one bit of evidence proving beyond doubt that the head was



Ancestor?

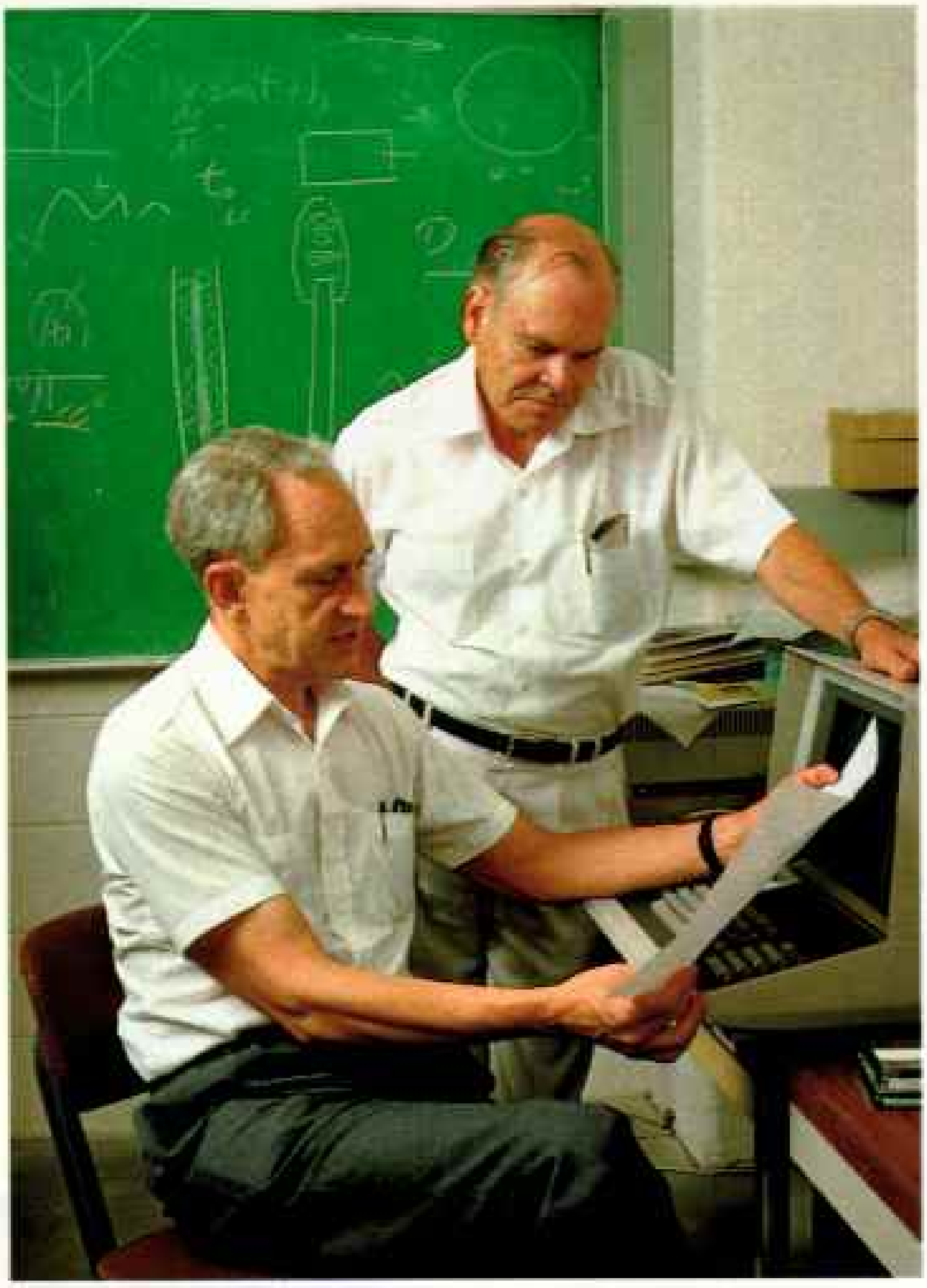
By ALEXANDER MARSHACK

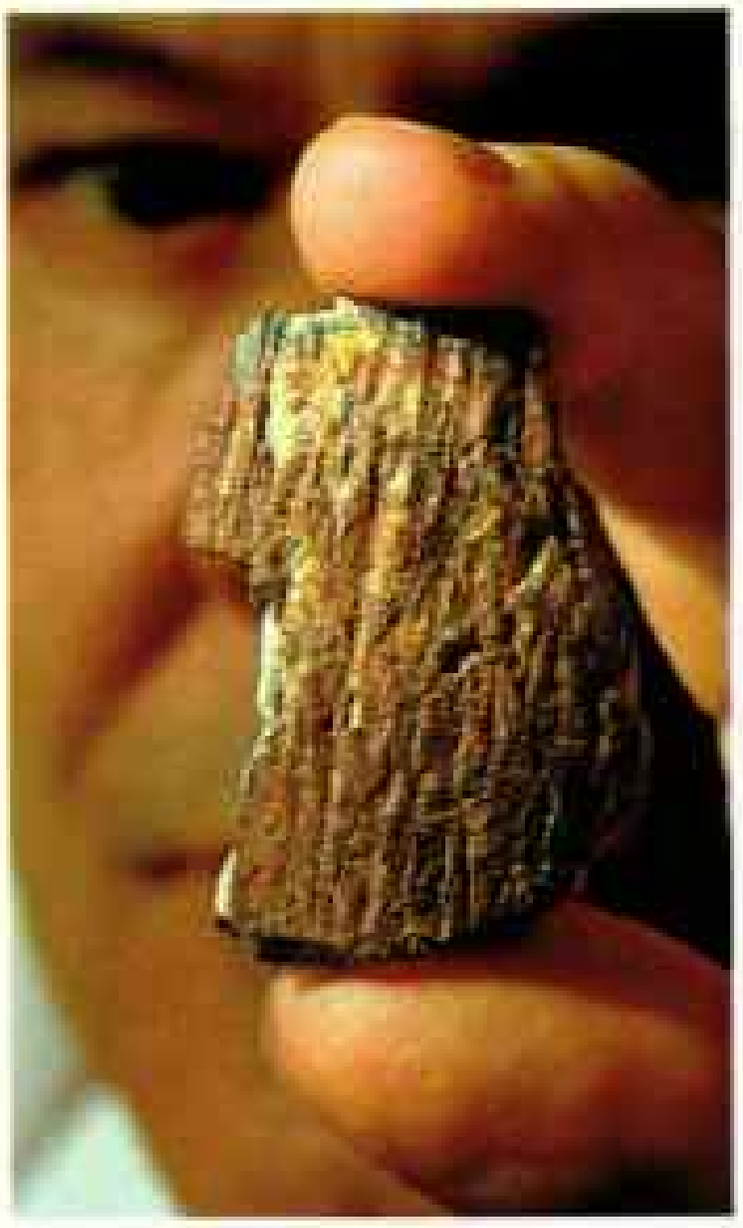
Photographs by the author and IRA BLOCK

real or fake. If the head was valid, it would be one of the most important objects from the Ice Age: a realistic carved portrait of an Upper Paleolithic hunter of mammoths, bison, and reindeer.

The only other human head from the Ice Age that had eye sockets, eyeballs, and lids was the realistically carved female with a bun (left) excavated in a 26,000-year level at Dolní Věstonice. Pieces of the ivory lamellae—like layers of an onion—had flaked off, leaving an uneven surface and an unfinished look. Later I reexamined this head in Czechoslovakia. I cleaned it and found incised nostrils, a detail not noted before, that resembled the style of the male head. Were these accidental similarities or aspects of a regional Ice Age style?

My initial microscopic analysis indicated that the male head had been broken in several places, glued together, and covered with a protective coating. I was told by the owners that the piece had been dipped in horse glue, once a common method of preserving bone. The ivory had apparently been shaped with flint tools. Many grooves were striated and changed configuration as the line curved. A steel blade would not make these patterns. Some strokes were overlaid





with encrustations of sand and minerals that had apparently accumulated over time. Natural cracks, also filled with minerals, crossed the engraved lines, suggesting that weathering had occurred after the piece was carved.

The bottom had been sawed horizontally at about the shoulder line. I had seen fine-toothed blades from the Dolní Věstonice collection that might, when hafted, have been used to saw ivory in this way. The nostrils and eyes presented a special problem. They appeared to have been cleaned, and even recarved, and then covered with paraffin.

The protruding brow reminded me of that on a skull found in Brno, Czechoslovakia, in 1891. Was the carving a portrait of this human type, or did a modern carver try to imitate the skull? I recalled the many attempts at forgery of Ice Age carvings, some of which I had uncovered myself. Usually they had been attempts to replicate the so-called Venus figurines (pages 458-9).

The time had come for laboratory tests. X-ray diffraction at the Peabody Museum revealed the presence of iron oxides, which give the artifact its reddish brown coloration, and fluorapatite, the result of an exchange between the ivory and

minerals in the soil. Both suggest long burial in the ground.

I took these results and my photographs to the British Museum, which had seen the piece once before. In the late 1940s the museum had been asked to authenticate the piece but had to return it when the owners moved to Australia; the museum may have put the paraffin in the eyes as a preservative. Museum experts now told me it would be difficult, if not impossible, to fake the complex changes that had occurred in the ivory.

Clearly the ivory needed to be dated, and, more important, the carving itself. Accelerator carbon-14 dating was not feasible because it would consume a portion of the statuette. I contacted Dr. Edward Zeller, director of the Radiation Physics Lab at the University of Kansas Space Technology Center, who became intrigued with the problem. He suggested alpha-particle spectral analysis to locate radioactive elements useful in estimating age. Working with fragments at first, Ed found uranium in surprising quantities. Uranium would enter the tusk only after its burial in sediment or sand where groundwater containing traces of uranium was seeping. More startling were the high counts of radium and other radioactive products of uranium decay.

While Ed was testing, I detoured to Czechoslovakia on my way to a conference in Italy. I wanted to learn about soil conditions in the area of Dolní Věstonice and confer with Dr. Klima. I learned that uranium, a valued resource after World War II, had been located in the highlands northwest of Brno. Rainwater draining these heights may have reached the lowlands where the head was reportedly found. Klima said, "We have so many unique things from Dolní Věstonice and Brno—the 'marionette' [page 441], the oldest fired clay figures, the 26,000-year-old female head—it would not surprise me to find here the oldest male image."

Back in Kansas, Ed Zeller (left, seated) and his associate Dr. Wakefield Dort, Jr., a Pleistocene geologist, standing, now had the carved hair piece (lower left) to test. They placed it in the counting chamber of the alpha-particle spectrometer (upper left) for 72 hours. The final ratios of uranium to decay products suggested that the carved surface of the ivory may be about 26,000 years old.

The scientists envision this Ice Age scenario: Sometime after a mammoth died, someone carved a piece of its tusk. The carving became buried in sediment or sand, where it absorbed uranium, iron oxide, and fluoride from the groundwater. The calcium phosphate of the ivory absorbed the minerals, especially the uranium. At the same time, radioactive decay set in, leaving its by-products at levels that require thousands of years to build up to the present reading. If the head had been carved anytime in the past few centuries, the decay products on the surface would have been cut away. "Even Madam Curie couldn't fake that effect," Ed said. He and Dort have no doubt that the carving is ancient, but the precise age has yet to be confirmed.

But we concur that the story is not complete. We would like to know more about the history of the piece and find the exact location of discovery in order to test the soil. We should also do further dating tests. Until we tie up these loose ends, I am left with the possibility that the head may be the earliest known portrait of an Ice Age man. □

MAGNIFIED 50 TIMES (ABOVE); ALL BY IRA BLOCK

PHOTOMICROGRAPH exposes a hairline fissure that apparently occurred after the ivory was carved. The walls of the crack show several episodes of mineralization with mixtures of apatite (calcium phosphate), iron oxides, and a little manganese, built up in layers. The same mineralization accumulated in the carved grooves. Such encrustation, occurring over thousands of years, would be—according to geologist Wakefield Dort, Jr.—impossible to fake.

Art Treasures from the Ice Age

Lascaux Cave

Astonishing the eye, a cavern in southwest France preserves the creativity of Paleolithic artists, who painted and engraved hundreds of images here 17,000 years ago. On the brilliant white calcite walls of the Hall of the Bulls, painters evoked on a grand scale the animals they knew.

By JEAN-PHILIPPE RIGAUD

Photographs by SISSE BRIMBERG and NORBERT AUJOULAT

The paintings have both elegance and strength. . . . Their primitive drawing helps to give them a freshness of expression, sometimes rather rugged and naive, suggestive in their own way of the early Renaissance.

—The Abbé Henri Breuil

THE ONLY HUMAN REPRESENTED IN LASCAUX, A CRUDE STICK-FIGURE MALE WITH A BIRD HEAD OR MASK, WAS DRAWN BESIDE AN EVISCERATED BISON, WOUNDED PERHAPS BY A HUNTER'S SPEAR. THE BARBED SIGN AND BIRD ADD TO THE ENIGMA OF THE SCENE AT THE BOTTOM OF A FIVE-METER SHAFT WHERE PREHISTORIC VISITORS LEFT A FINELY WORKED SANDSTONE LAMP (FAR RIGHT).

I WILL NEVER forget my first visit to Lascaux. It was a hot July day in 1949, and I was 11 years old. My parents had decided to show me this prehistoric painted cave that had been discovered nine years earlier, and about which there was still so much talk. A newly built road led to the cave near Montignac in southwest France, and there we found a country fair atmosphere. There were buses, hundreds of people, and vendors selling ice cream and postcards. There were long lines to buy tickets, long lines to enter the cave. I recall the smell of the pine trees and how many visitors suffered from the heat.

After a long wait my parents and I passed through a monumental bronze door and into the semidarkness. We went down stairs into the large chamber called the Hall of the Bulls, 17 meters long, 7 wide, 6 high. The guide's flashlight lit the walls. Suddenly all around was a great cavalcade of animals: the mythical unicorn, the big bulls, the black horses, and red and black deer.

I was struck by these animals, motionless in the darkness of the cave for thousands of years, painted by artists that my imagination placed in an icy and hostile world. While the response of my parents and other adults was an aesthetic one, a reaction to the beauty of the paintings, the spectacle had for me an incomparable power for calling up the past.

Then our time was up, and we returned to the blinding light of the afternoon, the heat, the noise, the smell of the overheated pines. But those images were fixed in my mind.

Perhaps that experience helped lead me years later to become a prehistorian and archaeologist. But there was no way to foresee that one day, as director of prehistoric antiquities in Aquitaine, I would share the responsibility for preserving this most extraordinary of prehistoric art galleries.

The cave—with its great chamber and the two passages leading from it—contains 600 paintings great and small, almost 1,500 engravings, and innumerable mysterious dots and geometric figures. It also held a treasure of artifacts left behind by its artists some 17,000 years ago.

The story of Lascaux's discovery and the struggle to preserve it is as exciting as what we have learned about those artists. For, despite the best of intentions, the authorities almost allowed the destruction of Lascaux.

THE MODERN story of Lascaux begins on a Thursday afternoon in September 1940. Four adolescents make their way through the woods on a hill overlooking Montignac. They have come to explore a dark, deep hole the oldest boy had noticed the Sunday before. It lies between the roots of a dead tree. The boys have a knife, a few bits of rope, a homemade oil lamp. They are excited: Rumor says there is a secret underground passage to the old manor of Lascaux, and the hole they confront could lead to that passage.

They toss a few stones down the hole to judge its depth. The stones fall and roll a long time; it must be deep. They clear stones and undergrowth from around the entrance, then squeeze through, one by one. They slide, tumble, reassemble, and begin to explore. They soon see lines and spots in red and black. They hang the lamp, examine the walls more closely, and discover to their great surprise paintings of animals—bulls, deer!

That September 12, young Marcel Ravidat, age 17, Jacques Marsal, 15, Georges Agnel, 16, and Simon Coencas, 15, discovered the wonders of Lascaux cave. They pledged secrecy, but the next day they went back and explored the gallery to the right of the Hall of the Bulls. They went down a shaft in which they saw other paintings. They could no longer contain their emotions; the secret had become too heavy to bear. "We . . . put all our trust in our old schoolmaster, Monsieur Laval," one would remember.

Six days later, after the boys had widened the hole, the old schoolmaster entered the cave,

PAINTING BY JACK UNRUH

Painting by the flickering light of animal-fat lamps, artists probably used scaffolding to reach as high as five meters from the cave floor in the Hall of the Bulls (re-creation at left). In a nearby gallery, holes about two meters high held branches for a platform that stretched from wall to wall; still visible is the clay used to pack the poles in place.

This artist outlines the 5.5-meter-long silhouette of the largest bull in the cave. Painters mixed black, yellow, red, and white pigments on the spot, combining minerals and sometimes heating them to obtain subtle color variations. Even blacks were mixes, such as charcoal and clay.

The artists used tools similar to these (left) from the nearby site of Cap Blanc. On a grindstone rest nodules of manganese and ocher, two sculptor's picks, and an engraving burin whose scraper end bears hardened ocher.

Jacques Marsal (far left), one of the cave's discoverers, is now its chief guide.

LAMP, 32 CM; PHOTOGRAPHED AT MUSÉE DES ANTIQUITÉS NATIONALES, SAINT-GERMAIN-EN-LAYE, FRANCE; TOOLS AT MUSÉE D'AQUITAINE, BORDEAUX; PHOTOGRAPHS BY ROBERT AUGUSTAT (FAR LEFT) AND DIEGE BRAMBERG

scratching his face in the process. When he gazed on the paintings in the great chamber, his face still bleeding, he "shouted cries of admiration." He visited all the galleries: "I had literally gone mad." He realized he must quickly inform prehistorians. He notified the Abbé Henri Breuil, the "pope of prehistory."

Already visitors were crowding the entrance to the cave. A race had begun between prehistoric archaeology and tourist exploitation. The village of Montignac had quickly put up a sign: "Grotte de Lascaux—2 kilomètres."

The excitement that followed the discovery of the cave was all but forgotten with the German occupation of France, and visitors became rare. After the war, work was begun. The entrance chamber and a staircase were built, and trenches dug for electric cables. The cave welcomed the public on Bastille Day, July 14, 1948.

But prehistorians had to wait another year to start digging. Alas, many precious objects used by the painters of Lascaux had already disappeared under the shovels and pickaxes of the masons and electricians.

PERHAPS 600 PEOPLE visited the cave each day at that time. During the 1950s a veritable mob appeared daily in front of the cave. It was noticed that at the end of the day guides and visitors complained of headaches when they emerged. There was so much carbon dioxide in the underground air that it was difficult to light a match! Each visitor, just by breathing, poisoned the air.

Even worse, in several places air warmed by visitors came into contact with the cooler cave walls and formed minuscule drops of condensation. When these fell, they took with them pigments from the paintings. With time the murals would have disappeared.

In 1958 an elaborate system was introduced to regenerate the atmosphere in the cave. It sucked up air from the outside, filtered it, cooled it, controlled the humidity, and removed the carbon dioxide. This complex machinery—it was believed—would allow the number of visitors to increase while preserving the paintings. How wrong!

In 1962 more than 1,500 visitors showed up each day. But the guides had noticed that small green spots were appearing on the walls. Analysis revealed that they were composed of bacteria and algae. These developed with prodigious speed, growing in a few months from three colonies to 700.

After almost dying from suffocation, the cave now suffered a deadly infection. In 1963 André Malraux, then France's minister of cultural affairs, closed the cave to the public. He established a scientific commission, whose members gathered at the cave like physicians at the bedside of a sick patient. Antibiotics and a formaldehyde solution were administered to arrest the bacterial and algal pollution. The intensity and duration of lighting were reduced. Access to the cave was through a "shoe bath" to avoid

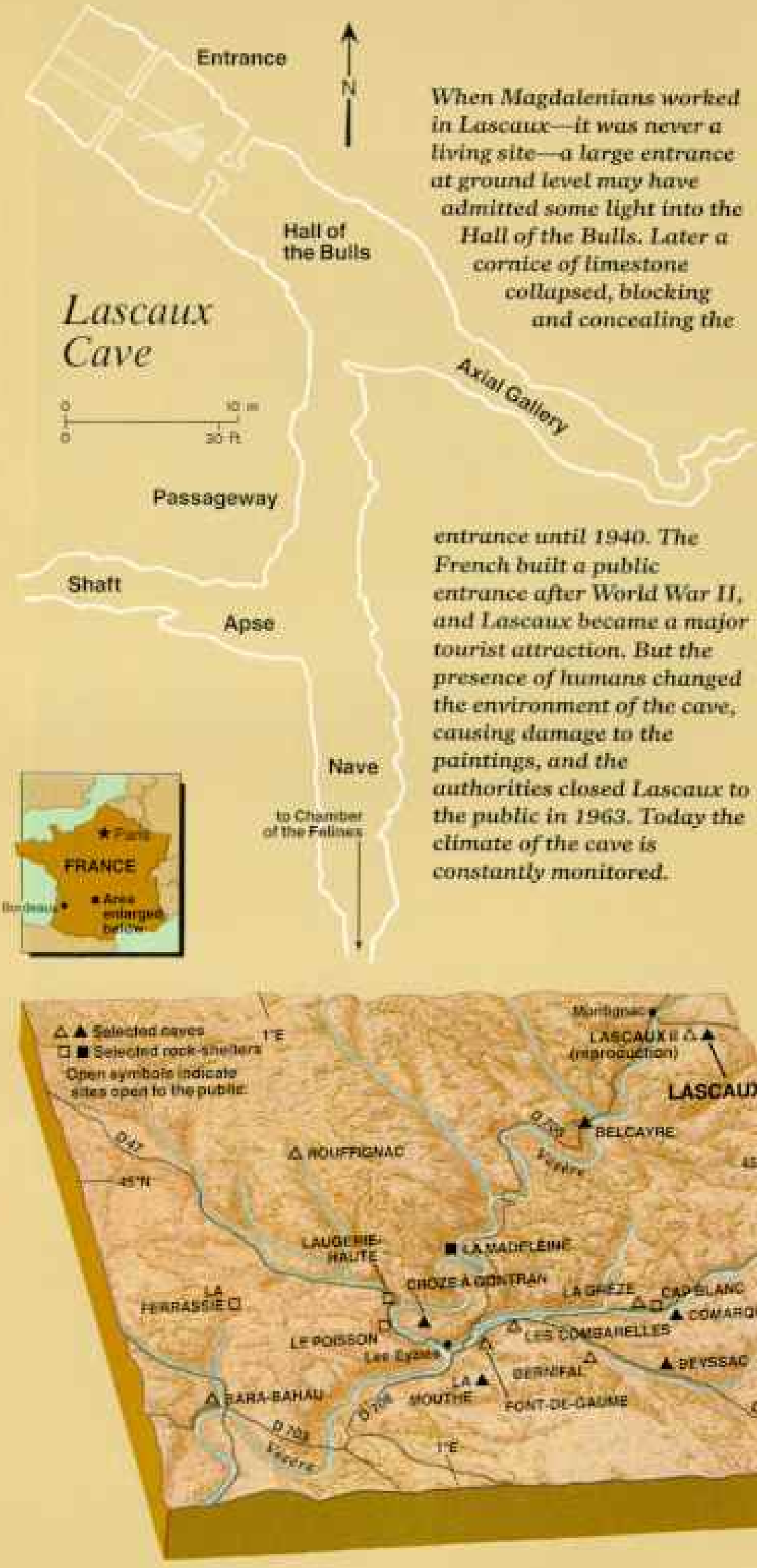
Calcite extrusions pock a small standing horse (left), one of some 300 engravings in the Passageway. In this low-ceilinged corridor, excavators found worn flint burins and evidence of piles of plant material, perhaps used as cushions by the engravers. The artists scratched an outline of

the introduction of new germs.

After two years of intensive care the experts declared the cave saved but no longer open to the public. It would remain under the constant supervision of scientists and technicians and be visited only by scholars and specialists. Thus would this patrimony be preserved for future generations.

SINCE THOSE crisis years of 1963-65 at Lascaux, scientists have learned much about the complex ecology of caves. A cave is not a humid and inert mineral world but a complicated ecosystem with its own flora, fauna, and microclimate, all linked to the outside. In spite of darkness, it is a center of life. If you place a petri dish containing a nutritious solution in a cave, you will notice after a few days colonies of bacteria, fungi, and algae developing. And if you look closely at the walls, you will find flies, mosquitoes, and sometimes bats.

In the Périgord region the caves *(Continued on page 494)*



the animal on the limestone wall, dabbed on pigment, and later reengraved the silhouette with the burins.

On the opposite wall a tiny air current removed some painted images through the ages, leaving only traces in cavities sheltered from the draft (left).

Lascaux is the best preserved of nearly 200 painted and engraved caves from the Upper Paleolithic period.

Lascaux's date—17,000 years before the present—was confirmed by studies of fossilized pollen, by charcoal and bones dated by carbon 14, and by the recovery of flint tools of the Magdalenian style, associated elsewhere with sites occupied between 11,000 and 18,000 years ago.

When Magdalenians worked in Lascaux—it was never a living site—a large entrance at ground level may have admitted some light into the Hall of the Bulls. Later a cornice of limestone collapsed, blocking and concealing the entrance until 1940. The French built a public entrance after World War II, and Lascaux became a major tourist attraction. But the presence of humans changed the environment of the cave, causing damage to the paintings, and the authorities closed Lascaux to the public in 1963. Today the climate of the cave is constantly monitored.

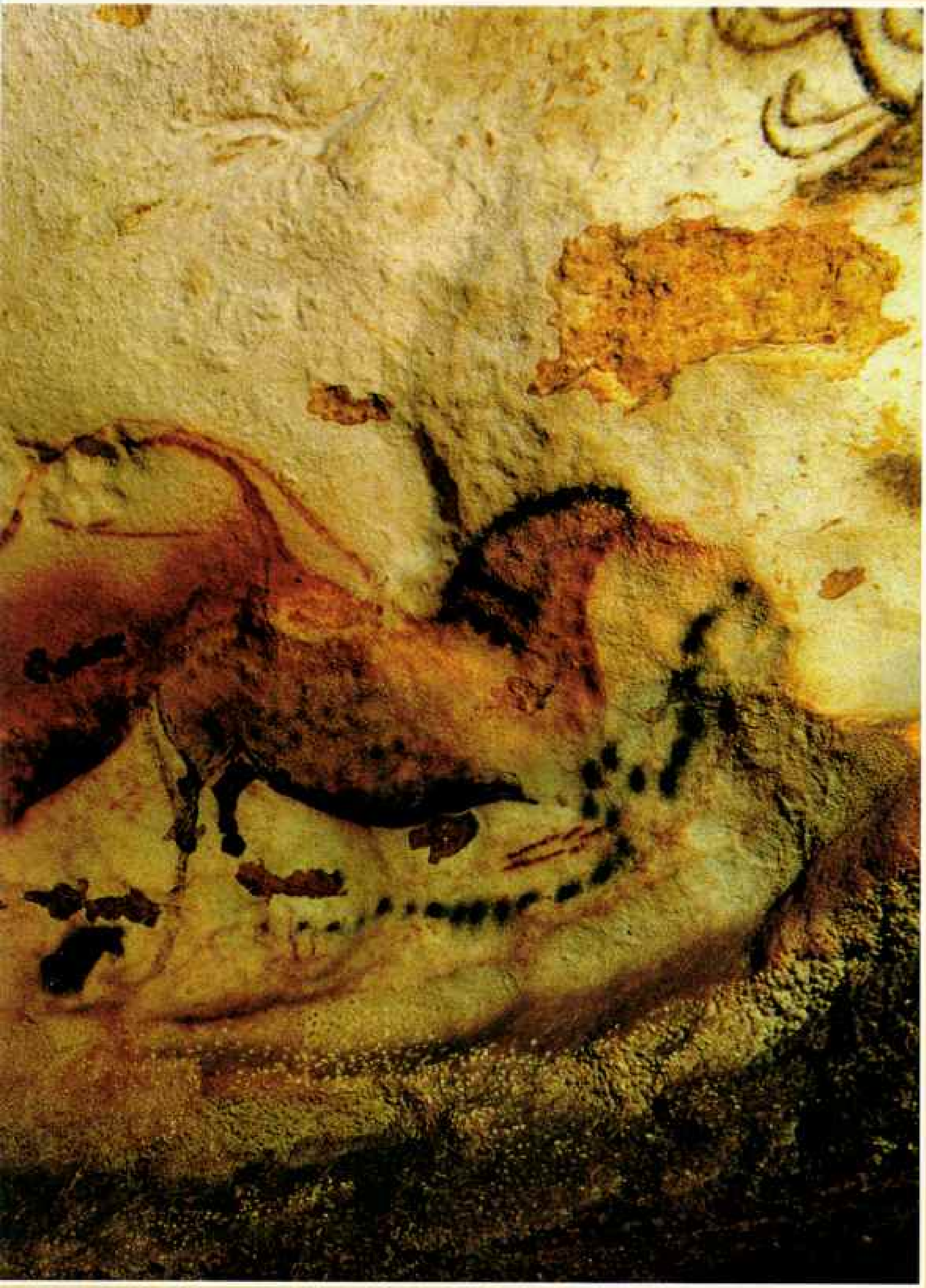
NGS CARTOGRAPHIC DIVISION
DESIGN: DAVID C. CHANDLER
RESEARCH: MAUREEN J. PLYM
PRODUCTION: AMY L. SHIER, BARBARA A. BRENNAN
MAP EDITOR: JOHN F. BLOZIS
PAINTING BY CHRISTOPHER A. KLEIN

Contorted ceilings challenged painters who ingeniously fitted surface features into their creations. A bulge in the rock was incorporated into a bull's shoulder, far right. Here in the Axial Gallery the bull and a line of shaggy ponies, apparently in winter coat, seem to rush headlong toward the cave entrance. The horses walk along a natural margin between light and dark limestone that was used by the artist as a groundline.

The bull is an aurochs, ancestor of domestic oxen and one of the largest animals of the Ice Age, weighing more than a ton. Fifty-two aurochs have been counted at Lascaux; the horse, a more popular subject, appears hundreds of times.

This horse (above) with small stretched head and reaching legs captures the energy of flight. The artist portrayed depth by leaving white space between the far leg and the chest, a technique that anticipated by millennia the use of perspective in Western art.

In the Axial Gallery, Chinese horses—so named for their resemblance to later Asian paintings—are believed closely related to Przewalski's horse, a wild subspecies



discovered in Mongolia about 1880. Markings around and overlying the animals may have held meaning. The barb on the aurochs's rump, at center, is interpreted as a spear.

took form in the limestone sediments of the Cretaceous and Jurassic periods. These are marked by a fine network of fissures linking the caves to the outside. Gas exchanges take place. Rainwater also infiltrates by these fissures, after going through the humus of the soil and becoming rich in carbon dioxide (CO_2).

This water, now acid, will slowly dissolve the limestone and carry away quantities of calcium carbonate ($CaCO_3$). When it arrives in the underground cavities, this calcareous water comes in contact with air, which contains less carbon dioxide. It then frees its CO_2 and precipitates part of the calcium carbonate it contains. This is how stalagmites, stalactites, and stalagmitic floors are formed.

In deep caves the temperature of the walls and air is about equal to the average outside temperature. In Lascaux, for example, the temperature of the rock is about 12°C (54°F), and it varies only a few tenths of a degree. The outside temperature ranges from minus 10° to 30°C.

This delicate system, with its subtle equilibrium, is built up through a long and slow evolution, but it can be destroyed through sudden change.

Humans are agents of such change. Scientists at the underground laboratory of the National Center for Scientific Research at Moulis, in the Pyrenees, have determined that an average-size man produces, while walking in a cave for an hour, 20 to 25 liters of carbon dioxide, 30 grams of water, and a heat flow of 150,000 gram calories—the equivalent of a 175-watt light bulb.

Thus when there were 1,500 visitors a day at Lascaux, the oxygen consumption exceeded 10 cubic meters, the carbon dioxide exuded was 8.5 cubic meters, and the water resulting from the breathing of all these people weighed 20 kilograms.

This was like spraying a fine mist of 20 liters of water a day on the walls and floor of the cave. The flow of heat sent out by these visitors was equal to 1,600 kilowatts by day's end.

The electric lights added several thousand extra calories to the cave's atmosphere, and their

Creature of imagination has the hind end of a bison, the belly of a pregnant mare, the front legs of a feline, a mottled hide, and two straight horns—although it was once dubbed the unicorn. Some observers see in the odd head the profile of a bearded man. Is it a shaman in animal dress? Or a creature drawn from a verbal description?

luminous rays helped mosses, ferns, and lichens develop, mostly around the lamps but also on the paintings.

Variations in the level of CO_2 caused by human breathing modify the chemical composition of the water on the walls and can cause the formation of a calcite film that can mask the paintings and engravings.

Moreover, the increase in the air temperature has caused in some parts of the cave a drying that alters the paintings.

In all cases the effect of man on the underground environment is negative. And often the attempted remedies are worse than the ailment.

The solution to the problem appeared only after years of trial and error. To reestablish and maintain in the cave the conditions that existed at the time of discovery and that had preserved the paintings for thousands of years.

When the cave was closed and the restaurants and souvenir shops shut, all the guides left—except one, Jacques Marsal. This man, who was one of the four boys who discovered Lascaux, has remained attached to the cave. He was among those who alerted scientists to the "green disease," and he participated in the work of the preservation commission.

Today he continues as the "nurse" of Lascaux, to watch day and night the monitoring equipment. He is also the one who shows the cave to those authorized to enter. He knows better than anyone else how to show to advantage "his" cave. In the half-light he reveals surprising details, underlines with one light stroke a prehistoric artist's motion, shows a thousand engravings that an inexperienced eye does not see. He is, appropriately, the impresario of one of the greatest painting galleries in the world.

UNDER the generous rain of a spring afternoon, I go to Lascaux for one of many technical meetings concerning the health of the cave. The road leading to the cave is lined with pine, chestnut, and juniper. The pollens contained in the fossil floor of the cave, the one trampled underfoot by the prehistoric artists, have been preserved and identified. The species were much the same.

Seventeen thousand years ago the climate was a little colder than today. The paintings were done for the most part during a cool temperate period succeeding a very cold period around 18,000 years ago. Later, around 15,000 years ago, there was another cold period; then the climate became step-by-step what it is today.

We call the people who painted this cave Magdalenians, after the site of La Madeleine, the rock-shelter where evidence of their culture was first found. This culture flourished from 18,000 to 11,000 years ago. It was marked by fine art and toolmaking and the use of bone for harpoons, spearpoints, and other purposes.

I can sometimes envision the group of Magdalenian hunters who for the first time noticed the entrance of the cave. They enter cautiously and are at once struck by the beauty of the rooms and the galleries with their surprising whiteness. Did these hunters paint the bulls, deer, horses, bison? Or did they commission some well-known artists?

The stylistic unity of the paintings and engravings at Lascaux indicates they were the work of a small number of artists. Some art historians suggest a master and his students. In any case they abandoned on the cave floor many objects of everyday life.

Archaeologists have found scrapers and engraving tools, worn by rubbing against limestone walls. There were flint blades with cutting edges, probably attached by resin to wooden supports to create weapons or tools. There were bone spearpoints and needles with eyes. I believe these were part of tool kits belonging to the artists—or to people who participated in the ceremonies that probably took place there. Elements of personal ornamentation—perforated seashells—seem to confirm this hypothesis.

The painters appear to have eaten at their work site, for many small broken reindeer bones have been found, as well as the bones of deer, wild boar, and rabbit.

Charcoal indicates the use of torches made from branches of coniferous trees. Many small limestone slabs, used as animal-fat lamps, were also found.

The artists preferred to paint and engrave on walls that were smooth and of a light uniform color. Such surfaces are fairly high from the ground, and to reach them scaffolding was necessary. This has been confirmed by the discovery of natural holes that had been modified to hold scaffolding. Fragments of a small rope made of braided plant fibers were found on the cave floor. And almost everywhere were found lumps of coloring minerals: brown, reddish-brown, yellow, black, and white.

STUDY of the works themselves shows that Magdalenian artists had great experience. Engravings were made with incomparable sureness; drawings executed without erasures; without "repentance."

Some animals were drawn on irregular surfaces so that it was impossible to see the head while

A great black cow overlaps a frieze of horses in the Nave (left), the work of an artist who climbed to a natural ledge two meters above the floor and left behind lamps and pigments. On the opposite wall, deer heads in a line on a calcite crystal layer give the illusion that they are swimming in a dark river. Researcher Norbert Aujoulat stands at the entry to a corridor leading to the Chamber of the Felines, site of seven cave lions. A bison is visible on the wall to his right.

In close-up (above) delicate horse heads emerge behind the rump of the black cow. The bovine's rear hoofs rest on curious color grids.

Fantastic nine-point antlers rise from the profile of a roaring red deer in the Axial Gallery, its legs apparently left purposely incomplete. Under the deer, 13 dots and a rectangle could be identifiers or hunting tallies—yet another mystery in the glory of Lascaux.

drawing the tail. This implies a complete vision of the animal by the artist.

Sometimes a detail in the rock with a particular shape was the initial motif: the eye, for example, of a horse whose body will be perfectly integrated on the wall. Some animals were distorted by the painter to give the spectator, who will view it from a different place, a more striking perspective. The use of undulations in the wall is frequent, and they give a surprising volume to the paintings. Thus a concavity forms the belly of a pregnant cow.

Also to give a third dimension, the artists have detached—by the means of a blank or uncolored area – the legs that are the most distant from the spectator from the rest of the body of the animal. Thus the artist knew perfectly how to render this perspective with the bison in the Nave.

What was this painted cave used for? It is not known, but some experts believe it was related to hunting-magic rituals.

Archaeology has an additional story to tell. About 8,000 years ago, long after the disappearance of the painters, other prehistoric people visited the cave. We have found charcoal from their torch. When they viewed the paintings, they were looking at works of art then already about 9,000 years old—nearly as old to them as the Folsom points of American Paleo-Indians are to us.

Research at Lascaux continues. One researcher, Norbert Aujoulat of the Department of Parietal Art of the National Center of Prehistory, is subjecting the paintings to micro-imagery analysis, which reveals the successive strokes of the Magdalenian painters. The knowledge gained may lead us deeper into the artists' minds.

These images are worthy of such intensive study. It was reported that when the famous modern artist Picasso came out of the cave, he exclaimed: "We have invented nothing!"

PÉRIGORD, with its forests and valleys, prompts musing. It is a pity that Lascaux must be closed, but perhaps one day we will find a way to open it again while still preserving it. There is, meanwhile, a replica, beautifully created, open to the public only a few hundred meters from the original.

I am struck by another optimistic thought. The quality of the paintings and engravings of Lascaux indicates that these were the works of professional artists who had acquired much experience elsewhere. So the paintings of Lascaux were probably not unique. There were almost certainly similar ones elsewhere.

For example, the cave of Gabillou, about 60 kilometers west, has engravings with characteristics so similar that one could think they are the work of the same artistic school, if not the same artists.

How many other caves, perhaps as precious as Lascaux, are still waiting in the dark for the arrival of idle adolescents, tenacious spelunkers, or even —with a little bit of luck—a prehistorian, one who remembers well that day as a boy when he first glimpsed the majesty of Lascaux. □

Clovis Cache Found

Weapons of Ancient Americans

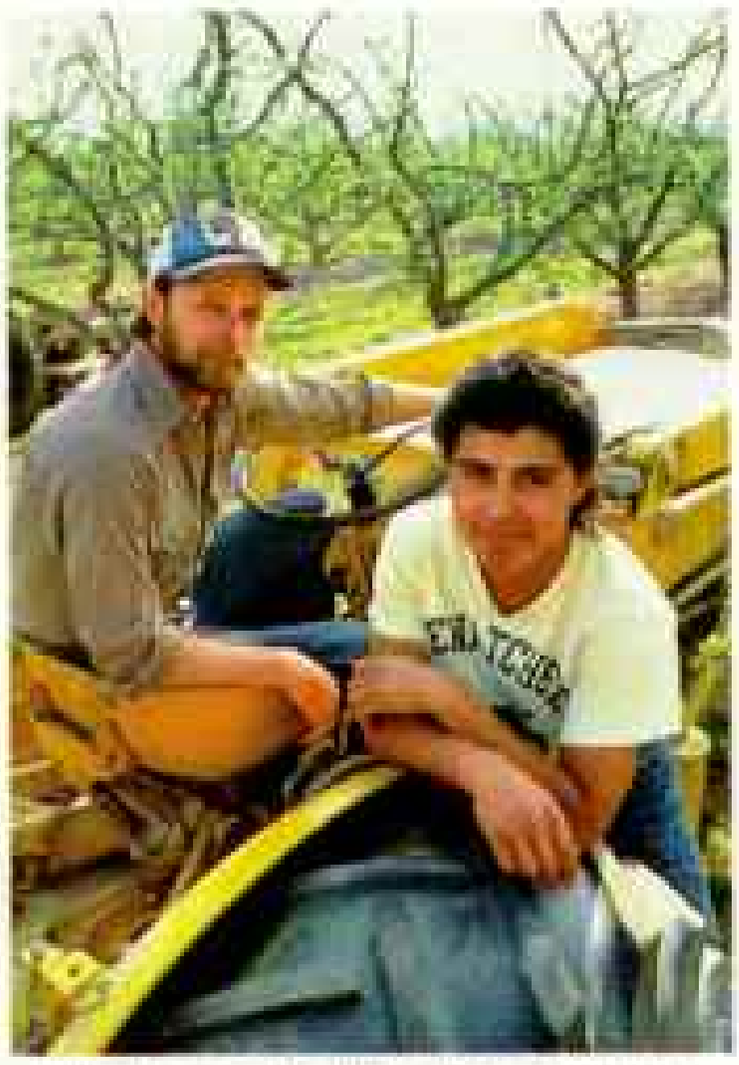
By PETER J. MEHRINGER, JR.
Photographs by WARREN MORGAN

HIS SHOVEL clicked against something solid, and Moises Aguirre peered into his irrigation trench in an apple orchard in central Washington. He reached down, and his hand closed on a long slender stone, sharp to the touch. He rubbed off the dirt.

In his palm lay an enormous spearpoint. In time he would learn that it was one of the largest of its kind ever found—a relic of Paleo-Indian hunters known as Clovis people, who pursued Ice Age mammoths, camels, bison, and horses nearly 12,000 years ago.

Clovis tools are the oldest undisputed artifacts ever found in the New World. The makers probably descended from peoples who crossed from Asia to Alaska across the Bering land bridge when Ice Age glaciers captured much of the planet's water. Their distinctive points, fluted at the base for fitting into spear shafts, represent the craftsmanship of North America's most accomplished flint knappers.

Clovis and other fluted-point technologies spread across the continent with astonishing rapidity, often in the wake of retreating glaciers. A thin veneer of fluted points covers the continent from British Columbia to northern Mexico, from Nova Scotia to Florida. Where Clovis points have been dated in the West, they fit tidily into a time slot between 11,000 and 11,500 years before the present, and in the East a few hundred years later.



MOISES AGUIRRE, AT RIGHT, AND FOREMAN MARK MICKLES UNCOVERED GIANT CLOVIS POINTS—THOUGHT TO BE MORE THAN 11,000 YEARS OLD—AT THE R & R ORCHARD NEAR EAST WENATCHEE, WASHINGTON.

Other Paleo-Indian sites of the Americas make claims of greater antiquity (map, pages 436-7). But over each hangs a small cloud of doubt: disturbance by erosion, contamination of the carbon used for dating, uncertainty that objects claimed as tools actually were made by humans.

Moises Aguirre showed the point to his foreman, and the two resumed their task of installing an irrigation sprinkler at the R & R Orchard near East Wenatchee. By day's end they had turned up 19 stone tools, including six large Clovis points.

Aguirre took the finds to the orchard manager, Rich Roberts, and his wife, Joanne. They showed the tools to amateur archaeologist Russell Congdon, who recognized them as Clovis and called in archaeologist Robert Mierendorf of the National Park Service. In August they reopened Aguirre's diggings and found more artifacts hidden beneath the apple trees.

They refilled the hole, and orchard owners Mack and Susan Richey protected the site with a covering of massive concrete slabs—a wise precaution in light of the fact that it lies only 30 feet from a busy county roadway.

Face-to-face with fresh evidence of the New World's Ice Age inhabitants, eminent archaeologist George Frison (bottom, in pit) exposes Clovis points and a knife. Only 30 feet from a public road, the site attracted curious bystanders. The first spearpoints were unearthed in 1987 in an irrigation trench in the Richey-Roberts apple orchard; they provided a prehistory lesson to one of the owners, Mack Richey, and his daughters Jessica, left, and Kristen (facing page).

DAVID L. ARNOLD, NATIONAL GEOGRAPHIC STAFF

Last autumn the Richeys asked me to direct excavations. Offers of help came from a talented group of faculty colleagues and students at Washington State University's Anthropology Department. Other volunteers joined in, including leading authorities on Paleo-Indian archaeology from around the nation. I consulted with members of the Colville Confederated Tribes about the importance of the site to Native Americans and the respect and thorough scientific treatment it deserved.

On a chilly morning last April a crane removed the concrete slabs. I assisted two geophysicists in surveying the site using ground-penetrating radar. The readings suggested additional artifact concentrations near the original finds. That same day Mel Aikens of the University of Oregon confirmed this by unearthing a Clovis point almost identical to the largest recovered by Aguirre the year before.

But this artifact was in place, perhaps just as it had been left by a hunter or flint knapper more than 11,000 years ago. Now we had a chance to learn about that person and the culture and environment in which he lived.

The pace quickened. Crowning 40 years of archaeology in the Pacific Northwest, Dick Daugherty of Washington State University found a cluster of three Clovis points, including a stunning matched pair (preceding page) measuring about nine inches long. They are the largest ever found, and not of common chert but of translucent chalcedony—true works of art.

More artifacts came to light: a decorated bone tool with beveled end; flaked tools called bifaces; scrapers; and more Clovis points, until they numbered 14—the most ever found in one place. All came from only two square meters of excavation.

We had set out not to complete the excavation of the site but to see if a major dig was needed. Obviously it was; the site was far too important to proceed without additional planning. After a week and a day we closed it down and backfilled the excavated squares. The orchard grew quiet except for the buzz of bees exploring spring's first apple blossoms.

Laboratory studies in progress at Washington State will provide much information about the site and its artifacts. Already stains on the largest point show it had been hafted. And initial tests by Margaret Newman at the University of Calgary in Alberta indicate bovine blood residue on three of the stone artifacts,

Clovis hunters swept the continent

Earliest undisputed inhabitants of the Americas, the people known as Clovis descended from late Pleistocene hunters who moved south from Canada, probably through an ice-free corridor that had opened by 12,000 years ago. Skilled at taking mammoth, bison, and other Ice Age animals, they used distinctively fluted spearpoints recovered at sites throughout the U. S. Initial digging at the Richey-Roberts Clovis Cache has exposed the largest Clovis points yet found.

including one of the large chalcedony points; perhaps these tools were used in killing or butchering bison.

The shortage of analytical information did not stop our speculations. The bone tools became (in the minds of beholders) points, spear foreshafts, wedges for splitting wood, or pressure flakers for finishing Clovis points. The outlandishly large stone tools were proclaimed ceremonial (never mind that some may have been broken in use, that others showed wear, and that edges had been ground for hafting). The site itself was called a simple tool cache, a habitation, the last resting-place of a Clovis chief, a flint knapper's hut, a hunting shrine, even a shaman's tent.

All agreed, however, on one point: that we will soon return to one of the most important and exciting Paleo-Indian discoveries of all time. □

Air Bridge to Siberia

Long barred by the Cold War from visiting friends and relatives across the Bering Sea, Alaskan Eskimos make a historic flight to Siberia for a reunion. If the thaw between the U.S.S.R. and U. S. continues, such visits may become commonplace again.

By WILBUR E. GARRETT
EDITOR

Photographs by STEVE RAYMER
NATIONAL GEOGRAPHIC PHOTOGRAPHER

SPRING BREAKUP in the Arctic—always an occasion for celebrating—took a new turn this year as more than winter ice melted in the Bering Sea. On June 13 a 40-minute flight from Nome, Alaska, 240 miles west to Provideniya, Siberia, signaled a thaw in the 40-year-old political ice curtain between the Soviet Union and the United States. The trip—approved just before the Moscow summit in May—allowed Siberian-Yupik-speaking Eskimos, one of four ethnolinguistic groups in Alaska's Eskimo population of some 35,000, to visit their ancestral homeland and friends and relatives they hadn't seen since 1948.

As the driving beat of drums quickened during a performance of Eskimo dancing, Alaskan Tim Gologergen, at left, leaped on stage and joined his hosts in a session that had the Provideniya community hall jumping to an Eskimo beat.

"In the old days," Tim said, "it was only a 50-mile trip in a skin boat from St. Lawrence Island to Chaplino in Siberia. Every June or July three or four boatloads would visit. Our people would trade for furs, reindeer-skin clothes, tobacco, and winter supplies."

Tim—a civic leader from

Savoonga and former major in the Alaska National Guard's Eskimo Scouts—brought along a snapshot (left) taken in 1947 of Tataaq, center, a Soviet official who had led a party to Gambell looking for two Russians who had defected. Tim, right, told us, "They stayed two or three days. The guys had been there, but we didn't say anything."

Tataaq had died, Tim learned. But he did find friends and relatives he hadn't seen since he last boated to Siberia in 1942.

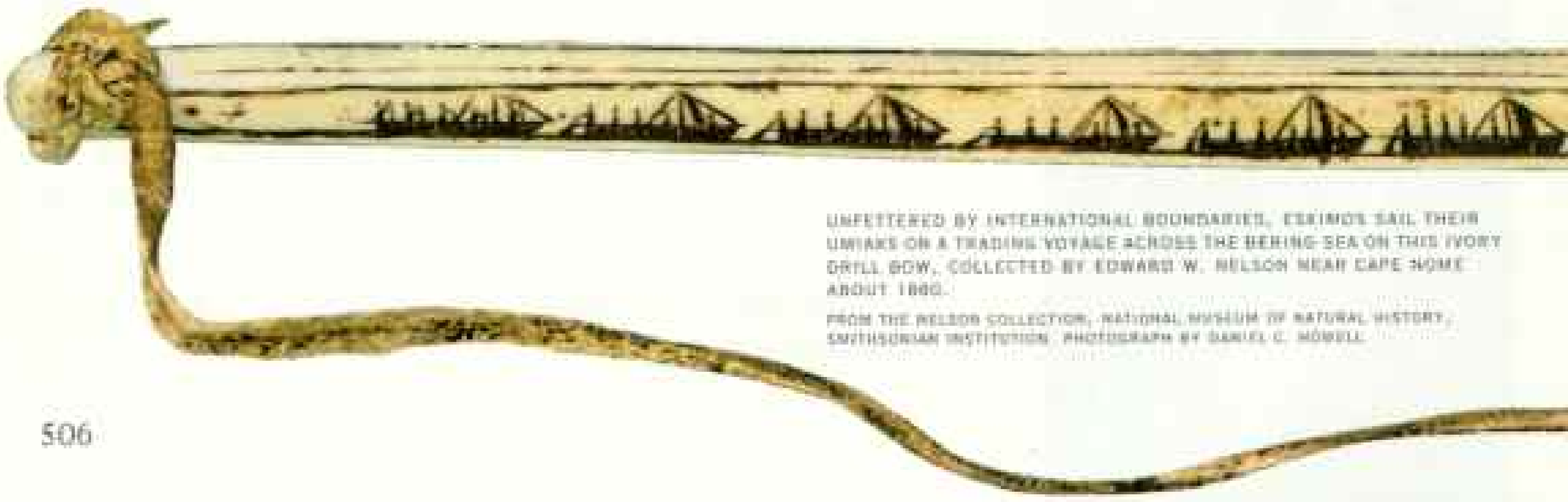
The Friendship Flight carrying 82 Alaska natives, officials, businessmen, and journalists was the result of years of lobbying by Alaskans for regular contacts between Alaska and Siberia. The warm welcome—including a specially designed poster—left no doubt that Provideniya also would welcome an end to the isolation.

CROSSING the Bering Sea is never easy. Vicious storms fetch up quickly in the severe climate. But what had been a hazardous trip for Eskimos in the best of times became a criminal offense when the U. S. and the U.S.S.R. closed their common border in 1948. Now *glasnost* has come upon the land, and our Alaska Airlines flight was cleared to enter Soviet air space, from which Korean Airlines Flight 007 was shot down only five years ago.

When we reached the Chukchi Peninsula, ice floes still flecked Emma Bay—frozen solid much of the year. An icebreaker lay at anchor as pilot Steve Day flew low between rows of 2,000-foot peaks to buzz Provideniya (upper right) before landing the 737 on an undulating gravel runway.

Rusting U. S. World War II landing mats—placed vertically as fences along the road to town—recalled the days when lend-lease warplanes were delivered to the Soviet Union, many through Provideniya.

There were few Eskimo faces in the well-dressed ranks of children recruited to welcome us with signs urging peace. But a number of Yupiks had been brought from nearby villages



UNFETTERED BY INTERNATIONAL BOUNDARIES, ESKIMOS SAIL THEIR UMIAKS ON A TRADING VOYAGE ACROSS THE BERING SEA ON THIS IVORY DRILL BOW, COLLECTED BY EDWARD W. NELSON NEAR CAPE NOME ABOUT 1880.

FROM THE NELSON COLLECTION, NATIONAL MUSEUM OF NATURAL HISTORY, SMITHSONIAN INSTITUTION. PHOTOGRAPH BY DANIEL C. MORELL.

to meet their Alaska cousins.

Provideniya was founded by European Soviets in 1933 as a supply port for Arctic settlements in the region, including notorious forced-labor camps where tens of thousands died. Coastal Eskimos moved and traded freely between the two continents. In an exchange of memos initiated by the U.S.S.R. and the United States in 1938, both nations took notice of the traffic but found no fault with it until the Cold War years, when—by common consent—visits were forbidden. In 1958 Eskimos in Siberia were moved from isolated coastal villages, and even clandestine contacts were cut off.

Time has not erased for Tim's sister-in-law, Ora Gologergen, 72 (above, at left), memories of pre-Cold War times. She warmly embraced Uugsima Ukhsima, 73, a Gambell playmate of the 1920s whose family had returned to Siberia—separating the two girls for half a century.

Uugsima, a member of the greeting committee, holds the Order of Lenin for distinguished service as a teacher. Her chin and forehead show tattoo lines common to Yupik women in the past. Though a proud Yupik, Ora admitted she was happy that Christian missionaries had halted tattooing in Alaska.

WILBUR E. GARRETT

Politicians' love of the spotlight knows no national bounds. With the long-awaited visit a reality, Provideniya official Oleg I. Kulinkin grasped the hands of Alaska's U. S. Senator Frank H. Murkowski (above, at left) and Governor Steve Cowper and raised them in a gesture of victory. Murkowski and Cowper, sensitive to the economic and cultural benefits if their state becomes a major doorway to the U.S.S.R., have both crusaded for rapprochement.

An influx of American tourists and traders could catapult the little town with only two paved streets into a bustling port of entry. Though salaries there are two to three times Moscow's for the same jobs, citizens told us few western Soviets survive more than a couple of Siberian winters before heading home with their savings.

THE VISIT was brief but good. The formality that first greeted the travelers quickly dissolved into a frenzy of getting acquainted, gift giving, and genealogical research. In the pin-trading competition, Alaska Airlines Chairman Bruce Kennedy's sagging lapels seemed to mark him the winner—and an honorary member of every trade union and school in Siberia.

The previous autumn a NOAA research ship had visited Provideniya. Three ports have been opened to U. S. fishing boats, and permission to crab in Siberian waters is expected soon. Joint Arctic research programs are under way. All point to lower tensions and reduced military budgets for both sides.

If U. S. and Soviet planners saw the Friendship Flight as a harbinger of business to come, for the Eskimos it was a sentimental visit to the past and a peek into an uncertain future. They had gone home to Siberia, where their roots and relatives are to be found, but neither they nor Siberia fit the old memories.

WILBUR E. GARRETT (ABOVE AND RIGHT)

Since St. Lawrence Island lies much closer to Siberia than to the Alaska mainland, they had shopped, hunted, fished, and even found wives and husbands there until recent times. But the Alaskans are now politically, economically, even culturally American.

The sadness of good-byes was tempered by the promise of rebuilding Eskimo ties. Bernadette Alzanna-Stimpfle (left, at left) of Nome—whose husband, Jim, is considered the father of the trip—says farewell to newfound friend Nina Sergeevna.

Assuya Mumigtekaq (right) managed an impromptu family reunion by taking her cousin Mildred Irrigoo and Mildred's husband, Clarence, to her two-room apartment for a snack of reindeer meat and fish (both raw and frozen) and homemade bread slabbed with fresh butter. The small rooms were neat, well furnished, and included a TV set. Family snapshots were proudly shared to a background of Yupik dance tapes.

But gift giving proved a problem. None that the Mumigtekaqs offered could be accepted. All contained fur or ivory banned by U. S. Customs. Irritated, Clarence Irrigoo suggested, "Let's meet out in the middle like in the old days. Then we can exchange all the gifts we want."

Spoken in the crowded confines of a small warm cubicle in a massive five-story cast-concrete building, the old hunter's attempt at humor pointed up a sad truth—not only would they never meet out in the Bering Sea again to trade illegally, but a major expansion of trade and traffic between these two shores could extinguish their fading culture. Of the estimated 2,350 Siberian Yupiks surviving, about half live on Alaska's St. Lawrence Island and half in settlements in Siberia.

The ancient Yupik coastal villages in Siberia, where the ageless rhythm of life brought whales, walruses, and seals to sustain them, were forcibly closed 30 years ago when the people were moved, integrated into Soviet society, and taught Russian. Assuya's two sons—seen in the photo she holds—are not hunters but soldiers in the Soviet Army.

Clarence's grandchildren may well meet their Siberian relatives "in the middle," but it might be as crew, guides, or dancers on cruise boats—perhaps even as their owners. If an American proposal is accepted, a weekly planeload of tourists will arrive from Nome, spend one day in Provideniya, and return along the Chukchi coast and across the Bering Sea via St. Lawrence on a cruise ship whose outbound passengers will have returned to Nome on the plane.

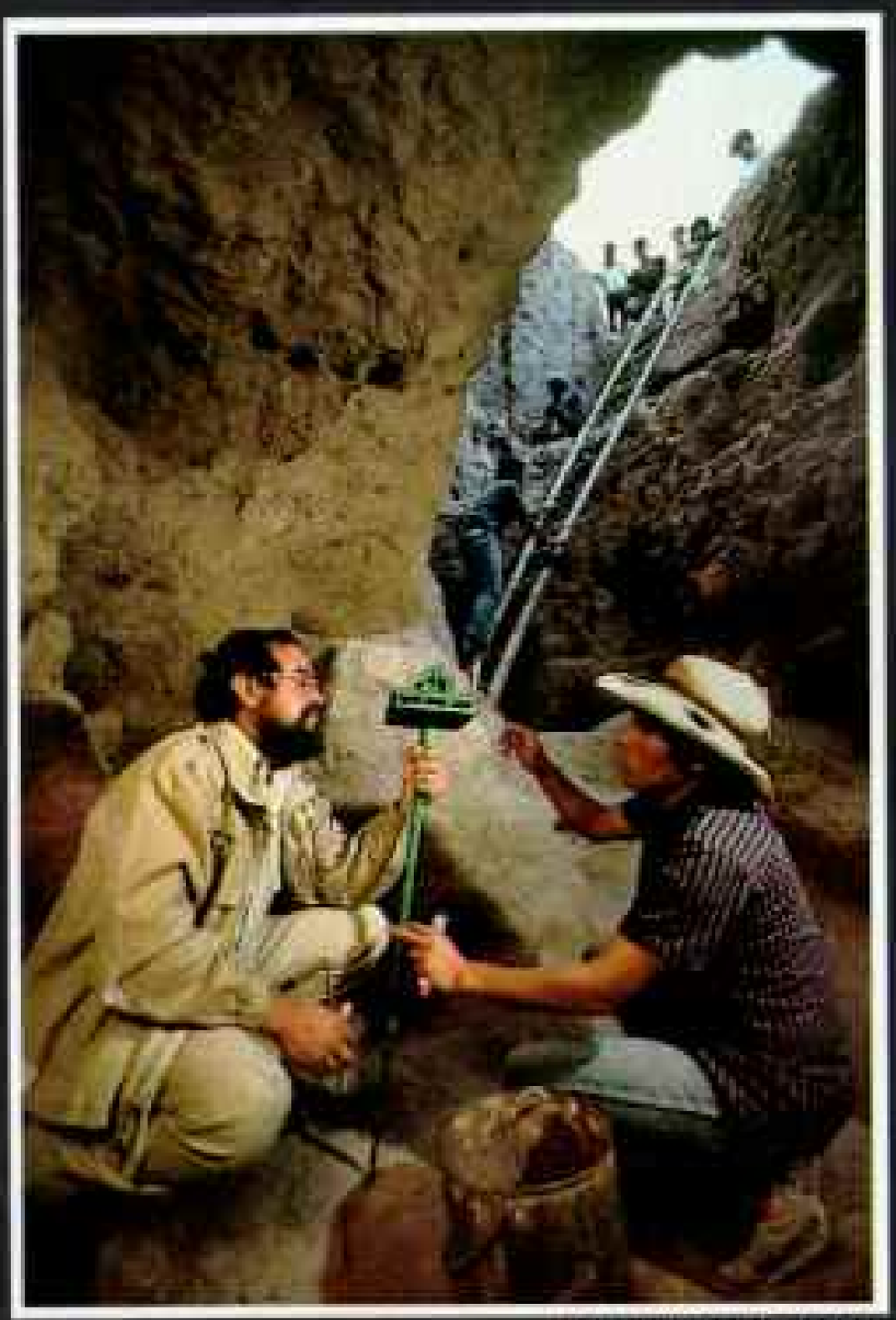
It will be a wonderful trip to a dramatic land and a great way to cement peaceful relations. And if passengers and crew are lucky and the season is right, they might even see a few whales, walruses, and seals. □

Discovering the New World's Richest Unlooted Tomb

By WALTER ALVA DIRECTOR, BRÜNING ARCHAEOLOGICAL MUSEUM, PERU
Photographs by BILL BALLENBERG

LIKE MANY A DRAMA, this one starts violently, with the death of a tomb robber in the first act.

The chief of police rang me near midnight; his voice was urgent: "We have something you must see—right now." Hurrying from where I live and work—the Brüning Archaeological Museum in Lambayeque, Peru—I wondered which of the many ancient pyramids and ceremonial platforms that dot my country's arid north coast had been sacked of its treasures this time.



BOTH BY MARTHA COOPER

OVERLOOKED by thieves who ransacked this 1,500-year-old Peruvian tomb, an ornate copper scepter is examined by the author, left. Salvage reaped a windfall when, nearby, he uncovered a sealed royal tomb bursting with wonders.

Pillaging tombs has long provided extra money for many people in the Lambayeque Valley. As cash income dries up between sugarcane harvests, villagers of Sipán speculatively eye an imposing, flat-topped pyramid and a massive adobe platform nearby, and gangs of looters put new edges on their shovels.

These structures were built by a people known as the Moche. From about A.D. 100 to the close of the seventh century these agricultural Indians flourished in the desert margin between the Andes and the Pacific, raising huge monuments of sunbaked mud and laying within them their noblest dead.

They also buried fine gold and pottery so alluring that in decades of excavation archaeologists have rarely found a major Moche tomb unplundered. The artifacts, and the priceless knowledge they represent, almost always disappear in an insatiable international black market for stolen pre-Columbian treasures. What awaited me at the police station in February 1987, I was sure, would be but the poorest castoffs of a grave robber.

Such castoffs! Among 33 antiquities confiscated from a local looter's house were the gilded copper faces of two jaguar-like felines (right), baring shell fangs. A pair of gold peanuts gleamed three times natural size,

wrinkled and ridged precisely like real peanuts. A gold human head, broadfaced like an infant's, returned my astonished stare with heavy-lidded eyes of silver and cobalt pupils of lapis lazuli (facing page).

The grave looters' tradition is, unfortunately, an old one. The first came in 1532, when Spanish conquistadores began ransacking the Inca Empire for gold, silver, and gems. The eroded facades of Moche shrines must also conceal troves, reasoned the invaders, and they tunneled energetically. In the 17th century looters even diverted the Moche River to undercut a pyramid.

Across time countless of these ancient adobe structures, which Peruvians today call *huacas*, have yielded enough exquisite pottery, jewelry, goldwork, and other antiquities to inflame the covetous hearts of generations of collectors. To satisfy their passion, they have encouraged bands of *huaqueros*, or grave robbers.

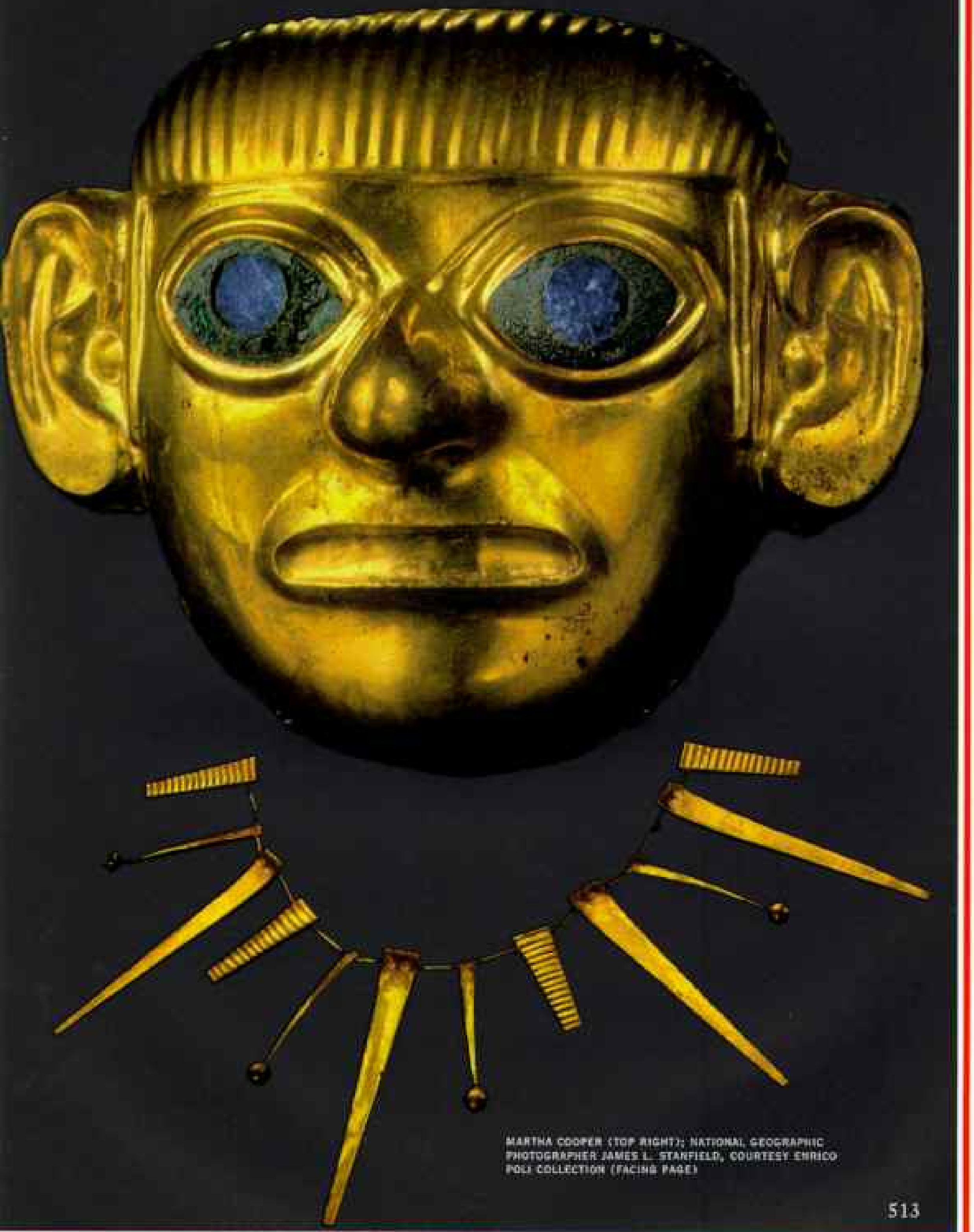
Scaling the scarred slopes of the Moche pyramid at Sipán can be treacherous work. Often enough I've missed a handhold or foothold and braked short of disaster only at the cost of skinned palms and buttocks. Yet some huaqueros dare the climb at night and, once at the summit, shovel by lantern or flashlight.

The Moche platform near the foot of the Sipán pyramid presents an easier target. Weatherworn to the shape of a mound, the platform at its base extends 230 feet by 165 feet. Rising a mere 33 feet, it lies within handy reach of nocturnal diggers.

I can easily imagine huaqueros scurrying like shadows on the February night last year when by chance they penetrated a burial chamber within the platform. Hastily the

MASTERPIECES from the looted tomb are now owned by a private Peruvian collector. They include a gold flute, a gold bracelet (above right), and a tiny gold warrior bearing a war club (top).

WITH HAUNTING EYES of lapis lazuli and silver, a gold head seized by police has a twin, reportedly offered on the black market for $60,000. Sheet-gold ornaments have been assembled as a contemporary necklace.



MARTHA COOPER (TOP RIGHT); NATIONAL GEOGRAPHIC PHOTOGRAPHER JAMES L. STANFIELD, COURTESY ENRICO POLI COLLECTION (FACING PAGE)

plunderers broke up necklaces, bracelets, and other ornaments to sell piecemeal to middlemen who in turn supply Peruvian and foreign collectors. For protection they posted armed lookouts atop the Moche platform and the pyramid of Sipán.

For good reason. According to police, a twin of the little gold head they seized is now for sale in the collector's netherworld for $60,000. A clandestine bid for a similar gold figurine has topped $100,000.

Local police tried to recover the plunder. Several days after the raid on the platform they searched a looter's house. He was away, but behind the house they found dozens of fragments of gilded copper—remains of figures and ornaments that, because of their low commercial value, had been broken to pieces and thrown out.

The police mounted a second raid in the predawn hours. This time the adversaries met face-to-face, and one of the looters was fatally wounded.

The village was in shock. But the artifacts that had been plundered from the platform would lead to a magnificent discovery. * * *

WHO HAS THE RIGHT to treasures such as this gold-and-lapis peanut necklace? Demand from private collectors and dealers has created an extensive black market, supplied by villagers of Sipán near the tomb. They have dug thousands of pits (facing page) in land occupied in the first millennium A.D. by people known as the Moche. In a cemetery at center lies the grave of an alleged looter of the tomb who was fatally shot by police during the confusion of a raid.

CHRISTOPHER B. DONNAN, COURTESY ENRICO POLI COLLECTION (RIGHT)

Into the Tomb of a Moche Lord

Perhaps the finest example of pre-Columbian jewelry ever found emerged near the looted tomb in a second, sealed chamber. A gold-and-turquoise ear ornament holds a thumb-size figurine with a movable nose piece and war club, a crescent-shaped headdress ornament, and a minuscule owl's-head necklace.

This was not art for art's sake. A skeleton found with the figurine was attired in much the same fashion.

THE TREASURES UNEARTHED by the looters could only have come from a tomb of unprecedented magnificence. Could the ancient Moche of Peru, who built the massive mound 17 centuries ago, have hidden other royal tombs in its depths?

I believed so.

Now, a year of intensive excavation has brought to light one of the richest and most significant tombs ever found in the Americas—the clearest mirror of the little-known Moche culture. Several similar burials may surround it, forming a royal mausoleum.

From this extraordinary burial we recorded treasure after treasure: A solid gold headdress two feet across, a gold face mask, a gold knife, multiple strands of large gold and silver beads, a beautifully crafted rattle hammered from sheet gold and hafted with a solid copper blade, gold bells showing a deity engaged in severing human heads, a pure gold warrior's backflap shield weighing nearly two pounds, and exquisite gold-and-turquoise ear ornaments.

A RESEARCH PROJECT SUPPORTED IN PART BY YOUR SOCIETY

Additional skeletons found in the burial chamber, along with the sumptuous grave goods, conjure up an elite of retainers, concubines, and warriors. They served in life at the pleasure of the tomb's chief occupant, were sacrificed at his death, and lay hidden beside him for a millennium and a half. My friend and colleague Christopher B. Donnan believes he was a warrior-priest (see article beginning on page 550). Perhaps his awed subjects titled him as I do: Lord of Sipán.

Discovery of this Moche ruler casts in high relief a people whose refined art and technology rivaled that of the Maya, their Central American contemporaries. In ceramics and weaving, the Moche were worthy predecessors—by some 1,200 years—of Peru's more storied Incas.

While never empire builders like those conquerors, the Moche nevertheless extended their dominion across a 220-mile-long swath of coast, settling in irrigated valleys in the manner of the ancient Sumerians of Mesopotamia. By diverting rivers into impressive networks of canals and channels, they transformed a barren hinterland into a fertile territory of enviable abundance. The oasis valleys that they farmed sustained well over 50,000 people, more than live there today. With organized purpose the Moche employed their surplus energy to erect lofty pyramids and master clever metalwork. They almost certainly traded with peoples as distant as present-day Ecuador and Chile.

For all their sophistication the Moche never developed a writing system, not even glyphs such as served the Maya. Nor are there foreign chronicles of their history, like the accounts in which Spanish conquistadores and priests recorded Inca ways. Fortunately, however, the Moche immortalized scenes of ritual, mythology, and warfare with a legacy of richly decorated pottery. Indeed, almost all we know of the Moche has been deduced from these ceramic masterpieces.

SEARCHING FOR THE TOMB, my colleague Luis Chero Zurita and I faced stiff competition from huaqueros and gold-crazed villagers.

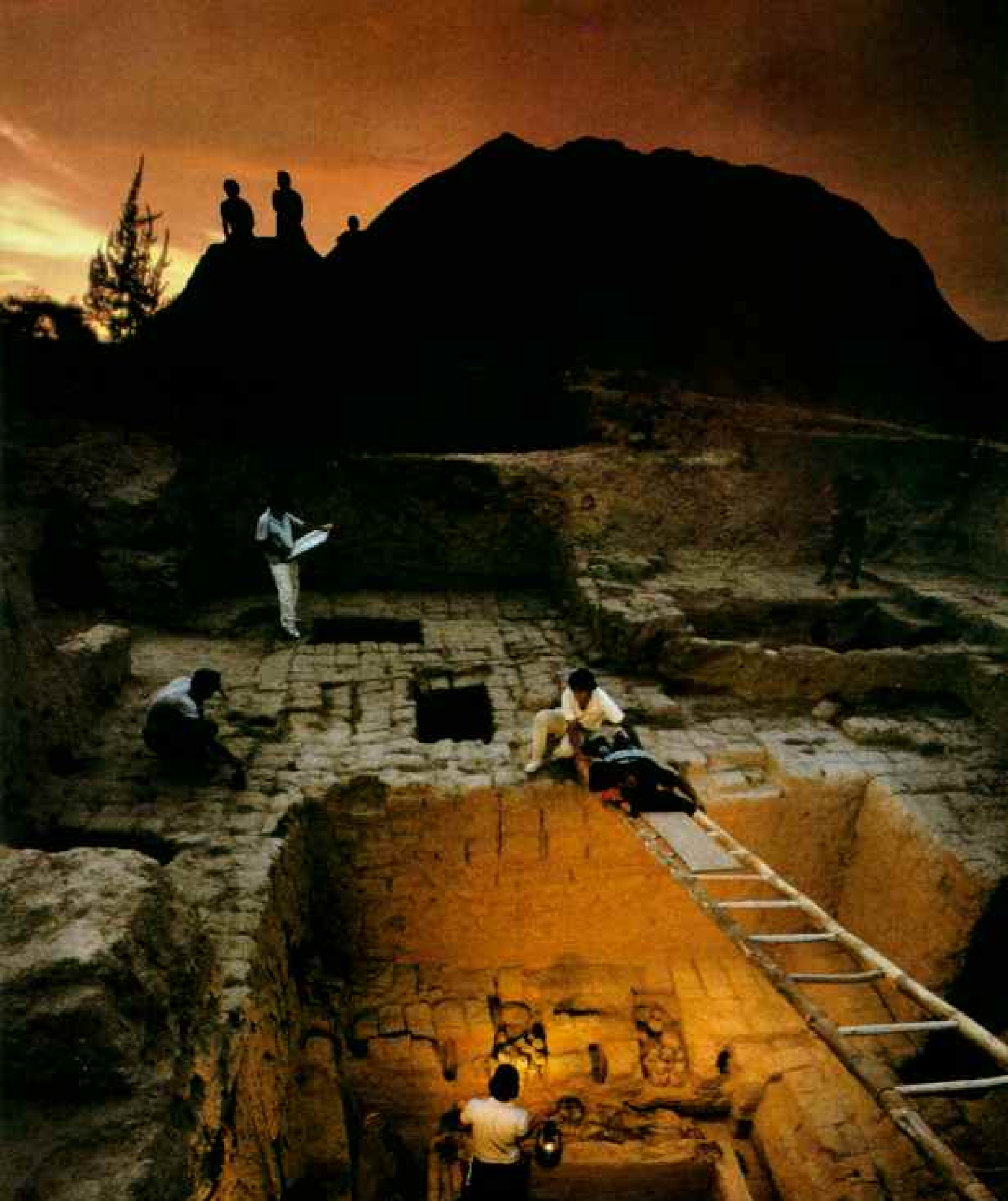
Gold fever gripped the people of Sipán and other villages. Men, women, and even young children flocked to the adobe mound. Using shovels, sieves, and bare hands, they poked and pried in a frenzy for scraps of metal, beads—anything the huaqueros might have discarded or overlooked.

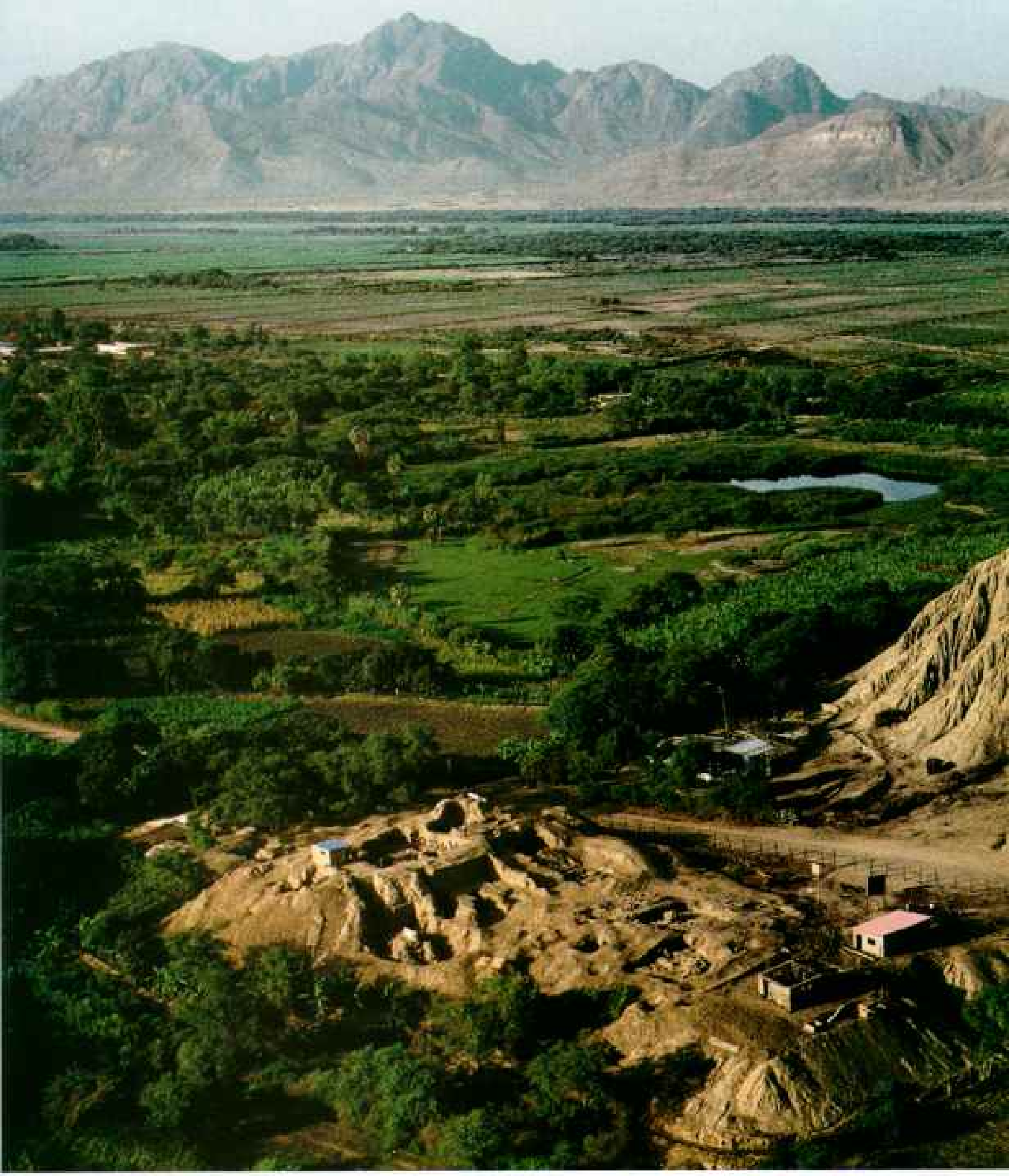
Lest vandals entirely raze the platform, we persuaded police to make surprise patrols until we could launch a rescue operation. For the time being our goal was modest: to salvage whatever information and artifacts had escaped the looters' pillage.

As soon as possible we set up a tent at the site. In April we paid the first wages to workmen out of funds contributed by a pasta manufacturer and a governmental development agency; a local brewery chipped in, and the National Geographic Society made a generous grant. Invaluable encouragement and support came from the National Institute of Culture of Peru, the Brüning museum's formal patron.

Tension ran high during the first weeks of

SILHOUETTED GUARDS keep watch over the tomb of a high-status person termed a warrior-priest. Villagers continued to sieve the other tomb for looters' leavings until the guards were posted. Excavation began in April 1987 with support from the Peruvian government, local firms, and the National Geographic Society.





A TALE OF TWO TOMBS unfolded beneath the Andean foothills near huge adobe brick pyramids, severely eroded. The taller pyramid at center was raised by the Moche about A.D. 200, the one at right by another culture 500 years later. In front of their pyramid the Moche built an adobe platform 230 feet long, 165 feet wide, and 33 feet high. On its left they raised another platform probably crowned with a temple (diagram, right). Grave robbers' holes pit that site; they hit pay dirt with one 23-foot-deep strike in February 1987, destroying all archaeological evidence in the process, including any bones. The author's systematic follow-up led him to the intact tomb four months later.

1 *Looted tomb*
2 *Intact tomb and pottery offerings*
3 *Possible upper platform for a temple*
4 *Ramp to main platform*
5 *Author's preliminary excavations*
6 *Previous looters' pits*

MARTHA COOPER

"THE DECAPITATOR," a grim deity holds a knife called a tumi *in its left hand and a profiled human head in its right, a common theme in Moche art. Found in the royal coffin, the figure adorns a gold bell, its sound created by small copper balls inserted in the hollow spheres bordering the piece. A second bell was also found, as were two more attached to large elements of attire called backflaps (page 545).*

our excavation. Angry villagers, who were barred from the platform, viewed Luis and me as a higher class of thieves, intent only on enriching ourselves. Brothers of the slain huaquero daily swore vengeance, shouting curses and death threats.

The policemen guarding the platform prudently kept their heads down when the funeral cortege passed by along the road to the cemetery of Sipán. There relatives and friends laid the dead looter to rest. Tomb robbers a thousand years from now may prematurely exult when they stumble on the highly polished black marble slab of the huaquero's grave marker, glowing amidst poor wooden crosses and weathered slabs. Surrounding them all lies a ransacked ancient cemetery, pockmarked by looters.

Protecting the platform at night proved a challenge. Luis and I camped out at its base and mounted three-hour watches with our workmen, two student archaeologists, and a policeman. Several times staccato bursts from the policeman's submachine gun shocked me from sleep—warnings fired above the heads of huaqueros sneaking up in the dark.

Mornings we awoke to the dispiriting sight of the platform marred by more than a dozen large pits dug before our vigil began. Where the huaqueros had struck their bonanza, there gaped a hole 23 feet deep branching into a honeycomb of caverns and tunnels. Using ropes and buckets, we spent days simply clearing the pit of broken brick.

NEAR THE BOTTOM we uncovered the first hint of what was to come. Here we found the imprints of wooden beams that had once roofed a small chamber. Sockets for supporting posts had been cut into bricks laid some time earlier, evidence that the chamber *(Continued on page 532)*

Archaeologist WALTER ALVA, director of Brüning Archaeological Museum in Lambayeque, Peru, has supervised excavations of ancient cultures in northern Peru for the past 11 years. He currently directs the Sipán Project.

Peru's Moche Culture

THE LIMELIGHT of history that for so long bathed Peru's Inca now illuminates the Moche people, who preceded them by 1,200 years. They farmed a series of river valleys draining the Andes along a 220-mile stretch of Peru's northern coast. From roughly A.D. 100 to 700 the Moche irrigated crops such as corn, beans, squash, and peanuts amid the searing desert. They ate llamas and guinea pigs and caught fish from the nearby Pacific. Their valley settlements were distinguished by great pyramids and platforms of adobe brick. Ten thousand Moche may have lived at Pampa Grande, a few miles east of the Sipán tombs in the heart of Lambayeque Valley.

The Moche had no writing system. But the library of their buried art allows us to reconstruct their culture and rituals, and even to identify individual figures.

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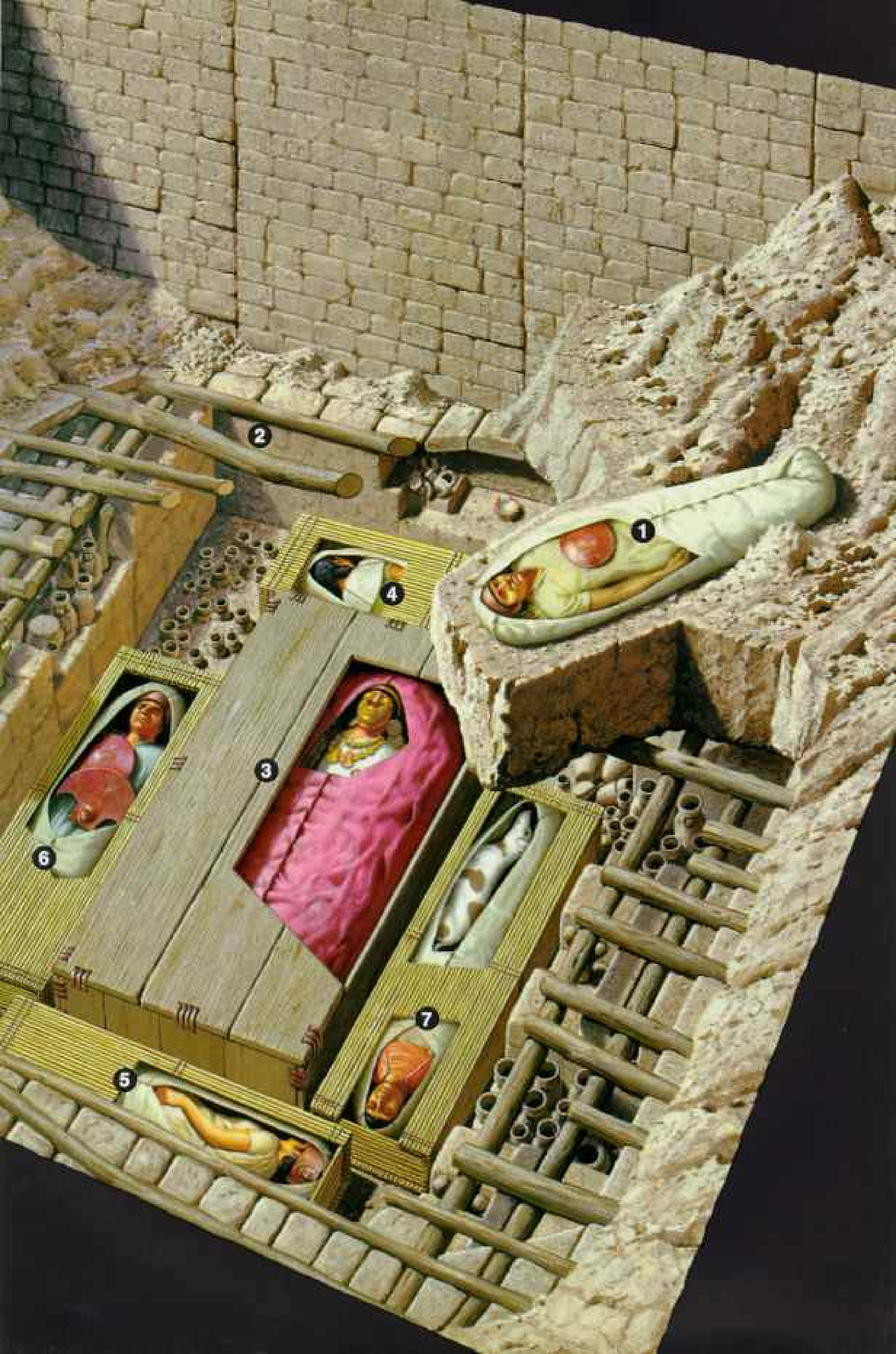
WALTER ALVA; PAINTING BY MED SEIDLER

A royal mausoleum comes to light

He did not go alone to his grave. The warrior-priest lay surrounded by men and women—and even his faithful dog—who had served him well in life.

An area of dirt and rubble surrounded by mud brick suggested that the platform had been opened and resealed after its construction. Twelve feet down, archaeologists came upon the skeleton of a man about 20 years old with a gilded copper helmet and copper shield, whom they dubbed the guardian (1). Fragments of roofing beams (2) were dated to about A.D. 290. A few feet lower, copper strapping and the imprint of planking mark the warrior-priest's coffin (3). Buried at his head and feet, two women (4,5), about 20, possibly were wives or concubines. Flanking the central coffin lie two men (6,7), about 40, one buried with the dog. They lie to the right of the excavated coffin (above) with the other man at left; the warrior-priest's bones, hardened with acrylic resin, have been removed.

An enduring mystery involves feet missing from several of the tomb's occupants. Both feet were absent in the figure called the guardian. Moreover, one of the men and one of the women buried next to the ruler lacked left feet. Were they amputated to symbolize that, even in death, they would never leave their master? Clues from the continuing excavation may shed more light on such questions.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AMID STUNNING TRIBUTE, the warrior-priest lies bedecked from his head, far right, where some ornaments have been reconstructed, to his feet, surrounded by seashells from Ecuador. The painting on the reverse side details the artifacts.

HEINZ PLENGE

Layers within sumptuous layers

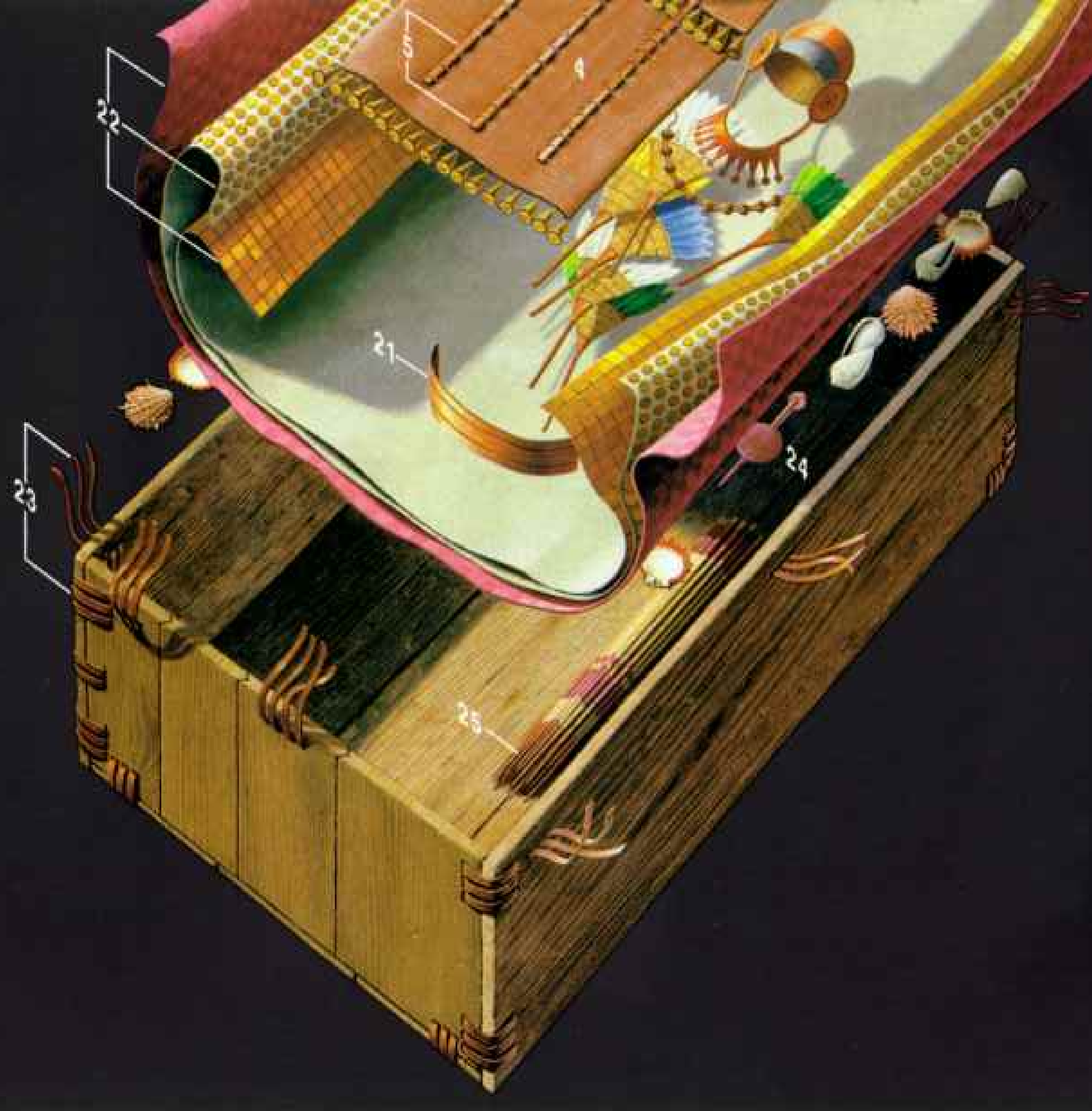
HE WAS NOT especially tall—about five feet six inches—and in his early 30s, according to skeletal analysis. The Moche wrapped their fallen ruler in a lavish cocoon of tribute, including these elements:

Beneath the coffin's three-planked lid (1), feather ornaments, some in headdresses, appeared in groups (2) both above and below the body. Fabric banners with gilded copper platelets depicting a figure with turquoise-bead bracelets lay faceup above the body (3) and facedown below (4). Copper struts (5) made the lower banners rigid. Eleven chest coverings, called pectorals, of shell and copper beads (6) also appeared in layers. A gilded copper headdress (7) lay atop a textile headband to secure it (8).

An outer shirt covered with gilded copper platelets and cone-shaped tassels at the hem (9) and a simple inner white garment (10) clothed the body. The skull, face, ears, neck, and chest were festooned with gold, silver, and copper ornaments (11). Turquoise and gold-bead bracelets adorned the forearms (12). Gold and copper ingots lay on his hands; the right held a gold rattle (13), the left a copper knife (14). Seashells (15) lay at his feet, clad in ceremonial copper sandals (16).

Beneath the ruler a massive gold headdress ornament (17) overlay a wood support frame (18). Under it were crescent-shaped gold bells, two attached to backflaps of gold and copper (19). A small gold headdress ornament was found near a copper headdress chin strap (20). The significance of copper strips (21) remains a mystery. Three shrouds, two sewn with gilded copper platelets (22), enfolded the contents of the coffin, fastened together with copper strapping (23). At the very bottom lay shells, a miniature war club and shield (24), and copper-pointed atlatl darts (25).

PAINTING BY NED SEIDLER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BOTH BY MARTHA COOPER

UNMISTAKABLE EMBLEM OF POWER comes to light as the ruler's fragile bones are gently lifted from the tomb, revealing a breath-taking gold headdress ornament buried beneath him (top). Fused by corrosion onto the foot bones, copper sandals (above), far too stiff for walking, played only a ceremonial role.

(Continued from page 522) was not part of the original construction. Unlike the ancient Egyptians, the Moche did not design their pyramids and platforms as mausoleums, but to serve as religious enclaves and administrative centers. Only at a ruler's passing was a chamber carved out to accommodate his body—almost as an afterthought.

Moche workmen had to race bodily decay when entombing a master. Modular construction methods eased their task: Moche pyramids and platforms are built of rectangular bricks arrayed like bread loaves in wide and distinct vertical stacks that abut but do not bind each other.

Moche laborers built the platform at Sipán and one of the two pyramids before A.D. 300. Other hands laid the mud bricks of the second pyramid after 700. By then Moche culture was in decline, for reasons still obscure. Some scholars envision the Moche sapped by a slow and peaceful invasion of peoples from the south. An alternative theory cites warlike

highlanders called the Huari, sweeping down from the Andes to the east.

Before the Moche and after them, peoples of the coast built adobe pyramids and platforms. From the top of the Moche pyramid at Sipán you can pick out 28 other such huacas within an easy walk.

Vulnerable to looters, the adobe huacas face another enemy: rain.

In an average year the north coast of Peru receives less than half an inch of rain, preserving not only the huacas but also their builders; many have come down to us as leathery mummies. At intervals, however, shifting Pacific weather patterns known as El Niños unleash torrential downpours. In 1983 I waded sopping from house to office at the three-story Brüning museum to rescue mummies and other relics from basement exhibit cases menaced by floodwaters, a museum director literally bearing the weight of the past on his back.

During the centuries, El Niño rains have whittled down the platform at Sipán by about three feet. The Moche pyramid too has shrunk, by some 12 feet. Without caretakers to renew the original skin of sun-dried mud, its steep sides have grown deeply gullied, until the earthen temple resembles a mammoth block of beige chocolate melting in the sun. Yet it still towers nearly a hundred feet high.

EVEN GREATER Moche pyramids break the horizon elsewhere between the Andean cordillera and the sea. A colossal one endures 350 miles north of Lima, Peru's capital. Dubbed Huaca del Sol—Pyramid of the Sun—it dominates the valley of the Moche River, cradle of the Moche culture. Among the largest man-made structures in South America, it looms 135 feet tall, covers 12.5 acres at its base, and contains more than a hundred million bricks.

Erecting a pyramid or platform probably took a generation or more. The platform at Sipán ascends in three tiers, in careful north-south alignment. So many mud bricks went into it and its companion pyramids that a nearby borrow pit scooped out by the brickmakers remains today as a small lake.

Hundreds of men working in teams added gravel to mud and pressed the mix into small wooden molds, then baked the bricks in the hot sun.

Unaided by the wheel, other laborers passed

HEINZ PLENGE (TOP); MARTHA COOPER

WHISPERS IN THE DUST were coaxed into plausible statements. A figure with upraised arms (top) materialized from fragments of gilded copper sewn onto a cloth banner. Cane splints were used in headdress ornaments to hold feathers, which left telltale traces in the sediment as they disintegrated.

MINIATURE MAN OF GOLD within the ear ornament that electrified the archaeologists turned out to be one of a matched pair. While the first piece, in situ (left), was reasonably intact, the second (below) was badly deteriorated. Using the initial ornament as a guide, archaeologist Susana Meneses, the author's wife, meticulously disassembles the damaged figure's dozens of pieces for later restoration. A gold chin-and-cheek mask, nose ornaments, and other ear ornaments lie beside them.

HEINZ PLENGE (TOP); WALTER ALVA

fresh bricks hand to hand to workmates who stacked and mortared them with more mud. As the platform and an attached ramp rose higher and higher, scaffolding appeared, a roost for plasterers. The coat of mud and sand that they applied protected the platform's sloping sides and sealed its level top.

Immortality of a sort memorializes the men who made the bricks for the platform at Sipán. In the wet faces of new bricks they scratched their marks: an X, an S, a trident or circle or other symbol. Some bricks preserve handprints. I find it eerie to splay my hand across such a brick and find my fingers perfectly matched to those of another, long dead.

A POSSIBLE VISION of Moche ceremonial life emerged one day from the huaqueros' lucky pit. A heavy copper scepter, more than three feet long and embedded in a side wall, had escaped earlier detection. When we freed it, we beheld at its top a curious and complex scene sculptured in miniature.

A supernatural creature, half feline and half reptile, copulated with a woman upon a dais canopied by a peaked roof. Forming a balustrade around this dais were mace heads ranged in double file. Above, on the ridgeline of the roof, 17 tiny double-faced human heads were each crowned with a horned helmet. Might the erotic scene represent a myth of world creation or fertilization of earth? Or perhaps the semidivine origin of Moche royal dynasties?

With its platform and pyramid and its mystique of a semidivine personage, Sipán must have been a focus of spiritual life in the Lambayeque Valley. Nevertheless we know little of the Moche's religion, although their well-planned burials testify to faith in an afterlife. The strange deity of the scepter—if deity he is—turns up in scenes on Moche pottery from widely separated locations and from different periods spanning hundreds of years, demonstrating his high and lasting importance. Only rarely, however, does he appear on a dais or throne-like platform, sheltered by an elaborately decorated roof.

I came to believe that a canopied throne or sanctuary once stood on the platform at Sipán, together with a small number of storerooms and housing for a favored elite.

It was difficult to restrain my excitement when in June 1988 we discovered the first fragments of clay heads, exactly the same as those represented in the scepter. For the first time we learned directly that the Moche decorated the roofs of their palace compounds or shrines with painted, baked-clay sculpture.

In such a reserved compound there would have moved servants, concubines, warriors, and priests, all attending a sovereign. Accepting homage and tribute, performing priestly duties himself, and standing confidently at the apex of the social pyramid with absolute power of life and death over his subjects, he must have seemed a demigod.

THE MOCHE had a keen sense of how best to distribute themselves in the Lambayeque Valley in order to wring the last drop of advantage from limited supplies of moisture. At Pampa Grande, 12 miles east of Sipán, they erected two immense platforms in the narrowest part of the valley, a natural chokepoint from which to control water flowing down from the cordillera.

The strategic location of Pampa Grande, the ruins of numerous storerooms at the base of its platforms, and huge quantities of potsherds point to it as the valley's administrative and urban hub. Ten thousand people may have lived there.

From Pampa Grande to Sipán the Moche constructed a broad irrigation canal, the lifeline of the valley. Sections of this high-banked channel still exist, and I've often driven its now dusty bed; cattle and schoolchildren also find it a convenient sunken thoroughfare.

Following gravity's lead, the Moche farmed wherever water would flow; their main canal supplied a vast system of irrigation ditches that permitted them to till right to the foothills of the Andes. Avocado and other fruit trees lined causeways lacing irrigated fields of beans, peppers, potatoes, squash, corn, peanuts, and manioc. There were harvests in all seasons.

With all arable land reserved for growing food, villagers found living space on a hillside beyond water's reach to the east of the platform at Sipán. Their houses were mud walled and roofed with thatch.

The Moche enjoyed a diet rich in protein and probably better balanced than that of many modern Peruvians. Fish from the nearby Pacific were eaten fresh or sun dried. They ate Muscovy ducks and guinea pigs. To drink,

PERHAPS A ROYAL INSIGNIA, a figure similar to that on the banners stands before a two-foot-wide gilded copper headdress. Bracelets of hundreds of tiny turquoise beads adorn the man's wrists, while shell beads from an adjacent pectoral ornament adhere to the large hands.

there was potent *chicha*, a cloudy beverage fermented from corn that had been ground and boiled. Deer, now rare, were abundant, but they were the exclusive prey of nobles. Crayfish in irrigation ditches supplemented seafood from the coast.

To fish, to hunt sea lions, and to reach offshore islands, Moche mariners voyaged miles from land in tiny, high-prowed boats made of reed bundles lashed together like pontoons. Kneeling or trailing their legs in the water as if astride horses, they paddled with split stalks of cane.

Even now some Peruvian fishermen venture to sea in such bobbing *caballitos*—little horses. In the coastal village of Santa Rosa, not far from Sipán, boats can be seen planted upright in the sand like surfboards to dry in the sun. These modern versions embody a feature the Moche would have appreciated: foam cores for added buoyancy.

STILL A RIDDLE as we ended our postmortem in and around the huaqueros' pit was whether the platform at Sipán concealed any other important Moche burials. We had unearthed at upper levels several modest graves of a later people who used the monument as a ready-made cemetery for commoners. We had also uncovered a section of the platform filled in with loosely compacted sand and small stones. As we probed this fill—it was old but clearly younger than the surrounding brick—the suspicion seized Luis and me that here the platform had been opened and resealed in Moche times.

The imprint of another set of wooden beams, long since rotted away, reassured us that we were on the right track. The ten-foot timbers had enclosed a rectangular chamber about four feet deep. Sand sifting through the roof gradually filled the chamber below. Against this smothering blanket we made slow headway with the archaeologist's dustpans and paintbrushes.

At last the flick of a brush bared the lid of a red clay pot, and tedium vanished. Now every fillip exposed small pots, bowls, beakers, jars. We eventually inventoried more than a thousand pieces in all, perhaps the greatest cache of pre-Columbian ceramics ever excavated.

The Moche had pottery for every need. They produced huge amounts of strictly utilitarian ware—for cooking, for storing water, for stockpiling dried beans and corn.

Other clayware bore intricate iconography. Red-and-beige patterns, kaleidoscopic at first sight, resolve themselves on second look into oft repeated motifs. One seen repeatedly in Moche art is the burial theme: Two men strain with a rope sling to lower a coffin-like shape into the earth. Subtle ceramic portraits depict warriors, hunchbacks, women giving birth,

agonized prisoners pinioned to racks, and erotic sexual encounters.

I have no doubt that master Moche potters many times worked from life. The personal details they incorporated in their art—down to warts and wrinkles—lend a striking individuality to faces split with laughter or peering cool and haughty behind tight-lipped smiles.

These portraits, as well as naturalistic representations of animals, plants, and insects, traditionally grace so-called stirrup-spout bottles—beautifully crafted vessels with a characteristic handle-spout. The sole example in the cache we found was tensed in a crouch: an alert-eyed iguana.

Hundreds of red clay beakers were more crudely but humanly styled, like so many gnomes. Their coarse surfaces, the absence of wear, and their often identical shapes betrayed them as copies of a few basic designs, mass-produced in molds.

In these motifs, prisoners sat naked and suffered the humiliation of leash-like rope collars. Musicians clutched drums. Some figures knelt, their throats hung with necklaces and their earlobes adorned with large ornaments. Others puffed their chests beneath beaded pectorals, or kissed the air in salutation of a deity.

In the tomb many of these mannequins stood arranged in symbolic tableaux, like figures in a Christmas crèche. Musicians and prisoners, for example, ringed and faced nobler personages. More trooped double file.

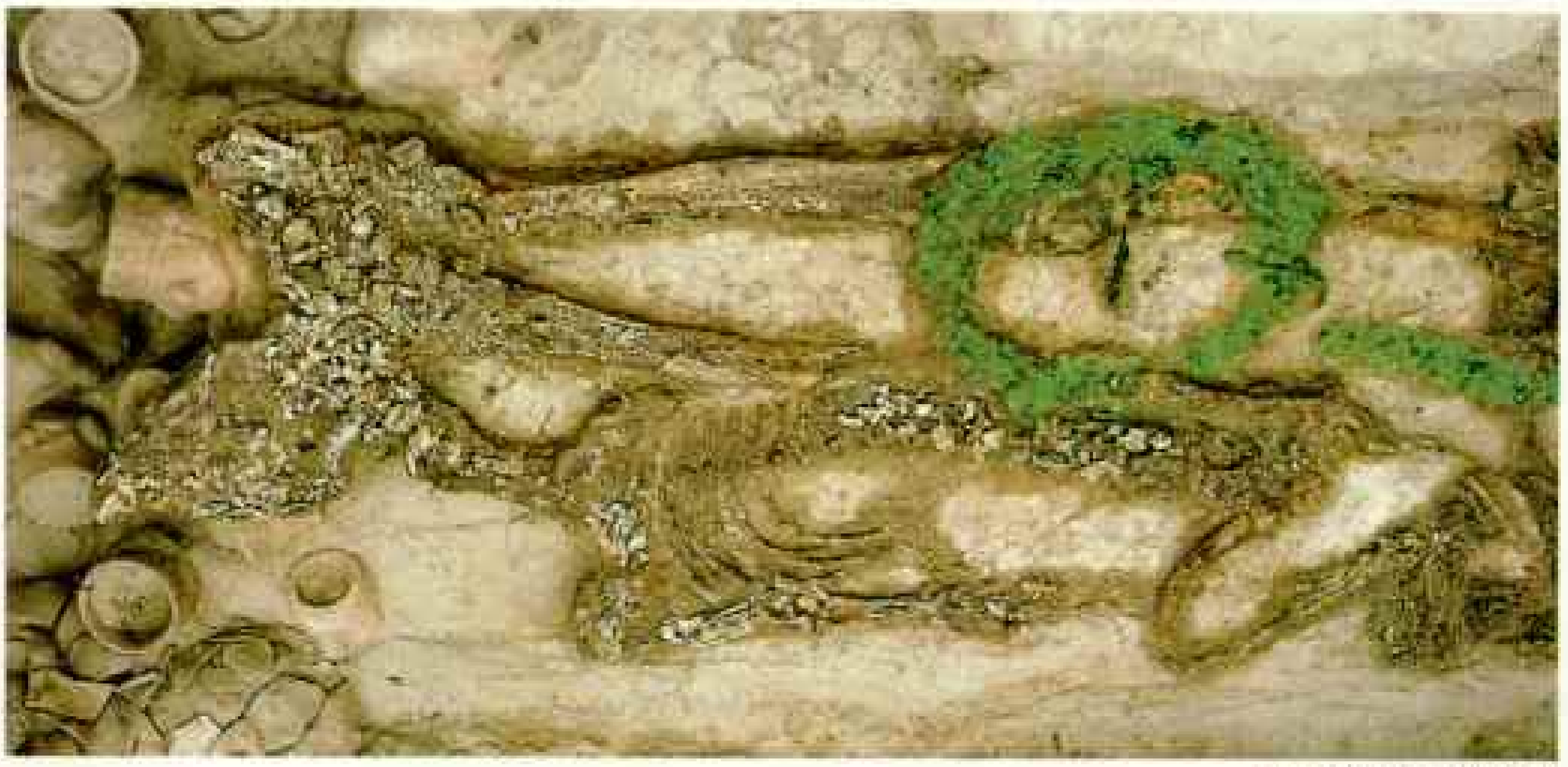
A few figures posed alone and apart, contemplating a half shell of *Spondylus,* a type of oyster venerated in Andean tradition as food for the gods, or meditating before deposits of llama bones. Llamas yielded food, wool for garments, and dung for fertilizer and fires, and served as long-distance freight carriers.

A macabre final discovery awaited us in the pottery chamber. Looking as if he had once been a contortionist, a man's skeleton lay jackknifed on its back, with chin, crossed arms, and knees all forced into a joint-popping tuck. More than anything, the remains resembled a bony embryo.

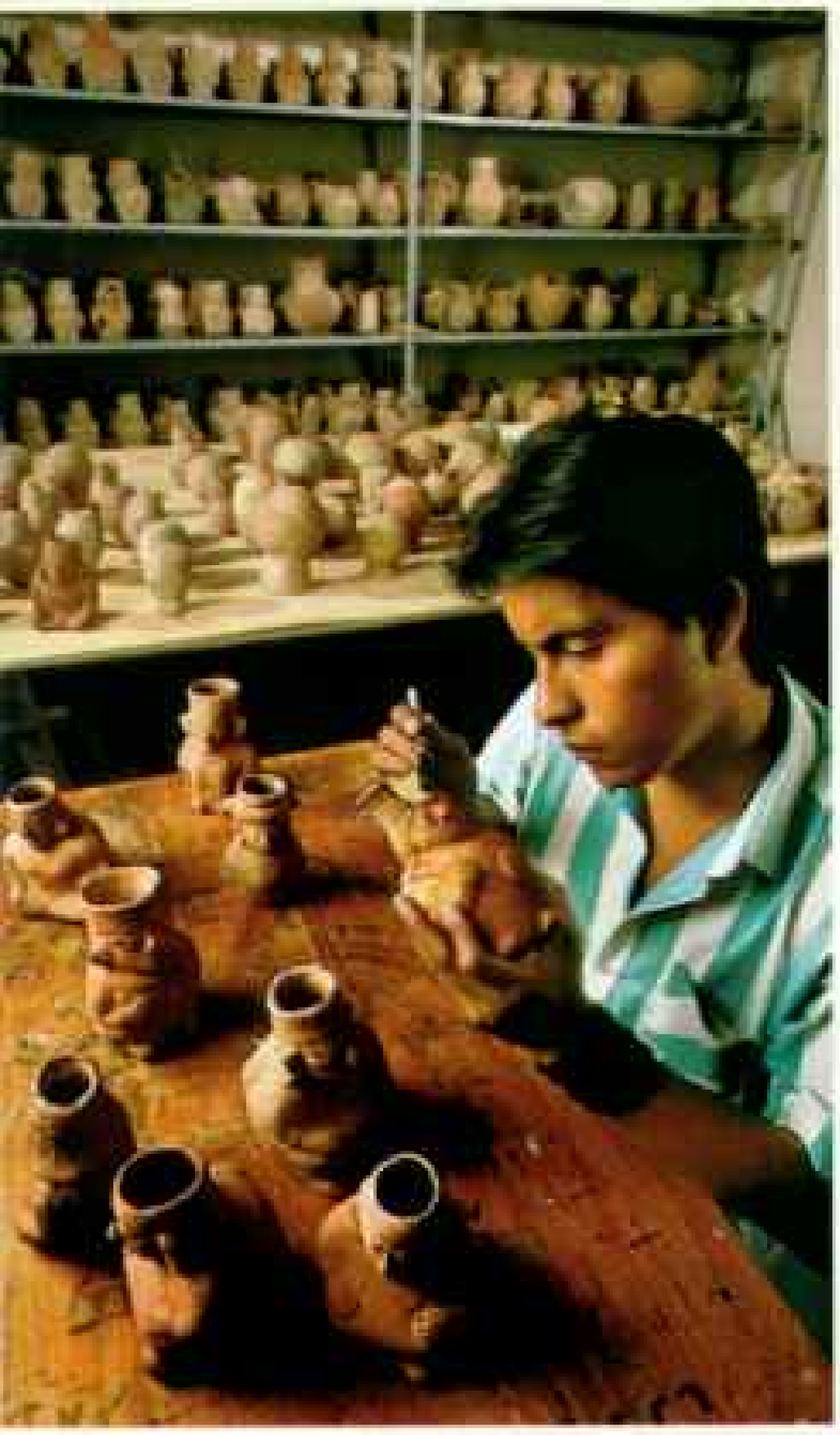
Nearby rested several semicircular copper sheets, once parts of headdresses, and a naturalistic human mask, also made of copper. Tantalizingly, they seemed not to be personal adornments of the contortionist. Thus his status could not have been so exalted as to demand llama sacrifices at his death and the hasty manufacture of a huge pottery collection. Could he have been a sacrificial offering—perhaps a voluntary suicide—buried to honor someone of far higher rank who might be entombed deeper in the crypt?

PIECES OF THE PUZZLE were unraveled by the author, shown cleaning one of dozens of red clay jars left as offerings, many in niches near the man buried with a dog at his feet (facing page). The dog's skull (below) appears at far left, with its ribs at lower center. A circular stain over the man's leg bones outlines a corroded copper artifact. The head of the woman who lay at the warrior-priest's feet (above) was wearing a large fabric-and-copper headdress bearing a mask at upper right.

WE PRESSED FORWARD with our search, turning to a different filled-in section of the platform. We burrowed daily until dusk; plumbed the mound mentally after dark. By lantern light Luis and I speculated endlessly about what might lie below our feet. A grand, undisturbed funeral chamber was our dream, although realistically we couldn't discount the chance



WALTER ALVA (TOP AND ABOVE)



that we might merely be rooting in debris dumped by the platform's builders.

Our expectations soared when, 12 feet below the surface of the platform, we came upon a second human skeleton. Badly deteriorated, it belonged to a man about 20 years of age. The position of the skeleton and faint traces of cane and fabric showed that he had been wrapped in cotton cloth and buried stretched out on his back.

There was other evidence of a solicitous burial. Lumps of copper still lay where they had been slipped into the dead man's left hand and mouth. A fragmented helmet of gilded copper rested upon his skull; a round copper shield covered his ribs. Obviously this person had been a warrior—a class profusely illustrated in Moche art.

Had the young warrior died in battle? A sharpened bone lay beneath his skeleton, but nothing told of death by violence, nor even by degenerative disease.

Yet the man's fate was certainly out of the ordinary, for we found no trace of his feet. The poor preservation of his skeleton made it impossible to tell if these had actually been amputated. Nor could we determine if they had disappeared before or after death.

As our expectations for the tomb rose, Luis and I began speaking of this strange warrior as the "guardian." And we grew convinced that his missing feet symbolized his duty to remain forever at his post, vigilant and on watch.

Guarding whom? We dug on.

BY EARLY JULY we had consolidated the guardian's delicate bones with acrylic preservative and disinterred them in a block—rather like quarrying stone. Painstakingly we probed for the boundaries of the chamber in which he lay.

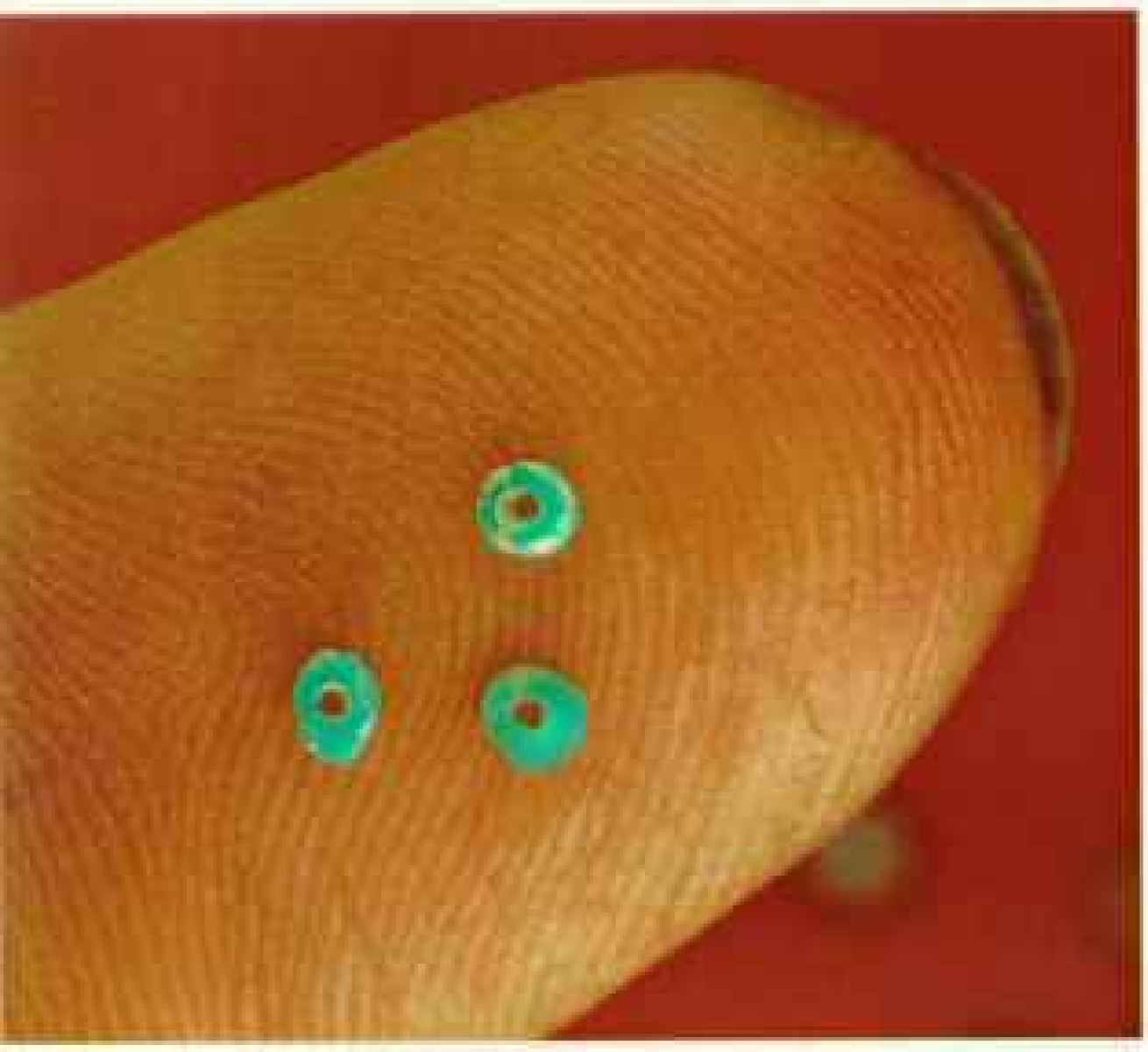
A stratum of adobe bricks guided us around the final corner of a square opening in the platform, 15 feet on each side. From the 12-foot depth where we had discovered the guardian, we began lowering the chamber floor. Twenty inches farther down we again found traces of wooden beams.

The beams themselves had long ago disintegrated, as had those found earlier. But the indentations they left in the earth and a few

SPRIGHTLY COLLECTION of red-clay figurine jars probably mirrors characters from Moche society such as a warrior with club and shield (above, at right), a drummer, at left, and, at center, a prisoner with a rope around his neck—the last a very common theme. Made from two-piece molds, the jars are cleaned (facing page) by one of several student volunteers from the author's alma mater, the University of Trujillo.

The tomb and a huge pottery cache discovered nearby contained more than a thousand pieces, one of the largest pre-Columbian ceramic collections ever found. It includes a stirrup-spout bottle in need of mending (left), which depicts a seated figure with copper ear ornaments. In their sculpture and complex fine-line drawings, Moche artists brought their world to life, showing scenes such as hunting, fishing, combat, punishment, sexual acts, and elaborate ceremonies.

Magic from Moche eyes and fingers



HOW MANY MOCHE ARTISANS could dance on the head of a pin? It almost seems that they could have, so intricate are the works that they somehow conjured up with early first-millennium technology. How did they make nearly microscopic turquoise beads, dwarfed by a fingertip? Archaeologists are baffled. Similar beads decorated the bracelets worn by the figures in the banners. Larger beads of shell and copper were strung together in one of the pectoral ornaments (below); the copper beads, now oxidized, have turned green.

The scholars were amazed when they beheld the intricacy of Moche goldwork. With holes the diameter of a modern needle (opposite, below), hollow gold beads were crafted from sheet-gold hemispheres fused together at the bead's midpoint. Such delicate adornments were strung into bracelets and necklaces.

Larger than life, a gold peanut faithfully reproduces ridges and indentations. It was part of two peanut necklaces found on the royal figure, the peanuts on his right side made of gold, those to his left of silver.

WALTER ALVA

crumbly fragments were revealing. Seventeen rough-hewn timbers, as much as eight inches in diameter and 13 feet long, had rested on a pair of cross supports. Radiocarbon tests later gave a date for this assembly as A.D. 290, plus or minus half a century.

By now we interpreted wood as the harbinger of a find. Sediments showed that some of the timbering had slumped a foot, suggesting a caved-in roof—and thus another chamber beneath. Then came a revelation that held us transfixed: Beneath our brushes materialized a bright green sheaf of ribbon-like copper strapping so artfully worked that the corroded metal resembled leather lashings.

With quickening pulses we dusted off seven more of the enigmatic copper straps. Together they marked the corners and sides of a rectangular area four feet wide and seven feet long that was faintly imprinted by three vanished wood planks.

For long seconds breath and words would not come; only a ripple of birdsong drifted into the excavation to break the enchanted silence. When we finally spoke, it was to babble: "A coffin! It's sealed. . . . Never opened!"

NO ONE ELSE in Peruvian archaeology had ever reported finding such a coffin. Not even Hiram Bingham, the American explorer who discovered several Inca ruins and who in 1911 slashed apart the jungly growth of centuries to reveal the mountaintop citadel of Machu Picchu.

Now more than ever we worked as carefully as surgeons laboring over life. To penetrate gingerly into the coffin, we used artists' brushes and air squeeze bulbs. Puff by puff, dust and sediment parted. Each layer and object was meticulously sketched and photographed where it was found. Quickly we understood that the contents of the coffin were layered and somewhat jumbled, disturbed by the fall of the chamber roof.

From fragments of gilded copper backed with brownish fabric, we made out two weavings, one embellished with four small figures of a single man, the other bearing a larger representation of the same man. In broad-legged stance, with arms upraised and fists clenched, he brought to mind a circus strongman flexing his biceps. I interpret the decorated weavings as being a personal ensign or royal banners.

A V-shaped headdress of gilded copper sheeting two feet across bore yet another figure of the man, with a nose ornament and owl necklace, thrusting out his chest in raised relief. The V flared widely—two outstretched arms with open palms.

Lifting a small clod beside the copper sheet, I gave a start—as who wouldn't, peered at by a meticulously detailed miniature man of hammered sheet gold, clad in a turquoise tunic.

This sprite—he stood no bigger than my thumb—may be the finest single item of jewelry yet to come from pre-Columbian America. Only under a microscope could we appreciate the exacting craftsmanship of its creator.

A tiny war club, seemingly gripped in his right hand, slid free to the touch. A gold ornament swung from the septum of his nose just as it might in real life. A miniature removable necklace was strung with pinhead-size likenesses of an owl's head; a pair of holes perforated each one to hold strands of gold wire. Tiny crescent-shaped bells swung from the little man's belt, and the tendons in his gold legs stretched taut.

MARTHA COOPER

By reassembling scattered bits of gold and turquoise that surrounded this homunculus, we later found him to be the three-dimensional centerpiece of an ear ornament, flanked by a warrior on either side.

NOW WE BEGAN uncovering the skeleton and lavish grave goods of the man in whose honor the gold effigy had been created: the Lord of Sipán.

A pair of gold eyes, a gold nose with two gold ornaments, and a gold chin-and-cheek visor overlay the Lord of Sipán's shattered skull like a death mask. A gold saucer-like headrest cradled the cranial fragments. Exquisitely faceted pieces of turquoise formed mosaics of deer, ducks, and warriors on three different sets of disk-like ear ornaments, including two fitted with the little man of gold and a matching companion.

MARTHA COOPER

Sixteen gold disks as large as silver dollars lay where they had adorned the royal chest. Perfectly round, they gleamed like miniature suns. Holes in the disks had been enlarged, as by a cord, indicating that the necklace had been worn regularly and not simply for occasional ritual display. Signs of wear identified other everyday items, including clamshell-like tweezers for plucking whiskers.

No such use marked the copper sandals we discovered on the feet of the Lord of Sipán. Strictly ceremonial wear, they were impossibly stiff for comfortable walking. Not that it mattered: Like Inca rulers, Moche sovereigns were often borne on litters.

The panoply of high rank seemed endless. We found four headdresses—two large gold crescents and two conical caps of cane fiber that were stitched with fine cotton thread and mounted with filigreed rondelles of gilded copper. Sediments in the coffin bore traces of feathers that adorned the copper-handled headdress ornaments.

Hundreds of minute gold and turquoise beads told of elegant bracelets, and thousands of white, coral, and red shell beads formed bib-like pectoral coverings. Five of these draped the chest and shoulders of the Lord of Sipán; two rested atop his legs; four more lay beneath his skeleton.

We found insignia of war: atlatl darts and a small symbolic war club with a shield in mid-handle.

I picked up a long rattle with a gold chamber that resembled an inverted pyramid. Its copper handle was sculptured with shields and battle clubs and terminated in a wicked-looking blade.

Scenes in relief on the rattle chamber were all too easy to decipher. In these a man wore much of the now familiar regalia of a Moche warrior. Tugging the hair of a hapless prisoner, he pitilessly thrust a war club at his head, bringing to mind the sacrifice of prisoners for blood offerings. I put down the rattle with the

NEARLY TWO POUNDS OF GOLD, a backflap buried with the warrior-priest is weighed by the author, at right, and his colleague, Luis Chero Zurita. At the author's request, an official of the Peruvian government's Department of Justice, standing behind them, legally registered all gold and silver artifacts before they were taken to the Brüning Archaeological Museum.

queasy suspicion that the Lord of Sipán had known all too well how to wield this symbol of his rank.

AND WHAT OF HIM, that fierce aristocrat: How did he die? Was he young or old? Did his people lament his passing? Bones in the tomb answer some of these questions.

First-millennium bones are often brittle, ephemeral things, and the skeleton of the Lord of Sipán was largely blackened splinters. We gathered shards of the skull, crushed as the timbers vaulting the coffin recess decayed and earth settled. Of other bones we found, only four vertebrae and the two heel bones remained whole.

We could not extricate this skeleton, like a fossil in stone, as we had the guardian's: That would damage artifacts lower down in the coffin. But coats of acrylic preservative hardened the disjointed bones in a unifying matrix of surrounding sediment; slipping slats of wood underneath, we carefully raised the skeleton.

From the Smithsonian Institution in Washington, D. C., physical anthropologist Dr. John Verano came to examine it. He gauged the Lord of Sipán to be five and a half feet tall and in his early 30s when he died. His back may have stiffened a bit at times from incipient arthritis, and a cavity etched a canine, but his full set of teeth showed little wear.

To what could this man in his prime have succumbed? We can rule out poor diet and prolonged bone-damaging or deforming diseases. But not, say, sudden death in an epidemic. Suddenly or no, the Lord of Sipán departed his people prematurely. A shocked society must have momentarily tottered, shaken and unbalanced.

And balance was mystically, profoundly important to the Moche. An eerie sense of this

DESIGNED TO SHIELD a warrior's backside, a backflap of copper, left, contrasts with an elegant gold backflap probably worn to enhance the ruler's power. Crescent-shaped bells showing the decapitator god crown both.

MARTHA COOPER

The royal gleam of gold

POWER SYMBOL that often appears with characters shown in Moche art, a one-pound crescent-shaped headdress ornament of gold with part of a copper pin remaining in its base affirmed the warrior-priest's authority. Around his neck gleamed 16 gold disks (right), with holes enlarged from long wear as a heavy necklace, here re-created. Copper disks adorn a gilded copper face (left, center).

A gold ear ornament inlaid with turquoise depicts a Muscovy duck (top left), probably raised for food. Moche artists stylized these ducks by

turning the bill 90 degrees so that it parallels the rest of the bird's profile. A similar ornament (bottom left) portrays a deer, now rare in the region. Deer hunting was an important ceremonial activity of Moche nobles. In previously known artifacts, deer often appear in association with a hallucinogenic plant and may have been invoked in healing rituals. Sea lions were also hunted on the coast, both for meat and for stones found in their stomachs—talismans still used in Peruvian folk medicine—which were believed to possess powerful medicinal properties.

crept over me as I lifted a pair of necklaces from the skeleton of the Lord of Sipán.

Those identical strings each held ten metal peanuts, similar to those looted. Five peanuts in each necklace were of gold, and all lay upon the Lord of Sipán's right side; matching silver peanuts lay to the left. Paralleling this, an ingot of gold nestled amid the bones of his right hand, an ingot of copper in his left.

The Lord of Sipán lay with head to the south and feet to the north, the position of his skeleton lying across the east-west axis of the platform. Such heed to the four cardinal points of the compass—to the four quarters of the world, the Moche would have said—is typically Andean. Very probably two and perhaps as many as four other royal tombs lie within the platform, and we can only wonder if they share this harmony.

At the head of the Lord of Sipán's coffin we uncovered the bones of one young woman and at the foot the bones of another. About 20 when they died, they may have been concubines of their master, if not his wives. One wore a copper headdress and rested on her right side, head pointing west. Her opposite was exactly that, lying with her head to the east.

Head to head with the women and flanking the coffin were the upward-facing skeletons of two men. Both had lived to around 40. Copper shield, headdress, and war club marked one as a warrior. The other, perhaps an assistant, lay buried with a dog, likely one of the spotted, whip-tailed breed that Moche iconography depicts chasing deer with aristocrats. It may have been the Lord of Sipán's personal and prized hound.

In final preternatural balance, the warrior and one of the women lacked left feet, so that their crippled legs ended at diagonally opposite corners of their master's sarcophagus.

A GOLD MASK covered the warrior-priest's lower skull from cheeks to chin. An elegant gold rattle depicting the beating of a prisoner (facing page) was found in his right hand and is remarkably similar to another rattle from the looted tomb (page 554). That specific link and others raise exciting questions. Was this entire adobe mound the final resting-place for a series of Moche rulers? How many more lie entombed?

I WATCHED from eastern hills one evening as the sun set beyond the platform and pyramid at Sipán. Backdropped by a flat horizon, distant from any visual yardstick, those commanding earthen heights seemed expressly sited to feed one's sense of awe and dreamy wonder.

When the glowing sky slowly flushed rose, I recalled Moche grave offerings of salmon-shaded *Spondylus* shells. It was not hard to imagine a funeral cortege making its way along a causeway across irrigated fields, a litter bearing the Lord of Sipán among his stricken people in final procession to his tomb. I pictured priests hollow-eyed with mourning, matching strides to carry the burden smoothly.

In my reverie, somber warriors trod heavily, the gilded copper royal banner flashing high above their nodding headdresses. Through the dreamscape, following the bier, came two young women soft and serene, escorted by a pair of warriors—one the guardian—and joined by another man, a hunting dog at his side. I fancied all their faces ecstatic, their minds filled with the coming embrace with death.

The sun's last rays faded, and in the deepening dusk the Lord of Sipán's platform and pyramid lost form and melted into shadow. Descending a stony hillside, I was thoughtful, tranquil. Mysteries of the Moche still baffled me, but no matter—I had seen and would not forget their majesty. * * *

Iconography of the Moche

Unraveling the Mystery of the Warrior-Priest

By CHRISTOPHER B. DONNAN

DIRECTOR, MUSEUM OF CULTURAL HISTORY
UNIVERSITY OF CALIFORNIA, LOS ANGELES

AS THE SIPÁN TOMB was being excavated and its contents cataloged, one question kept recurring to all who participated: "Who was this person?"

Analysis of the bones indicated an adult male about 35 years of age. The elaborate tomb, with its unusual plank coffin, accompanying male and female burials, and the quantity and quality of grave goods, attested to an individual of high status—a member of the nobility. But a more precise identification of this noble and the role he played in Moche society was possible through a careful study of Moche art.

The Moche civilization flourished on the north coast of Peru between A.D. 100 and 700. The Moche people had no writing system, but they left a vivid artistic record in beautiful ceramic vessels that were modeled with three-dimensional sculpture (left) or painted with fine-line drawings (center). These illustrate their architecture, implements, supernatural beings, elaborate ceremonies, and activities such as hunting, weaving, and combat.

During the past 20 years we have developed a major photographic archive of Moche art at the University of California, Los Angeles. This archive, containing more than 125,000 photographs from museums and private collections throughout the world, serves as an important resource for the study of Moche culture. The collection also provides tantalizing clues about the identity of the noble buried in the tomb at Sipán.

ARTIFACTS FROM PRIVATE COLLECTIONS; PHOTOS BY THE AUTHOR (LEFT) AND IRA BLOCK

As the tomb was being excavated, photographs of the objects were sent to UCLA for comparative study. Some tomb objects resemble in size and form those worn by the seated figure depicted in the ceramic vessel at left. Such vessels demonstrate not only how the tomb objects were worn, but also which objects would have been appropriately worn together.

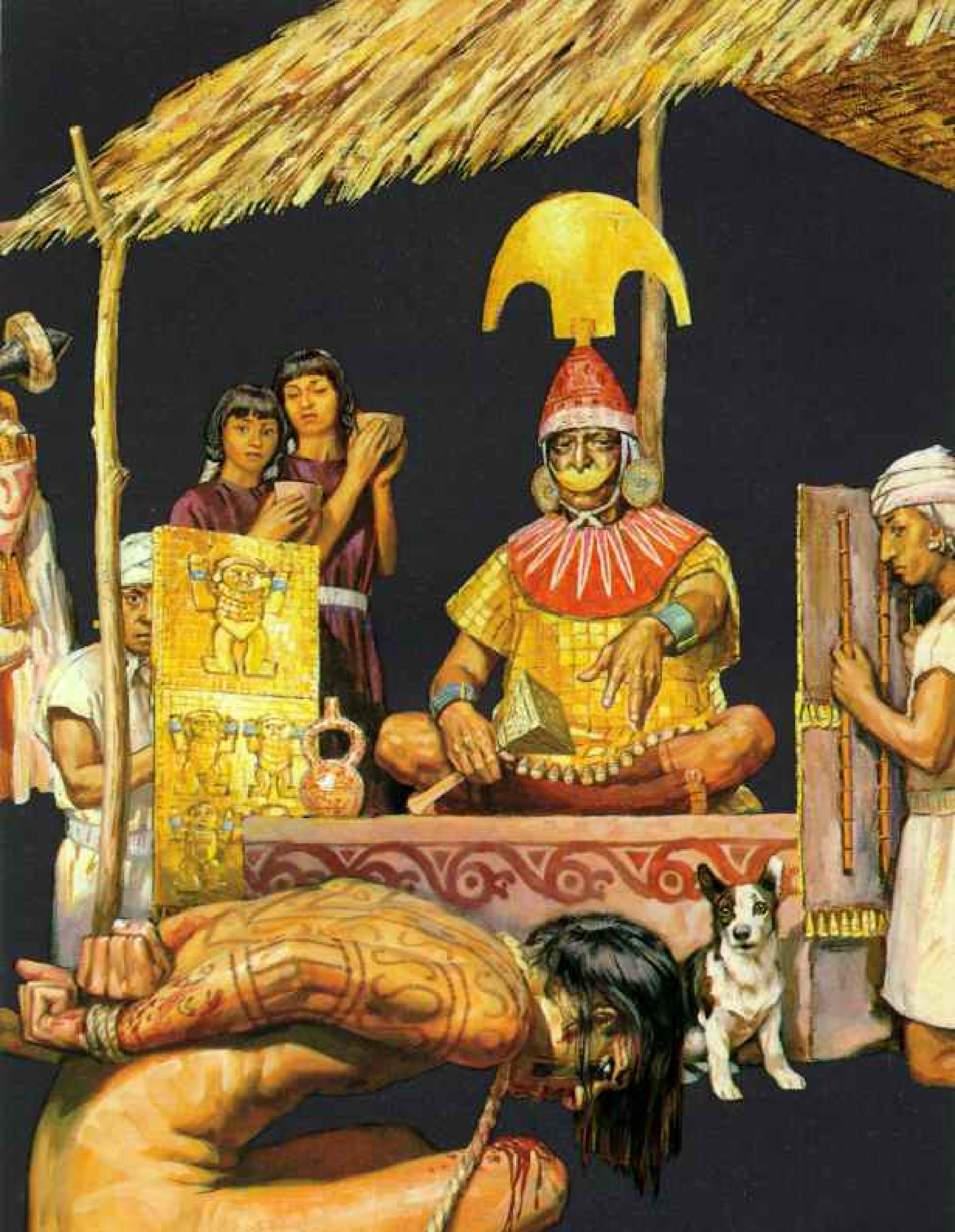
If we assume that the objects in the plank coffin were worn and used by the man during his lifetime, they indicate strongly that he was a warrior. Among them is the exquisite pair of gold-and-turquoise ear ornaments with standing figures (pages 516-17). The central figure is a warrior holding a typical Moche war club. His crescent-shaped headdress ornament, nose ornament, and bells that hang from his belt are identical with objects found in the coffin, indicating that they were worn as part of a warrior's costume (pages 529-531).

The two large backflaps found in the tomb, one of gold and the other of copper, further support the warrior role. In Moche art these are worn *only* by warriors, who often have one hanging from the back of the belt. Similarly the atlatl darts in the lower part of the coffin are identical with those portrayed in scenes of Moche combat. So too are the club and shield, represented by the miniature copper version found near the darts.

One other object in the tomb underscores the warrior connection—the gold rattle with copper handle that was grasped in the noble's right hand. The top and sides of the rattle chamber depict an elaborately dressed warrior holding a crouching figure by the hair while hitting him with his war club.

FACING DOOM, their clothes hanging from captors' war clubs, prisoners are presented to the warrior-priest as attendants display his royal banner. The scene incorporates elements from Moche pottery drawings as well as artifacts from the tomb.

PAINTING BY JAMES M. GURNEY



The tomb's multiple sets of combat objects, their exquisite craftsmanship, and the fact that they are made of gold and silver indicate that this warrior was of unusually high status and possessed special qualities. To understand why, it is necessary to understand the role of warriors and combat in Moche society.

Moche art provides numerous depictions of military equipment, warriors, and warrior activity. Some scenes show warriors parading as though in preparation for war. Others depict combat: warriors hurling slingstones and atlatl darts at the enemy from a distance and using war clubs at close range.

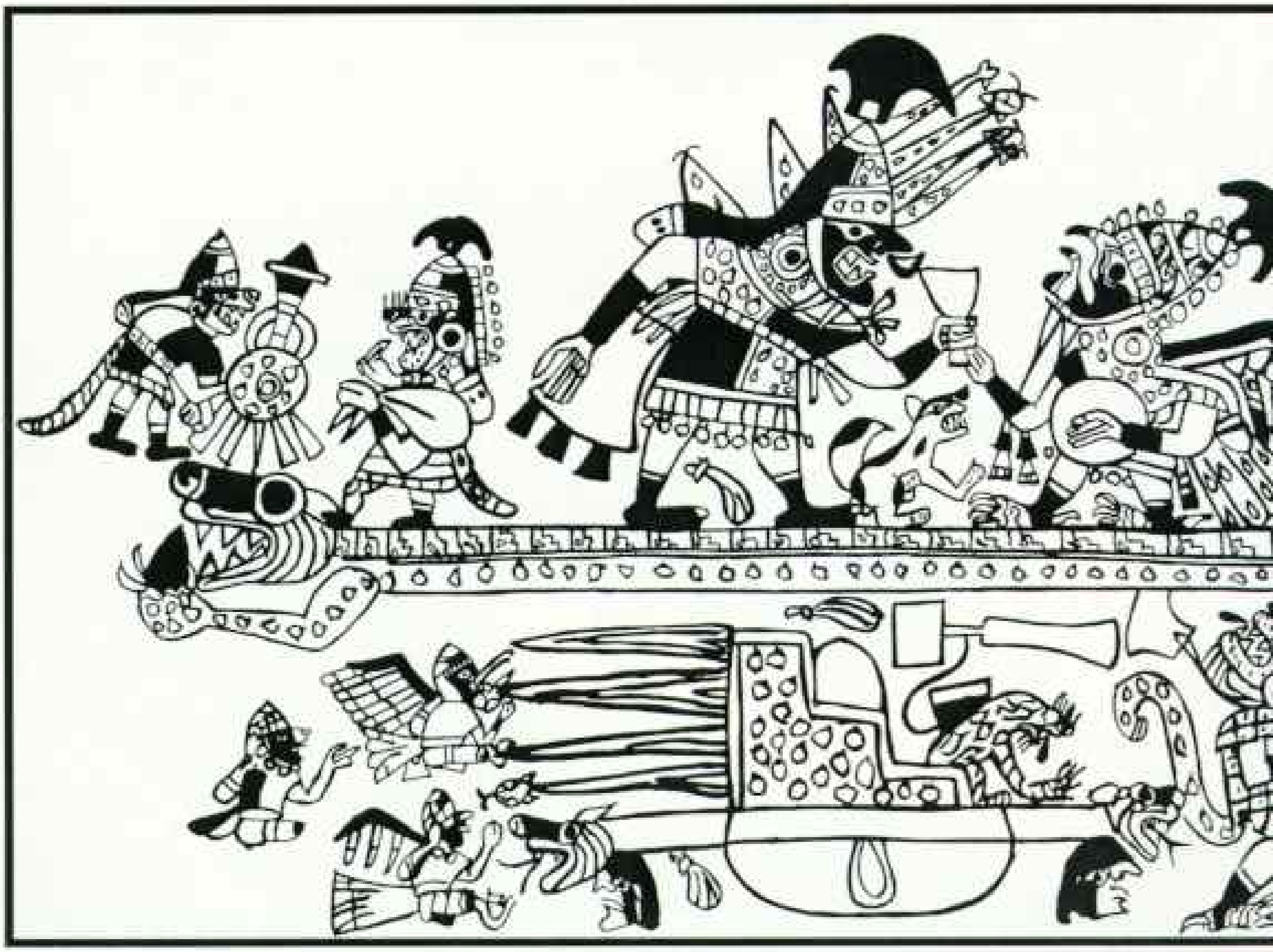
The artistic depictions show that a primary purpose of Moche warfare was to capture enemy warriors. Once they were taken prisoner, their weapons and clothing were removed and hung from the war clubs of their captors. With ropes around their necks, the prisoners were paraded, formally presented in courtly scenes, and ultimately sacrificed.

CHRISTOPHER B. DONNAN, COURTESY ERNESTO POLI COLLECTION (ABOVE); DRAWING BY DONNA MCCLELAND (BELOW)

The killing of captured warriors occurred at a special ceremony in which their throats were cut and their blood presented in tall goblets to elegantly dressed individuals—an event frequently depicted by Moche artists. The ceremony involved a specific cast of participants, recognizable by characteristic poses and garments.

One Moche ceramic bottle bears a highly detailed depiction of the sacrifice ceremony, painted in fine-line drawing around its chamber (below).

In the lower right of this scene are two captured warriors sitting cross-legged, their hands tied and their throats being cut by figures standing beside them. In the upper part of the scene a warrior-priest receives a tall goblet from a bird warrior.



The warrior-priest, with rays emanating from his head and shoulders, is the primary figure at the sacrifice ceremony. He is normally accompanied by a spotted dog. In addition to his conical helmet, he always wears a crescent-shaped headdress ornament, large circular ear ornaments, large bracelets, and a warrior backflap, and is frequently shown wearing a crescent-shaped nose ornament. Since each of these items was found in the tomb, could it be that the noble was actually the warrior-priest we see participating in the sacrifice ceremony?

One more piece of evidence seems to substantiate this conclusion. Beneath the warrior-priest in the scene below is his litter, with rays projecting from the backrest. A rattle like the one found in the tomb lies horizontally above the front of the litter, with its chamber on the left and handle on the right. This type of rattle is seldom depicted in Moche art, but existing examples indicate it was part of the ritual paraphernalia used at the sacrifice ceremony.

The fact that the rattle is tied to the litter in the scene below indicates that it is the property of the warrior-priest. When we consider that the man in the tomb was buried holding one of these rattles in his right hand, his identification as the warrior-priest seems certain.

This identification is particularly interesting since the royal tomb that was looted at Sipán in February 1987 contained many objects that are nearly identical with those found in the excavated tomb. These include large beaded bracelets, circular ear ornaments, a gold knife called a *tumi*, a crescent-shaped headdress ornament, and gold and silver peanut beads.

The looted tomb also contained crescent-shaped bells and a warrior backflap, all decorated with scenes of a beheading we call the decapitator motif. Moreover, it contained a gold rattle with silver handle (left) that is nearly identical with the rattle in the excavated tomb (page 549).

This strongly suggests that the looted tomb also contained a noble who enacted the role of a warrior-priest at the sacrifice ceremony. Could it be that Sipán was the designated burial place for these priests? As additional tombs are excavated in the burial platform, this question may be answered.

The royal tombs at Sipán have provided an extraordinary opportunity to correlate ancient artifacts with what is depicted in Moche art. Perhaps the greatest treasure in these tombs is the priceless information they contain—information that is helping to reconstruct the ancient civilization of the Moche. □

THE AFRIKANERS

Fatigue haunts an Afrikaner steelworker near Johannesburg. As South Africa's "white tribe," Afrikaners have been both a despised and triumphant minority in a land long tormented by conflict.

By ANDRÉ BRINK

Photographs by DAVID TURNLEY
DETROIT *FREE PRESS*

The heart of being a Boer, or farmer, is attachment to the land. In the Orange Free State farmers finish soft drinks during corn harvest while servants wait. The dream of the soil persists even in the memories of those who have moved to cities.

THE OLD MAN was quaking with rage. On a chair against the wall his wife was slumped, sobbing quietly. And on the edge of the small bed sat a pale young man, his blond head bowed but his body rigid in defiance.

"It would have been easier for me," said the father, his voice trembling, "to have been told my son was dead. Rather than *this*."

I felt like an intruder in that intimate and agonizing scene. Half an hour earlier the young man, a white postgraduate student in my department, had telephoned to ask me to come to his digs. He had just informed his parents that he was in love with a girl classified as Coloured (that is, of mixed blood).

"What will become of us?" asked the old man in horror. "I must give up my job in the church. Not one of our friends will speak to us again."

"He is still our child," the mother whispered in quiet desperation; her husband did not even seem to hear.

The episode illustrates a point made by Willem de Klerk, sometime editor of the leading Afrikaans newspaper *Rapport*, before he was forced to resign because of his criticism, however mild, of the government: "The Afrikaner is bursting out of his definitions of himself as well as those of others."

There were no problems with these definitions in my childhood. As a boy I lived in a succession of small villages in the arid interior, where English was an almost unspeakable foreign language, where the only black people one encountered were servants or laborers, where God was a daily reality and visions of apocalypse pervaded one's dreams.

Some of my earliest memories—images that persist as archetypes in the collective Afrikaner mind—derive from a feeling of snugness and security, staring out at the world from a brightly colored wrap that held me tightly to the motherly back of a black nanny whom I knew as Aia, or squatting on the back porch eating *mieliepap* (corn porridge) with this woman, scooping handfuls from a black iron pot and molding it in my small fist before tucking it away.

I remember visiting my maternal grandmother in Bedford in eastern Cape Province and the solemn family excursion every Sunday afternoon to the churchyard where, beside my grandfather's tombstone, my

grandmother's own grave had already been dug. Other summer holidays were spent in the Boland, the "upper country," of western Cape Province with its Mediterranean climate, often on the fruit farm of my *Oom* (Uncle) Jannie at Tulbagh. He was one of the country's expert vintners (having studied in France, something almost unheard of in his time) until my pious Aunt Dolly, persuaded of the sinfulness of drinking, instructed him to uproot every single vine on the property.

I remember farms where all the boys, black and white, would roam the veld together and make clay oxen, or cavort in the dam, or tend the sheep, or milk the cows, without thinking about black or white. Only later, by the time we turned 12 or 13 and the farmers' sons began to go to boarding school in town, did the white boys settle into their roles as masters and the black ones become their servants.

I remember how transfixed I was by the words of our prime minister, Dr. Daniël Francois Malan, who intoned at the inauguration of the Voortrekker Monument outside Pretoria in 1949: "Believe in God, believe in your people, believe in yourself." In our sitting room for a long time "Mum's election hole" used to be pointed out to visitors—a

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ANDRÉ BRINK, who teaches at Rhodes University, is the author of novels translated into 25 languages, including the recent *States of Emergency*. Photographer DAVID TURNLEY's book on South Africa, *Why Are They Weeping?*, will be published this month by Stewart, Tabori & Chang.

Hearts fixed on heaven, deacons of the Dutch Reformed Church in Swartruggens, a farm town in the Transvaal, sing hymns. Some 90 percent of Afrikaners are church members, ranging from whites-only separatists to advocates of a multiracial congregation.

reminder of the famous 1948 elections when my mother was so elated at the news of the pro-British prime minister, Gen. Jan Christiaan Smuts, losing his seat and the Nationalists coming to power that she jumped right through the floor.

Stereotypes persist, and a caricature of the Afrikaner has been perpetuated in the mind of the world: The rough-edged frontiersman, gun in one hand and Bible in the other, inspired by the conviction of his covenant with God, his divine mission to tame the wilderness and subject the black heathen; his life determined by an obsession with racial purity and an atavistic brand of Calvinism based on an Old Testament view of the world; suspicious of sophistication and most things modern; and ever ready, when confronted by dangers real or imaginary, to retreat into the *laager*, that ring of ox wagons symbolic of 19th-century clashes with black enemies.

If indeed there used to be a stereotype of the Afrikaner, it is no longer applicable. The angry young poet Antjie Krog, 35, who lives in Kroonstad, the Orange Free State version of any midwestern town in the United States,

The gilded city, Johannesburg was launched by the discovery of gold on the Witwatersrand in 1886. Prominent lawyer Billy van der Merwe, here with associates, represents the Afrikaner's ascent to power in realms of law, finance, and industry in recent decades. Some 2.6 million Afrikaners make up more than half of South Africa's white population, but less than 10 percent of its total population. Afrikaners hold nearly all top government and military posts. More than 80 percent live in cities, compared with 40 percent 40 years ago.

says: "Sometimes I envy our parents. They knew exactly what it meant to be an Afrikaner. My generation no longer does."

THE NAME Afrikaner was used as early as 1707 during the struggle of Dutch and French Huguenot colonists against the nepotism of Cape Governor Willem Adriaen van der Stel and his get-rich-quick officials, when the unruly young Hendrik Bibault resisted arrest: "I won't go," he said, "I am an Afrikaner, and even if the *landdrost* [magistrate] beats me to death or puts me in jail, I shall not be silent." At that time the name simply referred to someone born on African soil, in contrast to officials of the Dutch East India Company who, from 1652, were sent from Europe to run the small victualing station at the Cape.

For almost two centuries afterward Afrikaner designated mainly persons of mixed blood. The Afrikaans language was partly shaped by slaves and others who could not speak proper Dutch.

Even today the term remains loaded. Many whites insist that it embraces Afrikaans speakers from the white race only (some would go so far as to exclude even fellow whites who do not belong to the Dutch Reformed Church and the National Party). Some Coloured speakers of the language (many of them also members of the Dutch Reformed Church) accept being called Afrikaners; others, affronted by the ideological content of the term, object vehemently. All this makes it necessary to explain that this article deals specifically with what has become known as "the white tribe of Africa."

During the century following the clash with Governor Van der Stel, at least three different branches of Afrikaners emerged. Some became officials in the service of the Dutch East India Company and later of the British; some of these displayed remarkable business and judicial acumen and were quite liberal in their views. A second group continued farming in the vicinity of Cape Town, maintaining some contact with Europe. A third group, the *trekboers*, many too poor to survive on their own but too proud, in a slave-owning society, to do manual labor for others, trekked into the vast interior to establish patriarchal families—"a master, his wife, his children, and his dependents."

But gradually the frontier was closing around these trekboers—especially after the Cape was first occupied by the British in 1795, followed by permanent occupation in 1806. Though most acquiesced to British rule, between 10,000 and 20,000 (less than 20 percent of Afrikaners in the frontier districts) set out on the Great Trek between 1834 and 1840 to attempt survival on their own.

This exodus brought increased contact with black peoples, and what, to whites, was a great evasion was experienced by blacks as a great invasion. In many instances the two peoples managed to negotiate some form of coexistence; more often there was fierce conflict, culminating in Natal in the Battle of Blood River (1838), where a few hundred Boers repelled an attack by more than 10,000 warriors of the Zulu king Dingane.

BLAAUWBAANTJE, BY THOMAS BAINES, CIRCA 1854, AFRICANA MUSEUM, JOHANNESBURG

AFRIKANERS

The stubborn white tribe

What force drives Afrikaners? "The urge to be left alone," says author Brink. Thus Boers turned their backs on British rule and pressed inland in the Great Trek of the 1830s. Once there, adds Brink, they lived "as far apart as possible: The mere sight of a neighbor's smoke on the horizon could be reason for suspicion." Even today, "hands off, that's our problem" bristles from Afrikanerdom's highest levels.

In the push for elbow room, trekkers ran up against area tribes. In December 1838, at Blood River, some 500 Boers defeated more than 10,000 Zulus. A painting depicts Zulus attacking a Boer camp (above) in an earlier battle. Victory was taken as divine approbation; God had chosen sides. Years of battling black tribes stiffened racial attitudes. In 1948 the National Party instituted apartheid, literally "apartness." In recent reforms many beaches, cinemas, and restaurants have been integrated. Passbooks that blacks once carried to permit travel have been abolished. But apartheid's framework stands. Under the Group Areas Act, blacks, Coloureds (those of mixed blood), and Asians must live in segregated enclaves. A tricameral Parliament gives nominal representation to Asians and Coloureds but ignores blacks who cannot vote.

The Afrikaner sees himself besieged by a world that demands he give up land he bled for. Most regard yielding power to a black majority as intolerable. "Once you've given power away, you can't get it back," says one. Meanwhile, South Africa sees no end to confrontation.

1652-1850s

The Dutch East India Company founded Cape Town as a provisioning station in 1652. Wars, loss of land, and disease decimated the native Khoisan. Colonists born on African soil became known as Afrikaners. In 1806 Britain wrested power from the Dutch. To escape British control, Boer farmers journeyed into the interior during the Great Trek of the 1830s and battled tribesmen.

1850s-1902

The dream of freedom from British rule culminated in the founding of Boer republics in the Orange Free State and the Transvaal in the 1850s. But the discovery of diamonds in 1867 and gold in 1886 ended Boer isolation and led to conflict with Britain, eventually sparking the Anglo-Boer War. Britain triumphed and South Africa became part of the Empire.

PRESENT

In 1961 South Africa became a republic. Under the National Party's system of apartheid, blacks were to be cordoned off. Some 73 percent of the population was offered "independence" in ten homelands consisting of 13 percent of the country's territory, much of it marginal terrain. Four homelands have accepted these terms.

Scale varies in these perspectives. Maps show present drainage.

NGS CARTOGRAPHIC DIVISION
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PRODUCTION: ALFRED ZEBARTH, JAMES E. MCCLELLAND
MAP EDITOR: JOHN T. BLOZIS

Boers won early victories in the Anglo-Boer War, then resorted to guerrilla tactics in face of a British buildup. The British broke resistance by putting Boer families in concentration camps and burning their crops.

1652-1850s

1850s-1902

PRESENT

Standing foursquare behind a marriage of four decades, Danie and Tienie Nortje show their wedding photograph. In 1903 his family trekked from the Cape to the Transvaal with only a cow and two oxen. Such fortitude had typified Boer guerrillas in the Anglo-Boer War (below). "Independence among them was so strong . . . it proved impossible to maintain discipline in armies that . . . humiliated the imperial superpower in the early months," says journalist Joseph Lelyveld.

CULVER PICTURES

December 1988 marks the 150th anniversary of the battle. The centenary celebrations in 1938, with their reenactment of the Great Trek, became the catalyst that caused Afrikaner national consciousness to crystallize in the form the world knows. Today, with Afrikanerdom torn apart by infighting, the new celebrations acquire particular significance in recasting the past in a heroic mold in an attempt to reunite the *volk* (people, nation).

But the event also highlights divisive forces in society as two opposing series of festivals unfold—one organized by the government, the other by the extreme right wing in the political spectrum that wishes to exploit the occasion toward the attainment of a new whites-only Afrikaner state carved out of the Republic of South Africa. Both celebrations kindle suspicion and resentment among the black majority, which perceives the threat of white supremacy reconfirmed.

The discovery of diamonds at Kimberley and gold in the Transvaal prompted Britain to become more aggressive toward the two small republics the trekkers had formed, and after the devastating Anglo-Boer War (1899-1902) they lost their independence. In 1910 South Africa became a union within the British Empire. But deep animosities surrounding that war persisted, and even today many Afrikaners react with rage to the memory of 18,000 to 28,000 women and children who died in British concentration camps (as compared to the 7,000 Boers who died in battle).

Ever since union two major attitudes in Afrikaner politics have prevailed—on the one hand the conciliatory and fairly liberal policies of General (later Field Marshal) Smuts and his successors, on the other the narrow brand of nationalism championed by the party that finally came to power in 1948 with apartheid as its battle cry. For the first time in their history, Afrikaners had come to power in South Africa on their own, and they had no intention of relinquishing it to anyone else. They brought to their new task much of the crude skill through which they had survived for three centuries as a largely rural people.

WHAT STRIKES ONE today is that so many Afrikaners (more than 80 percent in 1985 as opposed to just over 40 percent in 1946) have become city dwellers, many of them as sophisticated as any slicker from New York or Sydney. One of the first Afrikaners to reach the top in South African industry—until comparatively recently the near monopoly of English and Jewish businessmen—was Albert Wessels, who progressed from barefoot farm boy in the western Free State to chairman of Toyota South Africa Ltd. with assets of more than 300 million dollars. The white-haired, urbane Wessels, now 80, recalls how after the Anglo-Boer War his parents returned to their farm to find the homestead burned down, the

The baas, or manager, of a government-owned vineyard near Cape Town trucks farmhands home. The economy depends heavily on abundant, cheap labor. Some workers make only $60 a month; women may earn only half as much as men.

orchards and garden parched, the fields barren after three years, and no stock or seed with which to start again.

Yet somehow the family made a new start, and his mother, strangely unscathed by bitterness, insisted on a sound education for her children. Wessels embarked on a degree in theology (with teaching, the traditional professions for "clever" young Afrikaners), but finding that he was too critical-minded for the church, turned to business instead.

"It became a matter of conscience to succeed in the economic sphere in order to prove to my Afrikaans compatriots that we could become the equals of the English," he says. To Wessels, as to others like him, big business never became an end in itself but remained an effective means of furthering the "Afrikaner cause" and the image of the Afrikaner as a worthy man of the modern world.

Among the younger generation of achievers there seems to be less concern about "demonstrating" something; achievement becomes its own justification. A case in point is Naas Steenkamp who, at 55, has reached the top in the mining profession as president of the powerful Chamber of Mines.

"It's not a matter of what group you belong to," he says, "but of personal abilities."

Even today Steenkamp has little time for "sentimentality about Afrikanerdom."

And yet. . . . Taking me outside his home high on a *koppie* (hill) in the fashionable Johannesburg suburb of Melville, Steenkamp showed me the stretch of land far below where his grandfather's farm had been. He knew intuitively that he *had* to buy this house and complete a circle.

On the farms and in the little dusty *dorpies* (villages) of the interior, a new breed of Afrikaner has appeared. Larger than life among them looms Oloff Hennig, lord and master of several farms on a small fertile plateau above Piketberg. Oloff is well over six feet tall, with the physique of a buffalo and a voice like a peal of thunder.

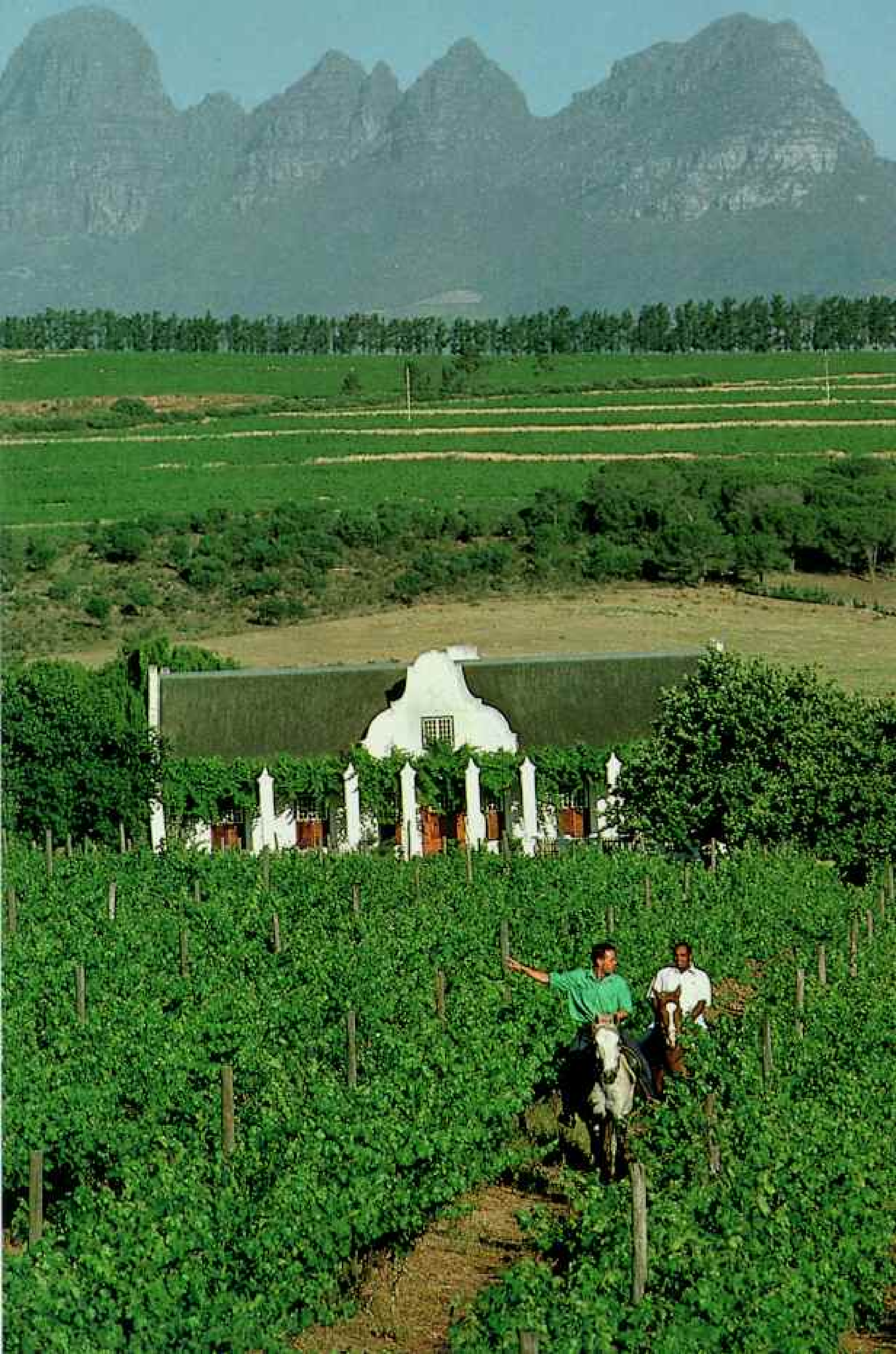
Oloff also comes from humble origins, and it was many years before he and his wife, Gill, owned land. Once they did, Oloff became one of the first farmers in the area to buy a computer; using the most up-to-date scientific methods, he has turned his orchards into a major concern. In South Africa he is the acknowledged king of *buchu* (a medicinal herb), has a stake in west-coast real estate, and is a breeder of racehorses.

Oloff rules over his laborers like a feudal squire of medieval times; at the same time he has ensured that they are all comfortably housed, with TV laid on in an extensive recreation center. "Don't talk to me about apartheid," he says, waving a colossal hand. "I can't stand all this meddling by the government. Look at the schools: White schools standing half empty, Coloured schools overflowing. Why can't they be shared? They should leave it to us to make our own arrangements."

NOT ALL present-day Afrikaners are well-to-do, of course. Donald Riekert, who lives in close communion with nature in Kuruman at the edge of the Kalahari Desert, actually regards wealth as the greatest curse of the Afrikaner. "The day our volk got rich, it lost its soul," says Riekert. "I often think that the worst sin the Afrikaner has learned to commit is to want to hold on to everything; he's lost the capacity to *give*." Don worked in a café for years to support his studies by correspondence, and nowadays he runs a small photographic business while producing his own brand of folk poetry.

Riekert's father grew up in dire poverty on a drought-stricken farm, feeding mostly on blackthorn honey, prickly pears, and locusts. During World War I—at 16, though he pretended he was 18—he joined the army to fight the Germans in German Southwest Africa. He stayed on for several years and returned home as a lifelong convert to the German way of life, with Bismarck, Radetzky, Moltke, and Hindenburg as his heroes. Don had planned to call his own firstborn Maxmiliaan Maria Joseph Freiherr von und zu Weichs an der Glon. But unfortunately—or fortunately!—the child turned out to be a girl.

Between the two World Wars a number of future cultural and political leaders studied in Germany, where they were profoundly



impressed by what they saw as the resurrection of German pride and strength after the humiliation of 1918. On their return to South Africa they were faced by their own people who, economically broken by the Anglo-Boer War, were moving to the cities, establishing an entire generation of poor whites. What war couldn't do was nearly achieved by poverty; that, and a terrible drought in the early thirties, linked to the Depression, threatened to extinguish the Afrikaner people.

They were saved mainly by cultural and social welfare organizations inspired by political motives. Among these was the Afrikaner Broederbond, or League of Brothers, a secret organization to promote the Afrikaner cause. Significantly it was born, in the words of its initiation rite, out of "the deep conviction that the Afrikaner nation with its own nature and task was called into being in this country by God's hand . . . for as long as it pleases God, to remain in existence."

In many of these organizations key roles were played by the leaders newly returned from Hitler's Third Reich. They also had a hand in the continuing rewriting of Afrikaner history, creating a new mythology to bolster national consciousness, and eventually in the victory of the chauvinistic core of Afrikanerdom in the elections of 1948.

Consigned to the earth he helped till, a laborer is buried at a funeral (below) attended by Hannes Myburgh, eighth-generation owner of Meerlust Wine Estate. Foreman Cassiem Africa (opposite, at right), fifth generation of his family to work the property, rides with Myburgh, who works to improve his laborers' living conditions and helps educate their children. "In the old days it was more master-servant; I don't want that," he says.

TRADITIONALLY the church has played a key role in the structuring and cohesion of the volk, but in recent times Afrikaners have become more ambiguous in their attitudes. Donald Riekert doesn't regularly go to church, and to the horror of some of his neighbors, he has not even had his children christened. Yet he would never dream of setting out on a trip by car without first asking the Lord's blessing.

In my youth, on Oom Jannie's farm, we had to spend the interminable Sunday afternoons indoors—those sweltering summer days redolent of ripening fruit and crushed grapes and bruised grass, resounding with birdcalls and the alluring murmur of a cold mountain stream under ancient oak trees in the farmyard—forced to read Bible stories or "uplifting literature." Today many younger Afrikaners never set foot in a church—although before a meal they may still hold hands and intone a prayer.

There are no fewer than three Dutch Reformed Churches, each with the same confessions of faith, same language, same people, in the same country. The Nederduitse Gereformeerde Kerk (NGK) has 1.5 million members, as opposed to the 200,000 of the Nederduitsch Hervormde Kerk and half that number of the Gereformeerde Kerk. More than 70 percent of all Afrikaners belong to the three Dutch Reformed Churches.

In 1987 the extreme right wing in Afrikaner politics, rebelling against a recent decision of the NGK to open its doors to all races, formed yet a fourth branch, the Afrikaner Protestant Church. In addition, of course, there are separate Dutch Reformed Churches for Coloureds and blacks. The situation is compounded by the fact that more and more Afrikaners, ill at ease among the political tensions of the white church, become members

of these later branches. One of the first to do so was Beyers Naudé, once an important figure within the Broederbond as well as a leader within the Dutch Reformed Church.

In 1963, no longer able to agree with the clandestine methods of the Broederbond, he was instrumental in exposing the organization's secrets in the press; soon afterward, when he refused to give up his position as editor of the liberal publication *Pro veritate*, he was forced to resign his position in the church. In 1977 he was placed under banning orders, and in due course he joined the (black) Dutch Reformed Church in Africa.

"When people become entrenched in their positions as enemies," he recently told me, "the danger is that they can no longer think of any other form of existence. It has happened in Northern Ireland. It is also happening to Afrikaners. We have lost our faculty of compassion."

Anton Vorster, the young man who was disowned by his pious father when he decided to marry a girl of mixed blood, traces many of the roots of that family break to religious experience: "The church played a central role in my youth. My father gave large amounts of money to 'our' church, but when a black preacher came to the door to ask for a contribution, he was told very patronizingly to approach his 'own' people."

FOR CENTURIES the church fulfilled more than a religious function in Afrikaner society: It offered almost the only occasion for social gathering. *Nagmaal*, or Holy Communion, once every three months, brought farmers in outlying districts to town to attend the church services, and also to sell their produce, mingle with their fellowmen, and enjoy the great variety of events made up of *boeresport*—pillow fights, three-legged races, catching a greased pig, tug-of-war, and innumerable others. At New Year's this would invariably be rounded off with an all-night ball in a barn or farmyard, accompanied by drinking on a great scale—*witblits* (white lightning), *mampoer* (peach brandy), or more innocuous ginger beer and lemonade.

With the dawning of a more urbanized age, these social events have almost died out, though they still mark festive occasions like Heroes' Day, New Year's Day, or Easter Monday. In small communities eating is still a popular pastime that brings people together, whether at wedding or funeral receptions, church bazaars, *vendusie* (cattle auctions), agricultural shows, or by inviting friends over for *braaivleis* (barbecue) or *potjiekos* (stew prepared in an iron pot over an open fire).

There are large regional and national competitions organized annually to pick the best of these backyard cooks. Stellenbosch boasts a Gourmet Guild, which has revived traditional Cape cooking with its strong Malay influence: *bobotie* (a richly flavored curried mince dish), *waterblommetjiebredie* (a stew made with water hawthorn), and the like. In Namaqualand you may be invited to taste the curious mottled greenish sausage-like

Speaking eye to eye, Foreign Minister Roelof ("Pik") Botha and Lennox Sebe, President of the Ciskei homeland, talk politics (above). A moderate in his party, Botha nonetheless insists that South Africa "cannot be held to ransom by the U. S." when it comes to deciding its destiny. Students at the English-speaking University of the Witwatersrand in Johannesburg protest Education Minister F. W. de Klerk's policies. Deputy Vice Chancellor Mervyn Shear asks students to confine the protest to campus. Students took to the streets anyway but were turned back by police.

The pageant of ordinary life goes on at a fair in Messina, on the northern border, where beauty contestants wait their turn on stage (above). The procession of politics is carried to a black township hospital visited by President Pieter W. Botha and wife Elize. Outside South Africa, Botha appears as a jackbooted enforcer. At home the far right labels him a dangerous liberal. Caught on a swaying political tightrope, South Africa's government wrestles with a paradox: How to share power with blacks without abdicating it.

puffadder (springbok bowel stuffed with pluck), or less exotic but delicious wild cabbage *bredie* (stew), or kidneys roasted in caul.

A very special social art is that of the storyteller, and in the Marico region of the Transvaal, in Namaqualand, or in South-West Africa (Namibia) old men still can hold an audience captive for many hours with colorful anecdotes and hyperbolic tales of the feats or foolishness of country heroes.

In recent years storytelling has been brought to television by the tremendously popular Jan Spies; he has turned into national heroes the well-meaning country-bumpkin son of a farmer who used a spanner to kill a fly on his father's head, or the old man who chiseled away the underside of a railway bridge to let his donkeys through. Asked why he hadn't simply dug a trench in the ground, he pointed out that it was the donkeys' ears that were too long, not their legs.

In other respects television—introduced in South Africa only in 1976—has ended many traditional forms of entertainment. The extent to which television has mesmerized people and broken down communication is illustrated by a recent event in Pietersburg in the northern Transvaal, where the body of the elderly Mrs. Anna Bronkhorst was discovered in front of her TV set after she had been dead for three days. Her husband, Lourens, hadn't even realized that she was dead.

If TV forces people indoors, it inevitably cuts one's ties with the outdoors—and this threatens one of the central urges in the Afrikaners' collective consciousness, the dream of the veld. Especially during the "hundred years of solitude" of the trekboers in the interior, survival for those early Afrikaners depended on their ability to tune in to their continent—to adjust to the rhythms of the seasons, to face drought and flood, to read the veld and the skies, to find medicines in bushes and roots and bitter berries.

THE DREAM PERSISTS. In a classic story by the early Afrikaans writer Jan van Melle, "Oom Karel Neem Sy Geweer Saam—Uncle Karel Takes Along His Gun," an old Boer on his deathbed comforts himself with the belief that he will be allowed to take his gun to heaven: "His life has been filled with hunting and war. He has helped clear the land; he's been in most of the frontier wars; he was in every battle against the English. How would he feel in heaven without a gun? Surely there must be something to hunt over there? The devil isn't dead yet. Somewhere beyond our known world there must still be places to be cleared; places where one would find dangerous animals and kinds of savages and kinds of English to fight against?"

Even the smoothest city slicker among Afrikaners continues to cherish, deep down, a nostalgia for the bush. Some devote their whole life to nature. Ludwig Wagner, game ranger in the Kruger National Park, points out that of 22 rangers in the park only five are of English descent; he himself has been there for 20 years. No matter how modernized the

park may become, he assures me, a mere 200 yards from the road you're back in the Africa of centuries ago.

In some frontier areas of the Transvaal fear of "terrorists" has drastically changed the patterns of life: safety wires, security systems, armed commandos, and radio watch patrols characterize daily existence. But it seems that nothing will drive those Afrikaners from the land. There is something painful about the way in which they grimly persist, behind barbed wire, to pursue a life normally associated with freedom and open spaces.

In another form, something of the past seems to persist in a constant wanderlust, for if a traditional Afrikaner symbol has been the laager, one should never forget that a laager was made of wagons, and that the urge to explore, to trek into the unknown in search of open spaces, has been a motivating factor throughout Afrikaner history. One curious aspect of these historical evasions is singled out by the jovial Ronnie Melck of Stellenbosch, a vintner of renown and an eighth-generation member of a family that has never left the Boland.

"On more than one occasion Afrikaners trekked right out of their country," he points out. "And where did they end up? In the desert of Patagonia, or in the most barren region of Angola, or in the arid Enkeldoorn area of Rhodesia. I tell you, it's because of the Calvinist streak in us: it makes us feel good when we suffer. Yet, at the same time, these experiences have strengthened us and made us more durable."

Writer Jan Rabie spent many years in Europe. "Europe taught me," he says, "that the more my mind is opened to the whole world, the more I become responsible for a tiny portion of it, by being an Afrikaner in a small village, in a small language."

Perhaps this "small language" is the crux of the matter, even if many Afrikaners are embarrassed by the Language Monument (South Africa may be the only country in the world that has ever erected a monument to a living language). It stands on a granite hill outside the Boland town of Paarl, where the Society of True Afrikaners was formed in 1875. For many years the language remained intimately associated with the "Afrikaner cause," but in the work of a new generation of poets and fiction writers in South Africa, its frontiers have been consciously extended to include dissent.

As a writer I find it tragic that the best known words Afrikaans has contributed to the vocabulary of the world are *apartheid*, *laager*, *baasskap*, and others in the same mold, for I know intimately the exhilaration of working in such a young, virile language. According to the poet Uys Krige, who in his lifetime translated several Shakespeare plays, Afrikaans at its present stage of development is comparable to Elizabethan English. This idea makes it almost a crime that in the mind of the world the language should be associated only with one political ideology.

Says Chris Barnard, of the watershed generation of *Sestigers*—"Writers of the Sixties"—and 1988 president of the Afrikaans Writers' Guild: "The Afrikaans language is our only real achievement, the only thing that

Straddling the fence between subsistence and poverty, unemployed Afrikaner Daniel Brits and daughter Susan (opposite) live in subsidized housing. White unemployment has quadrupled to 1.6 percent since 1980. Still, average whites earn three times more than the largely unskilled blacks, whose official jobless rate has reached 20 percent. Free choice has its price: Despite repeal of the Mixed Marriages Act, those who marry, like Jeff and Lillie Venter, face ostracism and rarely live in white areas.

Cheering from the sidelines of his living room, Piet Pretorius watches Saturday afternoon cricket matches (above). He supervises a hundred gold miners in a shaft some 4,000 feet deep (upper right) at the Kinross Gold Mine, 60 miles east of Johannesburg. Nearly all Afrikaner miners hold supervisory positions.

Though blacks and whites work side by side, socializing is usually a segregated domain. Here a group of Afrikaners in the Orange Free State play a game of jukskei, a form of horseshoes (right). In recent years team sports have become increasingly integrated. But apartheid has made South African teams the pariahs of international competition, and they are usually banned from participating.

keeps us together. There is nothing else: neither politics nor religion nor anything else."

HISTORICALLY, the Afrikaners' group awareness has often been defined in terms of a threat. Increasingly, since 1795, this threat was posed by Great Britain. And it is amazing to discover, even today and even in many sophisticated Afrikaners, a deep-seated mistrust, if not actual hatred, of the English. At the very least, there is an active sense of always having to compete with the English, of having to "show" them—exacerbated by a persistent tendency among South African English to despise Afrikaners as uncouth or uneducated.

A friend, who gave up her librarian job to

help her husband on his prospering farm in the lush subtropical eastern Transvaal, recalls with gleaming blue eyes how, when she had her baby son, an English colleague commiserated: "How awful to bring up a child in this country in times like these. Doesn't it make you shudder to think he may marry a black girl one day?" My friend's reaction came from the guts: "I'd rather have him marry a black girl than an English girl."

The Afrikaner has traditionally defined himself in relation to the black African. At the outset race relations were largely determined by the labor situation (slavery and enforced employment of indigenous peoples). On the other hand, early Dutch sailors and colonists had no compunction about miscegenation, and as early as 1671 three-quarters of all children born to Dutch East India Company slaves were of mixed blood. Today's Afrikaners have been estimated to have an average of 7.2 percent of nonwhite blood in their veins.

Strange paradoxes in racial attitudes have prevailed ever since the late 18th century, when frontier farmers encountered black peoples in the interior. Military clashes were frequent, yet on several occasions white Afrikaners and black Africans allied themselves in attempts to repulse the British, whom both regarded as a foreign invader. White farmers and free Khoikhoi (the nomadic people incorrectly called Hottentots) regularly did service in the same commandos. And when, after 1828, a number of Afrikaners left the Cape Colony in open revolt against a new British

policy proclaiming the equality of whites and Khoikhoi, some of these same "racists" settled in black communities across the frontier, submitted themselves to the authority of Xhosa chiefs—even married black wives.

While many early Afrikaners subjected indigenous people to "the most inconceivable maltreatment," others adopted remarkably liberal attitudes. One of these was Andries Stockenström (1792-1864), landdrost of the remote district of Graaff-Reinet. Confronted by angry frontiersmen who demanded to take the law in their own hands in dealing with "vagrants" (Khoikhoi) and "marauders" (blacks), he replied: "From the principles to which I have always clung, I shall not deviate one hair's-breadth. . . . In one word, equal rights to all classes, without distinction."

Many of the younger generation have grown up expecting a volcanic eruption of black violence. This sometimes leads to vicious emotional manifestations on the extreme right. When an Afrikaner mission returned from Senegal in mid-1987 after meeting representatives of the banned African National Congress (ANC), it was greeted at

Jan Smuts Airport by hostile members of the extremist AWB (Afrikaner Weerstands-beweging—Afrikaner Resistance Movement). A British Airways flight attendant carrying a black baby was confronted by the demonstrators: "Put down that child," they shouted. "The Bible tells us not to consort with the animals of the veld," one man cried.

At the other extreme are people like the young son of a leading Afrikaner industrialist in Johannesburg who found fulfillment in being a member of a crack army unit. But studying at the liberal University of the

Pay up or get out is the choice given a tenant in Soweto, Johannesburg's black township. Afrikaner township manager Frederick Gerber arrives at 3 a.m. to collect back rent. In 1987 township residents initiated a rent boycott to protest housing conditions and apartheid. Now an estimated 54 million dollars in back rent is owed. Soon after this picture was taken, several families were evicted. "A township manager came with police. The family had one last chance to pay. If they couldn't, they were put on the street," the photographer reported.

Witwatersrand changed his outlook, and when he was called up for duty in a black township, he refused, left the country, and is now associated with the ANC.

And, again, there is Anton Vorster, who now lives happily married with his wife in a white suburb of Johannesburg where more people from other races are moving in, even though a government crackdown is a constant possibility. "We have never been harassed by anybody," he assures me. "Even the landlady of our apartment building sometimes drops in for a chat."

In the middle ground between these positions one finds an attitude demonstrated by farmers like Jan "Boland" Coetzee—a legendary rugby player and nowadays a leading vintner in Stellenbosch—who devotes much of his time to the improvement of labor relations on the farms. "For many years we farmers thought of nothing but capital and land. Now we're beginning to think of people again, and the result is a change in mentality difficult to explain—one has to experience it. . . . I have enough faith in my countrymen, black, white and Coloured, to believe we can find a solution together."

THE AFRIKANER WOMAN holds a difficult and ambiguous position in a strongly male-dominated society. Her role has traditionally been that of wife and mother, subservient to her husband. And even today any woman wanting to enter public life or embark on a career faces a tradition of female submissiveness.

"Hers is a cruel world," says Jeanette Ferreira, who lectures at the University of Zululand while running a household and looking after an energetic small daughter. "She remains torn by a professional life that poses enormous demands because the forefathers decreed that 'a woman's business is to serve.' She's regarded as a newcomer who constantly has to prove herself. She feels guilt if her household or homelife doesn't come first."

The poet Antjie Krog (who explains that she comes from a line of strong women) has another perspective: "The Afrikaner woman, in my view, is a privileged species, unique on earth. We enjoy the limitless freedom of time granted us by cheap, intelligent, black domestic help. So we can select the tidbits and specialize in entertaining, or designing clothes, or studying, or gardening, becoming a connoisseur in silver, and making our own pots or poetry for Christmas."

Tossing back her short-cropped dark hair, the hint of a steely smile in her mocking eyes, Antjie continues: "I blame the men for it. They like it that way. The more idle their wives, the more successful they obviously must be. Most have remained totally unliberated, living the way their ancestors did—complaining about the government, hunting up north, or telling racist jokes in clouds of *braaivleis* smoke."

But there is another side to being an Afrikaner woman. If she generally retreats into her home, she also turns it into a stronghold. Historically she has played a key role in the

Marching in the wake of tragedy, police follow a car bearing the widow of one of three white policemen killed by a car bomb last year in Johannesburg. The bomb was blamed on militant blacks of the African National Congress.

survival of the species: When many menfolk were prepared to surrender to British annexation of Natal after the Great Trek, a meeting of women resolved to trek barefoot across the Drakensberg peaks rather than lose their freedom. In the Anglo-Boer War their determination to survive the concentration camps kept their husbands fighting in the veld.

"The Afrikaner woman is always in the kitchen, always organizing everybody's life, always in the very center of everything," explains Rachel Breytenbach. Rachel's family is an eloquent illustration of this viewpoint. Her four brothers represent the full political spectrum among whites in the country, from Jan, the eldest, whose exploits as an army commander during the first South African incursion into Angola in 1975 made him a hero in the military establishment, to the poet Breyten, who spent seven years in a South African jail as a convicted terrorist for allegedly plotting against the state.

"The tensions in our family were almost unbearable at times," says Rachel. "The one who tried to keep us together was my mother. Whenever a quarrel broke out, she would retreat to the kitchen and come back with the

favorite food of whoever was there. That was her way of expressing her love and of patching up hostilities. And it worked."

Because of her position in the family the Afrikaner woman has been able to exert a very strong influence on her children and on patterns of social intercourse. Which is why Marina Geertsema can affirm: "Women, more than anybody else, have kept traditional values alive." By acting as custodians of "the system," women have maintained both the good and the evil inherent to South African society. But Jeanette Ferreira is optimistic: "I can see a whole younger generation of mothers like myself emerging, who are lovingly but resolutely beginning to liberate their children from all the preconceived roles."

IN ALMOST EVERY SPHERE one finds evidence of an old Afrikaner order breaking down. There are still those whose lives are ruled primarily by ideology, the "super Afrikaners," while others have adopted more open value systems.

Hardy Botha, one of the most dazzlingly imaginative artists in the country, has had his work accepted by international exhibitions. His very name suggests the dichotomy between the worlds of his youth and his maturity: By birth a staunch Gerhardus, he prefers the more congenial name Hardy (which reaches back to his mother's Scottish ancestry). "I'm scared by nationalism," he says bluntly. "I grew up with it, and I know how destructive it can be. It is shaped by the same instinct that causes gangs and mobs, and my worst nightmares are about mobs: You can see that in my paintings, can't you? All those carnivals and witches' sabbaths are a way of exorcising the idea of the mob."

In the end it comes down to a question of definition. And Breyten Breytenbach, now living in exile in Paris, eloquently makes the point: "I am an Afrikaans-speaking South African, bound to Africa, and living in Europe for the time being. But one cannot escape from what one *is*."

On the bistro terrace where we sit, late autumn sun beats on Breyten's tanned face; passersby glance at us, intrigued by a language most of them have never heard. Then the world streams on again. To be an Afrikaner is a schizophrenic experience. "We belong to Africa, yet too many of us think of ourselves as European," says Breyten. "That's why politics in South Africa is such a deadly serious business. With everything we do, our whole future is at stake."

Africa and Europe: Always it comes back to this. The Africa discovered by early trekboers, who survived because they had learned to tune in to the heartbeat of a wild continent, but which they betrayed when apartheid was devised to justify white European supremacy.

"The enduring tragedy of the Afrikaner," says Frederik van Zyl Slabbert, erstwhile leader of the white opposition in the Parliament, who quit his position to explore other democratic alternatives, "is that he is a white African who refuses to come to terms with his own continent and its people. Most of them still wish to be here but apart, and after more than three centuries the sadness of the Afrikaner is that he still has not come home." □

A yoke of barbed wire burdens South Africa. Farmers along the terrorist-prone border with Zimbabwe check fences. Their wives carry machine guns; children go to school in armored cars. In the black township of Soweto, a mother and children stroll toward an armored vehicle (right). Although apartheid prompts soul searching among the younger generation, the question lingers in a darkening sky: Will South Africa ever be whole?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THE HMONG

Laotian Refugees in the "Land of the Giants"

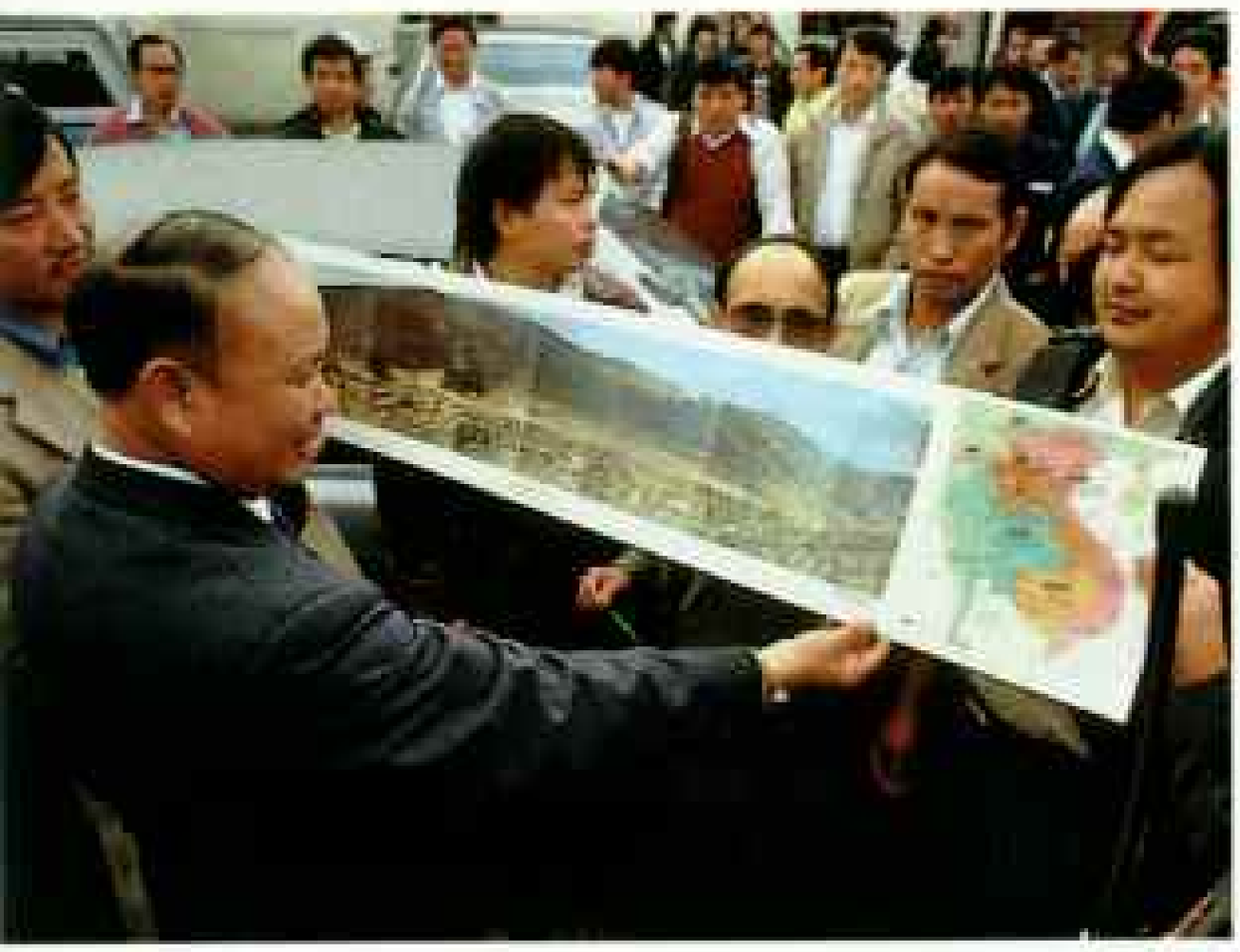
By SPENCER SHERMAN Photographs by DICK SWANSON

IN AMERICA

A world of difference divides Hmong in traditional and trendy attire at their New Year's celebration in Fresno, California. Nearly 100,000 of these Laotian refugees, former allies of the United States during the Vietnam War, now make their home in the U. S.

"IN THE REFUGEE CAMP in Thailand they say America has giants that eat Hmong people. Do I believe it? Well, I don't know . . . maybe yes. We have heard it many times," says Vas Seng Xiong, as he sinks back into the living room couch at his brother-in-law's home in Fresno, California. He laughs nervously, his thin body rattling as his voice cracks and fades into a dry cough. He is uncomfortable, and a little bewildered. He has been in the United States less than a week.

Vas Seng Xiong and the five other men sitting in a semicircle around him in this simple ranch-style house are Hmong from the northeastern highlands of Laos. They and about 97,000 other Hmong now live in the United States. Some 55,000 wait in refugee camps along the Mekong River border of Laos and Thailand to come to the United States or find some way to return home.



SECRET STRONGHOLD in Laos during the Vietnam War, the Long Chien air base, linked to a map of Southeast Asia in a poster, stretches before Gen. Vang Pao in California. A sergeant in the French Army in 1954, Vang Pao was in a relief column on its way to Dien Bien Phu when the French bastion fell to the Viet Minh. By the early 1960s he commanded the Hmong guerrillas as a general in the Royal Lao Army. Based at Long Chien, the Hmong were financed and supplied by the CIA to fight Communist forces. They suffered casualties at five times the rate of U. S. soldiers in Vietnam. When U. S. forces withdrew and the Pathet Lao and North Vietnamese subsequently completed their takeover of Laos in 1975, Vang Pao sought refuge in Thailand along with many other Hmong. An influential figure in the U. S. Hmong community, Vang Pao now owns a farm in Montana.

Anthropologists have described the Hmong as tribal mountain dwellers with strong clan loyalties, a people steeped in animistic ritual, bound by good and evil spirits to a way of life filled with the magical and mystical. Development specialists have called their agricultural life in Laos primitive and environmentally unsound. Narcotics officers have called them opium growers and dealers. The Communist leaders of Laos have called them barriers to national reconciliation. In the United States, refugee workers call their resettlement a worst-case situation.

The Hmong have one other attribute that makes them worthy of special note: They are Vietnam War veterans and, in the opinion of former Central Intelligence Agency Director William E. Colby, "damned good fighters."

Vas Seng Xiong and his brothers-in-law Nai and Chue Her were, for many years, foot soldiers in an army organized and trained by the CIA. It was a secret army; international treaties prohibited any foreign military presence in Laos. But at the height of the Vietnam War, 30,000 highland tribesmen, most of them Hmong, were supported by the CIA with arms, money, and personnel. Nearly as many died during the entire period from the early 1960s until 1973—10 percent of those who fought. If the same percentage of U. S. troops who fought in the war had been killed, the Vietnam Veterans Memorial in Washington, D. C., would commemorate some 270,000 dead and missing rather than the 58,156 fallen soldiers whose names are inscribed in the black wall today.

Not unlike many U. S. Vietnam veterans who felt abandoned by their country, many Hmong fighters feel they have been little rewarded for decades of service, cast adrift in a country so unfamiliar to them that they feel they have been "sent to the moon."

Since 1984 I have watched the Hmong adjust to life in the United States, seen the smallest of their tribal customs clash with American ways and often with U. S. laws. I have seen newly arrived Hmong ponder the use of stoves and refrigerators, and young Hmong spike their hair and wear chains in styles that they see on television. I have seen elderly Hmong depressed over their loss of authority, and

illiterate working-age men puzzle over the tools of the industrial revolution as the rest of America marches into the computer age.

But I have also seen successes: In Merced, California, I met Blia Xiong, a dynamo looking for ways to succeed even if they conflict with her tribal origin. "I love to work. I wanted to try to get ahead. The places we can afford to live are surrounded by people on welfare, they are on some kinds of drugs, their kids don't have very good manners, and they use awful language," she said firmly.

Blia, sitting in her Hmong crafts shop in the downtown shopping district, recognizes that the unemployment rife in the Hmong community—though understandable—is dangerous: "When you are staying home on welfare, you

NEEDLEWORK NARRATIVE depicts the dangerous journey out of Laos. Though some Hmong held out on hilltops after the war, others fled Communist reprisals. Dodging enemy patrols and land mines, they walked hundreds of miles to the Mekong, which they crossed on improvised floats. Many died on jungle trails and in river currents. Survivors in Thai refugee camps have used their masterful sewing skills to create tapestry records of Hmong life, stitching village scenes, ceremonies and celebrations, stories of their exodus. Destined for sale abroad, story cloths sometimes bear legends for English-language customers.

The Hmong Odyssey

Migration weaves a constant pattern in the fabric of Hmong life. Pushed south from China in the early 19th century and unwanted in Laos, they became swidden farmers in unoccupied highlands. Post-Vietnam War politics in Laos forced 150,000 into refugee camps in Thailand; half of them have resettled in the U. S. Scattered across the country, they still seek more genial surroundings away from big cities. Eighty-five percent live in California, Minnesota, and Wisconsin.

This needlework map by Tia Lee shows their flight from Southeast Asia, a customary New Year's celebration in California, cucumber growing for a Minnesota pickle factory, and a haven in North Carolina's mountains reminiscent of home.

begin to want to stay home. It is really hard to become who you want, but it is really easy to become lazy."

Or Vang Yee, who did not know how to use a stove when I first met him in 1985, but a year later had a job as an interpreter at a hospital, as well as a car, a two-bedroom house for his family, and a big new television set for his three kids.

SPENCER SHERMAN, currently the chief correspondent for United Press International in Seoul, South Korea, spent a year and a half studying the Hmong in America, 12 months of that time under an Alicia Patterson Fellowship. Photographer DICK SWANSON covered the war in Southeast Asia for *Life* magazine from 1966 through 1971.

THE EXPERIENCES of the men gathered in the Fresno house cover much of the range of Hmong success and failure in America. Sitting across from Vas Seng Xiong is Nai Her, owner of the house, who has been in the United States for five years. The contrast between the two is striking. Although Nai Her is a wiry, thin man, he has a well-fed look, clear-eyed and animated. Vas Seng Xiong is sallow, tired, and bone-protrudingly thin—as if he has just come through perilous surgery. In a sense he has: excising from himself the miseries of two years and eight months in a refugee camp.

"It is like a dream to him," said Nai Her, describing Vas Seng Xiong's first few days in

America. "The sky and earth are so different here. He says he cannot walk because there are so many cars. When Americans speak, he doesn't hear."

And now Vas Seng Xiong must face the most serious barrier confronting the Hmong immigrants—language.

As a people without a written language until American and French missionaries invented one in the mid-1950s, the uneducated Hmong are forced to learn about the printed word in a tongue foreign to them. Like Nai Her, many other Hmong over 30 seem unable to master the task.

"Without the words I can't work," Nai Her laments. He is a trained mechanic, but his limited vocabulary has kept him out of most garages. He has survived mainly on refugee assistance and welfare, a situation mirrored by seven of every ten Hmong in Fresno and by 60 percent of his Hmong brethren elsewhere in the nation.

The newcomer Vas Seng Xiong has brought with him a view of the world incompatible with his new life. He knows little about America, and much of what he does know will have to be unlearned.

"I heard when I was a little boy that the Communists came to our village and said: 'We have to fight the Americans and the government and chase them away because they have let a giant come to our country.' "

DOUG HULICK'S

IF THERE WERE Hmong-eating giants in America, they would certainly stand out in Fresno. From this city of more than 500,000 people, set in the middle of California's San Joaquin Valley, not a hummock disturbs the horizon for more than a hundred miles in three directions. The foothills of the Sierra Nevada can be seen on clear days, an hour's drive to the east. The flat valley is perfect for growing food. More than half the Hmong in the U. S. live in California. Fresno, with 23,000 Hmong, is the second largest enclave in the world. Only Ban Vinai refugee camp in Thailand, with 34,000, is larger.

There are half a dozen reasons why so many Hmong came to the San Joaquin, like the Dust Bowl wanderers of John Steinbeck's *Grapes of Wrath* before them—reasons of economics and emotion, power and survival.

The initial settlement of the Hmong in America's cities was a failure. Cities isolated them from their countrymen and subjected them to the greatest possible contrast with the tribal, agriculture-centered lives of their past. Many Hmong were attacked by robbers or more subtly victimized for not knowing how to use money or call the police. They were unfamiliar with locked doors, light switches, modern plumbing. Some would use the toilet to clean rice, losing the precious kernels if the device was accidentally flushed. Refugee workers would find living rooms made into gardens, with soil brought in from the outside. Landlords would find Hmong using open cooking fires in the house, not knowing what the stove was for.

Mouachou Mouanoutoua, a Hmong community leader and evangelical minister in Santa Ana, California, told me the story of a Hmong who went looking for a job and wrote

ON HER OWN in the Ban Vinai refugee camp, Pa Her (top left) awaits departure for the United States. When most of her family fled Laos, she stayed to care for her ailing father. After he died, she made slow, perilous progress to the Thai center.

Ending nine years of separation, mother and daughter share an embrace at the Minneapolis-St. Paul airport, and a party welcomes Pa Her to her new home. Schoolwork spread on the living room floor occupies the 20-year-old high-school student, who now studies English and math in a special Hmong class.

National Geographic, October 1988

down the name of his street in case he got lost. When he did lose his way, he sought directions from a policeman, showing the officer the paper with the words: ONE WAY.

Sgt. Marvin Reyes of the Fresno city police told me of a Hmong man in a car jerking his way through an intersection one night. Pulled over by a policeman who figured him for a drunken driver, the Hmong man said he had been told to stop at every red light. It was late; the stoplight was blinking.

COMPOUNDING the adjustment problems of the Hmong was an adjustment problem of the United States government. Because of the tremendous number of refugees coming into the country in the late 1970s and early '80s (207,000 in 1980 alone, including 125,000 Cubans from the Mariel boatlift), the government was overwhelmed. Resettlement officials did not have time to consider the individual needs of each ethnic group among the 850,000 postwar Southeast Asian refugees, particularly the little-known Hmong. Few knew of the deep clan and tribal bonds that kept the Hmong together as a people, bonds that were torn when small groups were settled wherever sponsors could be found. Certain government policies exacerbated the problem. In one instance in 1982 federal officials issued a welfare regulation that would cut refugees from relief rolls if they had been in the U. S. for more than 18 months. Before the rule took effect in Oregon and Washington, some 4,000 Hmong moved to California, where state welfare

DOUG MILLER

FENCE SITTING IN FRESNO gives Tou Bee Cha a new perspective. Left behind in Ban Vinai when his father moved to California in 1980, he ran wild in the Thai center until he was seven (above), when he joined his father. "Everything was a new experience for him," says teacher Anita Quintana. Good at math, he attends a class stressing language and basic academic skills.

programs offset the loss of federal funds.

Hmong politics also spurred the move to the San Joaquin. With their people spread out in a large country, leaders of the Hmong clans began to lose their hold. Younger people were beginning to take on responsibilities because of their greater command of English. Women, traditionally relegated to cooking, cleaning, and bearing children, were beginning to assert newfound rights in America. The traditional clan leaders began exerting pressure for the flock to come together again. The valley was also close to Santa Ana, California, where the famous Gen. Vang Pao, military leader of the Hmong during the war, had opened an office called Lao Family Community, Inc., that now has 12 branches nationwide.

For many Hmong such self-help groups serve as safety nets, teaching them living skills. For others they are a means of planning a return to Laos, to oust the Vietnamese-backed Communist government. That is Vang Pao's passion.

In a rare interview granted during Hmong New Year's festivities in Fresno, Gen. Vang Pao told me, his voice rising to a roar, "Laotians have nothing today. Between Laotian and Laotian we have no problems. We have the same blood, the same culture. But the North Vietnamese cannot dominate Laos, cannot control Laos, and must withdraw from Laos immediately!"

But the prospects of a return are not good. Though the general hints of support from several nations, including former foe China, he does not claim that any are offering funds, including his old ally, the United States. And support for the resistance is not even universal among the refugees. The words of one of them remain vivid: "I will not be involved with the dreams of angry men."

A return to agriculture was also an impetus for the migration to California. According to Cheu Thao, a top aide to Gen. Vang Pao, one question Hmong traditionally asked when considering a move to another site in Laos was

"were your crops good this year?" From the few who had moved to the San Joaquin Valley as early as 1979, the answer was yes.

But finally the Hmong moved because it is a tenet of their tradition, like the Gypsies, that the response to adversity is to walk away.

"You want to know why the Hmong move from one mountain to another, why they always change their place?" asked Kou Yang, a Hmong social worker in Fresno who has given me much guidance on the Hmong and their ways. "Then go ask the deer who has been hurt why he defends himself. Ask the deer who changes forests why he changes his place. That is similar to the Hmong."

Migration had taken the Hmong to Laos. Many Hmong, hounded out of China early in the 19th century, fled to the high mountains between Vietnam and Laos, away from the cultivated lowlands. The strategic location of their mountain homeland, overlooking North Vietnam, forced them into the conflict between Communism and the West, first as scouts and fighters for the French, then as guerrillas for the United States. With the withdrawal of U. S. troops, they were forced to flee—first to camps in Thailand, then to low-income neighborhoods in the United States, France, and Australia.

"SIN CITY" is a four-square-block apartment complex formerly used to house Fresno State University students and nicknamed for their collegiate lifestyle. The Hmong migration has transformed Sin City into a refugee ghetto. The smell of hamburgers and hot dogs has been replaced by cilantro and ginger, and football games in the streets have been supplanted by kickball games among Hmong children. Agriculture drew the Hmong to the Fresno area, but their lack of money to buy the prime valley farmland and their dearth of skills to handle the modern mechanized farming for which the area is suited quickly forced most into reliance on welfare and the cheap housing of areas like Sin City.

"We used to farm crops for our family to consume. In this country you farm to make business. You farm to market, you have to produce good quality to compete with other farmers, and I think a lot of people didn't realize that," says Tony Vang, director of the Fresno office of Lao Family Community, Inc.

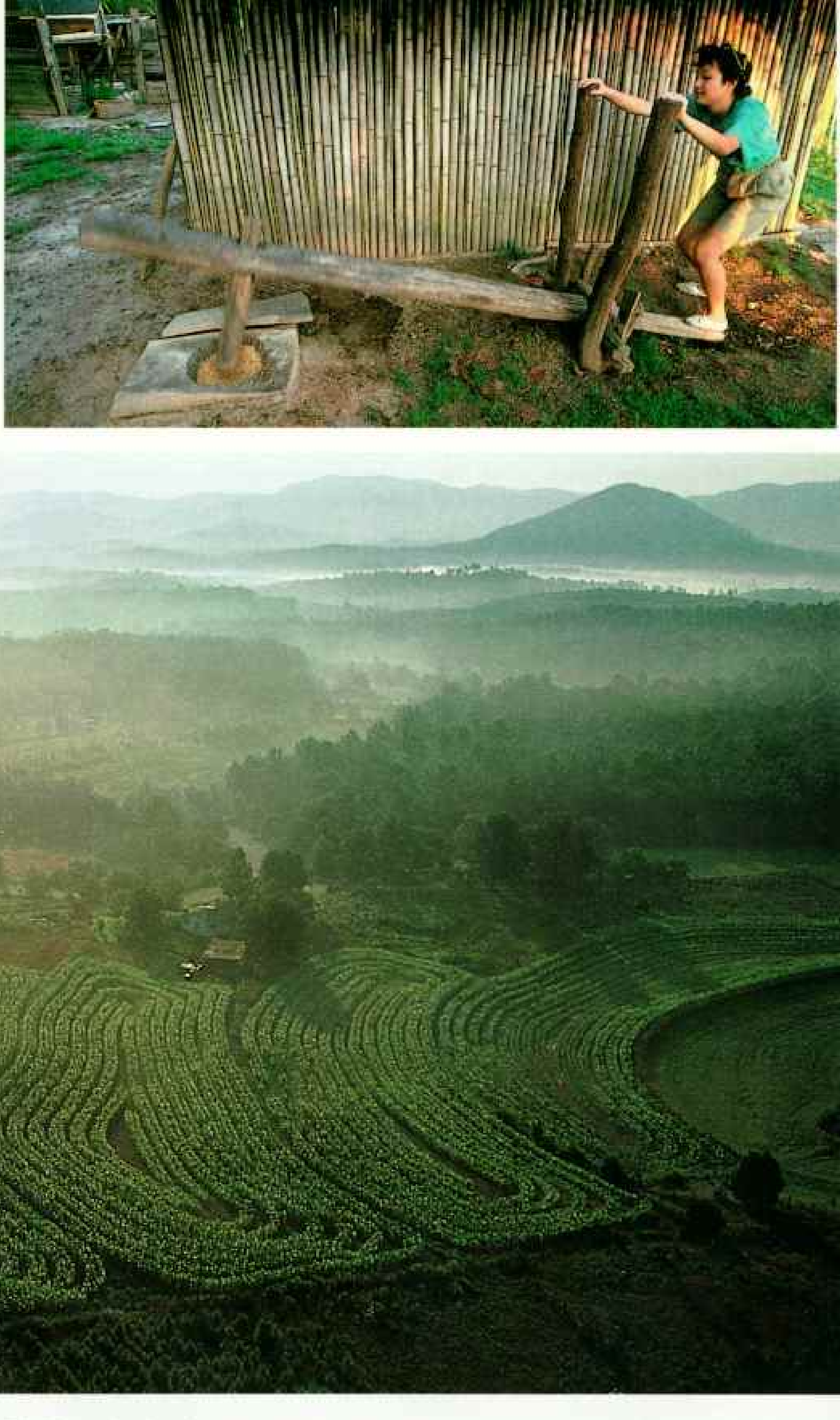
In Sin City today Hmong gardens fill the spaces between houses, and grandmothers watch hordes of young children whose mothers are away at work. As the 105-degree

HOPING FOR A GOOD CATCH, young women show off their wealth in silver and hand-sewn finery during pov pob, a courtship game played at the Hmong New Year in California. Tennis balls replace the cloth spheres once tossed, and potential husbands have succumbed to slacks, as the festival adjusts to its U. S. setting. Matrimony also may mix new and old. Suited up, Ge Yang dances with his gown-clad bride, Ying Lo, at their reception in Morganton, North Carolina, although both wore traditional clothing for the wedding.

HELPING HANDS of the Reverend Allen McKinney (below) reach out to Hmong refugees looking for a place to live. Churches in Marion, North Carolina, began sponsoring a few families in 1976, but McKinney's Garden Creek Baptist congregation became the driving force behind settling many more. Initial opposition from parts of the conservative, mostly white community has died down, and the newcomers have found a measure of prosperity unmatched by other Hmong immigrant farmers around the United States.

Nearly 600 Hmong live in this Blue Ridge region, and virtually all adults are employed. More families keep trickling in, drawn by strong clan ties and jobs in furniture, textile, and pharmaceutical factories.

A major boon, the area's plentiful, inexpensive land allows a partial return to agrarian ways. Rows of corn curve across Lao Toua Lo's farm (below). He allows Hmong families who work elsewhere to raise livestock and vegetables for their own consumption. Mali Kue, whose father introduced the dry rice farming of the Laotian hills to Burke County, works a pestle to pound husks from the grain for dinner. Those with less acreage keep kitchen gardens and raise pigs and chickens.



August heat beat down on a walkway between two Sin City apartment buildings, I was reminded of an alley in the Ban Vinai refugee camp in northern Thailand—the same stifling heat, the smell of boiled pig, the sight of half-bare babies and old wrinkled grandmothers in print sarongs.

Here, however, I soon passed a parade of carefully scrubbed Hmong children dressed in bright polo shirts and blue jeans, heading home from a summer day-care center at the nearby Wesley Methodist Church. It was there that Mike Morizono told me of the program that this church has set up to deal with the Hmong.

Part of the motivation for the day-care center was "just self-preservation." The children, he says, were climbing on the roof of the building and cutting up the lawns with their playing. Now, caring for the children has become a calling for the church, and every day the classes are packed with Hmong children cutting paper into designs and learning English-language ABCs.

FOR THE ADULTS in Sin City, life in many ways still resembles their existence in Ban Vinai. They are undoubtedly safer, healthier, and better fed here, but work is scarce. Unemployment is high among all residents of Fresno—13.3 percent as of last March, one of the worst rates in the nation. Among the Hmong, though, it is more than a third higher.

Trapped within the ghetto by economic forces, many of the formerly warm and welcoming Hmong have become insular and suspicious, leading to serious tensions with government officials. In the spring of 1986, for example, state welfare inspectors began unannounced home visits to investigate compliance with eligibility regulations. Officials soon reported death threats. The situation became so serious that Gen. Vang Pao traveled to a mass meeting of the Fresno Hmong to order the threats stopped.

The segregated Hmong communities do provide a safety net for the elderly and others who cannot adopt new ways. Those who have

begun to change their lives, however, must learn to bridge a turbulent gap between the ghetto and outside society.

In April 1985 Kong Moua of Fresno decided to get married. He found the girl he wanted and proceeded as he thought he should: Kong Moua and a group of friends went to Fresno City College and took the girl from the campus to his house. That night he had sex with her.

In the Hmong culture Kong Moua had performed *zij poj niam:* marriage by capture. In the eyes of the police—called by the woman, Xeng Xiong—he had kidnapped and raped. Zij poj niam is not an everyday occurrence but is not unusual either. The roles of the traditional culture demand that the man appear strong, the woman resistant and virtuous.

Gene M. Gomes, the judge who heard Kong Moua's case, says he was "uncomfortable" acting as half judge, half anthropologist, but conceded that the unusual circumstances required unusual measures. He agreed to allow Kong Moua to plead to a lesser charge of false imprisonment, giving the court the "leeway to get into all these cultural issues and to try to tailor a sentence that would fulfill both our needs and the Hmong needs." Gomes ordered Kong Moua to pay a thousand dollars to the girl's family and to serve 90 days in jail.

Tou Lia Xiong, 21, handled his marriage differently. In 1985 he fell for Mai Vang Yang, and they secretly decided to wed. One day Mai and Tou Lia went to his home and a few hours later sent emissaries to her father's house to arrange the details of the marriage, as is customary. Her father was at first outraged at his daughter's attempt to marry without his permission, but he finally agreed, and Tou Lia made a ritual payment of $1,400.

In some ways Mai and Tou Lia are typical newlyweds. She goes to school during the day, and he works in the Fresno school district, explaining Hmong life to students to ease racial tensions. After school he works as a stock boy in a liquor store. They have a one-bedroom apartment, sparsely furnished except for a brand-new 21-inch color television set. "Next is a VCR," Tou Lia said, smiling.

CITY STREETS serve as a playground in Philadelphia, where several thousand Hmong lived at the end of the 1970s. Like many in other areas, they had trouble adjusting to urban life. Economic problems and a series of assaults in 1984 drove out all but a few hundred. Missing an arm since a childhood war accident, Tou Vang came to the United States almost ten years ago, but speaks little English and has never had a job here. The 32-year-old father of four landed in the Fresno jail for carrying a concealed weapon, common practice in Laos, and driving without a license.

TAKING FINE STITCHES, Bee Kha appliqués designs onto a Mennonite quilt. She has plied her needle on the Statue of Liberty quilt in New York and earns as much as $700 a month for similar work at her home in Lancaster County, Pennsylvania. From an early age Hmong girls learn the art of pa ndau*—sophisticated sewing without machines, pins, or patterns—which produces 20 virtually invisible stitches to the inch. Used to make richly decorated clothing in Laos, and a measure of a woman's marriageability, these skills have translated well into the U. S. handicraft, custom-made-clothing, and textile-restoration industries.*

But they are also bound to Hmong ways. They will not use birth control, for example, because Hmong, traditionally, must have many children. They know it is better for their future in America to limit their families, Mai Vang Yang said, but that would make her an outcast in her community. Mai says she might have only four children, but there is little conviction in her voice: It is hard to be sure of the future when you have just turned 14.

Tou Lu Thao of Fresno, a farmer, told me, "One of the big problems that we face in adjusting to this society is that in Laos it is really free. If you want to build a house in that corner, you just go and build a house. Or if you want to farm that land, if no one has farmed it, you just go do it. Here one of the hardest problems is that you have to go by rules and regulations."

Game warden Roger Reese agrees. He told me that the Hmong, along with other Southeast Asians, have caused a lot of trouble by poaching fish and wildlife. "To them, it's just harvesting. They don't care what species it is. If they can see it, they take it. They employ any means—nets, setlines, traps, snares, slingshots, even two-by-fours. And they're good at avoiding detection."

LAO CHU CHA, a Hmong community leader in the small Sierra Nevada foothill town of Porterville, offers a different explanation for the difficulties the Hmong have faced in Fresno. He says there are too many Hmong people grouped together.

In July 1983 Lao Chu drove to Porterville from San Diego with the idea of setting up a farming cooperative and experimenting with building a typical Hmong community. Other families of his clan, the Cha, and of related clans followed. There are now 80 Hmong families in the town—500 people.

Life in Porterville, Lao Chu Cha said, is better than in crowded Fresno. His community, however, shares some of the difficulties faced by the Hmong of the valley. The slash-and-burn agricultural techniques that the Hmong are accustomed to are environmentally disastrous and illegal in the United States, so they cannot farm without learning new techniques. They can go to school to learn U. S. farming, but working-age men and women—never schooled in Laos—cannot read or write in Hmong, let alone English. While they attend English classes, they live off welfare and plant little gardens for food. Only 20 Hmong in Porterville have jobs.

Buried under the seemingly overwhelming problems of resettling the Hmong, their successes are easy to ignore—until you meet a

A WATER PIPE IS PASSED among members of the Hmong-American Veterans Alliance circling a campfire after a day of fishing in a Minnesota state park. The group's camp-outs and weekly discussion meetings in Minneapolis ease the transition into a new society. In honor of relatives who died in Laos, a cow is sacrificed in a tso plig ceremony (top) on Tong Vang's farm near Hugo, Minnesota, to free spirits of the deceased for their journey onward.

Mysterious Death Strikes Young Hmong

WITHOUT WARNING Neng Yang (far right) lost consciousness on December 21, 1987. A rescue squad performed cardiopulmonary resuscitation and rushed him to Rhode Island Hospital in Providence, but he had suffered massive brain damage. He died on Christmas Eve, the third victim in his clan, and 115th in the U. S., of Sudden Unexplained Death Syndrome (SUDS), a mysterious malady that strikes young, apparently healthy Southeast Asian men—especially Hmong.

Neng Yang's family believes an autopsy performed on a clan member, another SUDS casualty, caused the 23-year-old student's death. Hmong religion holds that the spirit cannot leave a mutilated body to join its ancestors before rebirth and may claim the life of a relative in a cry for release. Following Neng Yang's wishes and their own convictions, his parents, You Vang Yang and Ia Kue Yang (left), did not want an autopsy. The attending physician assured them they would be notified if the hospital wanted one.

When they arrived at the funeral home to prepare the body for burial, horrified relatives learned that the state medical examiner's office had done an autopsy without family consent.

Maintaining that the constitutional rights of freedom of religion, due process, and equal protection of the law were violated, the American Civil Liberties Union has filed a two-million-dollar lawsuit against the state's chief medical examiner on behalf of Neng Yang's family.

Reported in Japanese and Philippine medical literature in the 1950s and '60s, SUDS began to appear in the U. S. after the influx of Southeast Asian refugees in the mid-1970s. Forty-nine cases

PHOTO MONTAGE BY O'CONNOR SCHOOL PICTURES

occurred in the peak years of 1981 and 1982, but only a handful show up annually now.

The phenomenon still baffles U. S. doctors. Typically, victims lead ordinary lives and have no apparent illnesses. They die in their sleep, with perhaps a telltale gurgling or labored breathing, and no traces of drugs or abnormal organs are found. Chaotic cardiac impulses make the heart beat erratically, interrupting the blood supply and depriving the brain of oxygen, but the underlying cause remains a mystery. Researchers speculate that the stress of culture shock may be a contributing factor. Statistics indicate that the longer an immigrant lives in this country, the less risk he runs of dying from the disorder.

KEEPING THEIR CULTURE, even in death, mourners lay Mai Yang to rest at the Tollhouse Cemetery in the Sierra Nevada near Fresno. During ceremonies that last several days, they have prepared the body for burial without metal or plastic and have removed buttons and zippers from her clothing. Pa ndau cloths placed with her ensure the spirit's wealth, and the fabric around her head will identify her spirit as female in the next world. Pegged and glued, the casket contains no metal and, as far as possible in the narrow plot, is oriented according to custom with a view of the mountains. A cement grave liner with no bottom allows the spirit to escape.

A headstone in the same cemetery testifies to a refugee's wartime role.

man like Kue Chaw and visit his community in the rural foothills of the Blue Ridge Mountains. With his family, Kue Chaw (a former captain in the Hmong secret army) weathered urban living in Philadelphia from 1976 to 1980. Then he went on a nationwide tour looking for a place to rebuild a life more like the one they had lost in Laos. He found it in a small North Carolina town called Marion.

"It had the trees, though not quite like Laos. It had lakes and cheap land for vegetables," he said. He sent word to his clan. Today nearly 600 Hmong live spread out over rural Burke and neighboring McDowell Counties.

As the leader, Kue Chaw exerts a powerful force on the people who come and stay. "If you come to Marion, you must work. This is what life in America is about," he told me in the office of the Hmong Natural Association. There is little choice, as the state provides virtually no welfare support, but there are enough nonskilled jobs available to keep the Hmong employed. Land and housing are also cheaper, making it possible to buy homes.

There was some resistance from local people when the Hmong began to arrive, and a short-lived letter-writing campaign to local newspapers stirred rumors of a Hmong invasion. But the number of letters soon dwindled, and the Hmong went on living quietly.

"I THINK YOU HAVE TO DIVIDE the Hmong transition in this country into two parts," said Yang Dao in St. Paul, Minnesota. The twin cities are home to 14,000 Hmong, second in concentration only to Fresno. As the first Hmong ever to receive a Ph.D., Yang Dao is the most respected Hmong intellectual in the nation. "When our people first came here in 1976, they were surprised by the modernization. Everything was totally different from the way of life they had

known in Laos. They were happily surprised because life was better.

"Many Hmong in this country wrote back [to the refugee camps] saying: 'We are very happy in this country, this country is like heaven for us.' But after a while they realized it was not easy to adapt themselves to this country because they could not speak English and they could not find a job, and the stress started."

To cope with the transition, area Hmong come frequently to the Tong Vang farm north of the twin cities. There they hold traditional animal-sacrifice ceremonies to help ailing relatives or to assure that good spirits are watching over newborn children. Here too, in the cavernous barn, are held Hmong funeral ceremonies, elaborate affairs that often continue for four days amid organized wailing.

Yang Dao is not blind to the disintegration of much of Hmong culture in the United States, but thinks, in the final analysis, that the resettlement has been good for his people. "It is only here, in the United States, that the Hmong are able to learn, that the young can go to school and become important members of a society. Even if we someday go back to Laos, we will have the tools to play an important part in the nation, and not have to stick to the mountains.

"It is still the case, even in the United States, that you can go into a strange town and look in the telephone book for a Hmong name and call them. Even if you do not know them, you can stay at their house and they will feed you. This is something the other refugee groups do not have. It is something that keeps the Hmong together, as a group, as a people, as a clan."

I REMEMBER SAYING GOOD-BYE to social worker Kou Yang before his departure to China for six months as a visiting scholar from Fresno State University. His usual calm demeanor was cracking under the excitement as he pulled out books on China and Laos, pointing out their shared border and where he would go to find some of the estimated two million Hmong who never fled China to Laos: "The Hmong who have never been refugees," he said.

SMALL STUDENT ON A BIG BUS, Nancy Vang boards first for her ride to kindergarten. Daughter of Fresno area farmers, she made her mark on the class as an outstanding artist. "Nancy is really special," says teacher Lori Brugetti (below). Her school tutors Hmong students to bring them up to the academic level of their age group.

SMILES OF SUCCESS light Eagle Scouts' faces in all-Hmong Minneapolis Troop 100. Praised as a powerhouse of team spirit and enthusiasm, they bring pride to parents and symbolize hope and achievement to the Hmong community.

I asked how he could go freely back and forth between China and Fresno without a passport. He disappeared briefly, returning to display, proudly, his new naturalization papers. He is now an American citizen but still grapples with the question of whether a Hmong must cast off his past, like an adolescent casting off youth to become an adult, to be a true American. I told him I didn't think so and quoted to him the words of the Hmong refugee Mouachou Mouanoutoua in Santa Ana:

"Being an American is really espousing the founding principles of freedom, no matter whether you speak the language or not. And if I say I believe in the founding principles that make America, I think that is what makes an American. It is your love for it, your belief in it, and your labor to protect it. And I think the Hmong . . . know in their hearts that these principles are what they have fought for, even in Laos—the basic principles of freedom."

Kou Yang insists, however, that the Hmong must go a step further and cast off their refugee status. "We must start thinking like Hmong Americans. Take the best of Laos and the best of America and live like that, but stop thinking like refugees."

Whatever the future of the Hmong Americans, it most certainly belongs to people like Kou Yang. □

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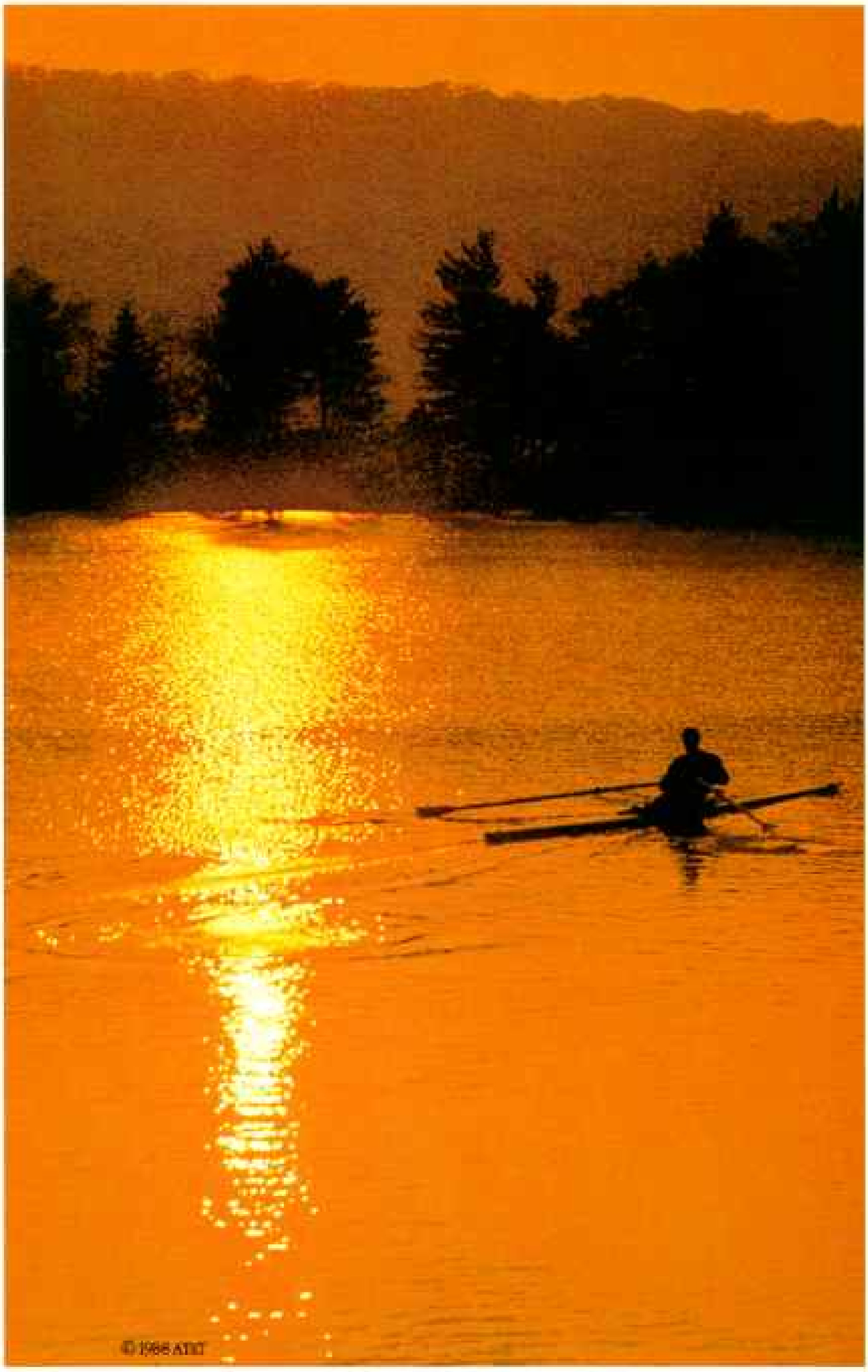
What do you do when your dreams
have pulled you away from
the one person who taught you to push?



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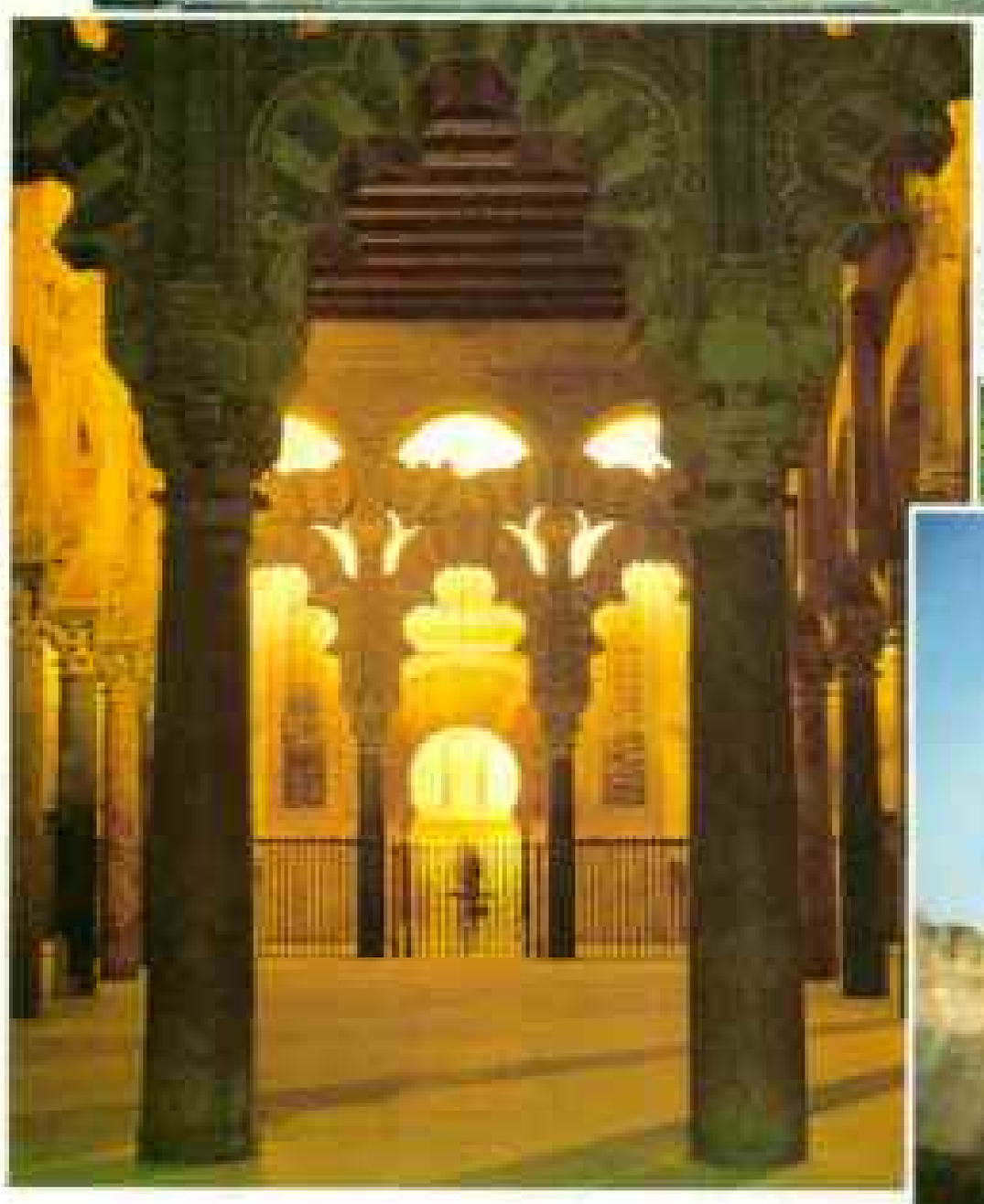

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FROM THE PRESIDENT

From 164 corners of the world

THE NATIONAL GEOGRAPHIC SOCIETY

IN THIS anniversary issue—the first in our second century of publication—we celebrate the diversity of the world's peoples. In a way, we also celebrate ourselves, for the members of our Society represent every part of the globe.

We come from cities, suburbs, and small towns from Scandinavia to the South Pacific. We are Christians, Muslims, Hindus, Buddhists, and Jews—as well as adherents of other religions—and persons of every hue, in all but ten of 174 independent nations.

Our ranks include heads of state and royalty: President Ronald Reagan and General Secretary Mikhail Gorbachev, Queen Sirikit of Thailand and King Hussein of Jordan. We are political figures like Lech Walesa of Poland and artists like Woody Allen of New York.

We are a young man in Siberia, who reassures us that the GEOGRAPHIC is read "even in Kamchatka"; a teacher in China, who says he circulates the magazine among hundreds of pupils until it falls apart; an engineering student from Zimbabwe, who credits his interest in earth sciences to time spent enjoying our pages.

We are 10.5 million individuals with a common interest in one another's lives. Not surprisingly, the great majority of us come from English-speaking countries. Roughly 80 percent live in the United States. Another 12 percent reside in Canada, the British Isles, Australia, and New Zealand.

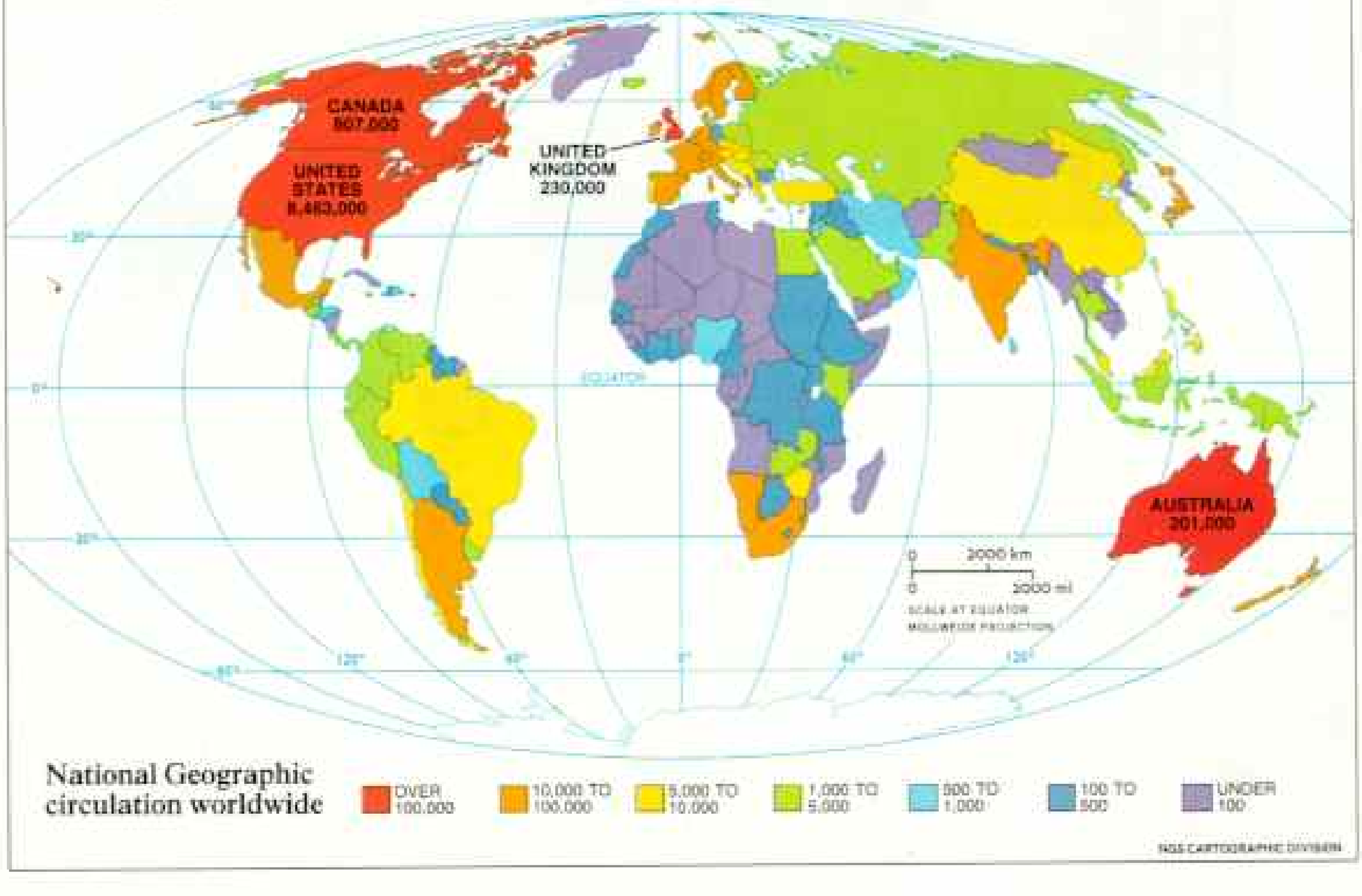
In size of membership, West Germany, the Netherlands, and Switzerland lead the nations of continental Europe, as do South Africa, Zimbabwe, and Kenya in Africa. Israel, Japan, and India have large membership rolls in Asia, as do the Philippines, Malaysia, and Singapore.

We are helping create a network of understanding among these many cultures through our magazines, books, and television programs. As Society members, we are brought together by a thirst for knowledge of the world around us and by a shared concern to preserve its beauty.

"There's a Chinese saying," writes a student from Tianjin: "Give a plum in return for a peach." I believe the fruits of our labors here at National Geographic are amply returned by the enthusiasm and support of our members around the world.

Gilbert M. Grosvenor

PRESIDENT AND CHAIRMAN OF THE BOARD



Guadalupe Fur Seal **Genus:** *Arctocephalus* **Species:** *townsendi*
Adult size: Length, male, approx. 1.8m; female, 1.2-1.5m **Adult weight:** Male, approx. 136kg; female, 45kg **Habitat:** Rocky shorelines on Guadalupe Island, west of Baja California, Mexico
Surviving number: Estimated at around 1,000 Photographed by C. Allan Morgan

Wildlife as Canon sees it

One of the greatest roles of photography is to record and preserve images of the world around us worthy to be handed down as a heritage for all generations. A photograph captures a Guadalupe fur seal as it pauses nearly undetectable amidst the rocks of Guadalupe Island's craggy shoreline.

The Guadalupe fur seal lives in isolation on a volcanic island that rises 3,600 meters from the ocean floor. This fur seal was hunted relentlessly in the 19th century. According to one estimate, as many as 200,000 lived on Guadalupe Island alone. By 1928 the species was believed to be extinct, until 1954 when a small colony of 14 seals was found. Today, the recovered population is fully protected and its island habitat is part of a wildlife reserve designated by Mexico.

As with most endangered species, the future of the Guadalupe fur seal greatly depends on mankind's ability to live in harmony with the natural world. An invaluable research tool, photography can contribute to a better understanding and awareness of the Guadalupe fur seal and how it lives within its natural environment.

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

OCTOBER 1988

GEOGRAPHICA

NATIONAL GEOGRAPHIC MAGAZINE

For the past century NATIONAL GEOGRAPHIC articles have reported on countries and cultures around the globe, the latest innovations in science, new discoveries of man's past, and the condition of our planet and its inhabitants. Often new information comes our way—sometimes on subjects we have written about, sometimes on entirely new topics—that warrants mention, however brief. As a repository of such news, we are inaugurating a monthly feature: Geographica. —THE EDITORS

Update on a Teenage Solo Sailor

The GEOGRAPHIC's all-time favorite teenage author has a teenager of his own. Robin Lee Graham, who sailed around the world alone (GEOGRAPHIC, October 1968, April 1969, and October 1970), lives with his wife, Patti, their 18-year-old daughter, Quimby, and 11-year-old Benjamin on an 80-acre homestead in Montana. For a time Quimby felt she had to accomplish a spectacular feat to equal her father's solo voyage, but her mother says, "She outgrew that idea."

The Grahams left California 17 years ago "to escape the congestion and notoriety." Robin is now an accomplished carpenter, woodworker, and builder. Far from the open ocean, the family has taken up windsurfing on nearby lakes. One of Robin's books, *Dove*, has appeared on high-school reading lists.

QUIMBY, ROBIN, PATTI, AND BENJAMIN GRAHAM. BY JIM RICHARDSON

Isla Cerritos: Maya Port Discovered

A huge seawall and extensive docks, along with an abundance of long-distance trade goods—including turquoise, obsidian, and ceramics—from central Mexico and Central America, have been discovered on an island only 650 feet in diameter off the north coast of Yucatán. A team of U.S. and Mexican archaeologists reported in *National Geographic Research*, Spring 1988, their belief that Isla Cerritos was the chief port for the inland Maya capital of Chichén Itzá, which held sway over northern Yucatán from A.D. 900 to 1200.

VESSEL DATED A.D. 10TH. BY BARBARA W. ANDREWS

Elephant Update

African elephants continue to disappear at an alarming rate to feed the ivory market. Of the 80,000 animals killed each year, only 20 percent are legally taken. Most imported ivory comes from poached animals.

In many African countries elephant population estimates in past years have been largely guesswork. But careful

W. R. E. PUTTOCK

Preserving the Addax

The scimitar-horned oryx is no longer found in Niger. Will the addax be next? Only about 50 of these large antelopes with long, spiraling horns survive in this nation on the edge of the Sahara. Thirty years ago there were several thousand. This desert dweller sleeps during the day and forages at night, nibbling grasses and succulent vegetation. Moisture from its food and dew help it survive for long periods without water.

Recently Niger, with assistance from the Swiss government and international wildlife groups, set aside a 30,000-square-mile reserve in the northeast section of the country, with one-sixth of the area for an addax sanctuary closed to visitors. The remainder will be open to tourism, and the local Tuareg people will be trained to enforce bans on looting of archaeological sites dating from 40,000 years ago and to conserve their meager resources.

Snowflake: Many Times a Father

Snowflake, the white gorilla (GEOGRAPHIC, March 1967; October 1970), is alive and well in the Barcelona Zoo. Now about 25 years old, Snowflake has sired some 20 offspring, all of them with normal gorilla coloring. Six survive; all live in the Spanish zoo with their famous father.

THE NEXT STEP.

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*Comparison based on EPA Interior Volume Index and Ward's Subcompact Class. 1988 comparison data used where 1989 data not yet available.

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surveys in East Africa by elephant expert Dr. Iain Douglas-Hamilton demonstrate the drastic reduction of the animals. From 1973 to 1987, numbers in Kenya have dropped from 130,570 to 19,749. Uganda's elephant population—greatly affected by continued unrest—has gone from 17,620 to 1,855. In Tanzania the decrease from 1977 to 1987 was 184,872 to 87,088.

Aral Sea Shrinking

Once it was the world's fourth largest lake. But nearly half the Aral Sea's 25,000-square-mile area has disappeared since 1960.

The large salty lake in the southern Soviet Union has fallen victim to irrigation that siphons water from its lifelines—the rivers Amu Darya and Syr Darya. In the 1980s these waterways were virtually dry when they reached the Aral. Water levels have dropped 43 feet since 1960, and salinity has nearly tripled. In some places salt rimming the shore stretches for 60 miles inland.

Twenty species of fish in the Aral Sea have been killed off, spelling the end of a fishing industry that at one time employed 60,000 people. Winds dump some 47 million tons of dried salt on surrounding fields and pastures each year. In its dwindled state the Aral Sea no longer exerts a moderating influence on temperatures, and growing seasons have been reduced.

Unless conditions are corrected, by early next century it will be "a lifeless brine lake," says Dr. Philip P. Micklin of Western Michigan University, who provided the projected shoreline data for the map above.

BY JIM AND SUE BARTLETT

New Stamps Honor Antarctic Explorers

Four who explored the continent of Antarctica by land and air are commemorated in stamps issued by the U. S. Postal Service on September 14, 1988. In 1820 Nathaniel B. Palmer (1799-1877) was the first American to sight Antarctica. Naval officer Charles Wilkes (1798-1877) led an 1838-42 expedition that first proved Antarctica a continent. Lincoln Ellsworth (1880-1951) was the first to cross both the Arctic (1926) and Antarctic (1935) by air. Richard E. Byrd (1888-1957) made a North Pole flight in 1926 and flew to the South Pole in 1929.

The stamps were painted by Connecticut artist Dennis Lyall, under the guidance of National Geographic Art Director Howard E. Paine. The same team designed four stamps honoring North Pole explorers, issued in 1986.

Postmaster General Anthony M. Frank and National Geographic Society Chairman and President Gilbert M. Grosvenor presided at the first-day ceremony, held at the Society's Washington, D. C., headquarters.

Saving the Corregidor World War II Memorial

Scarred by neglect and ravaged by scrap dealers, the Pacific War Memorial and fortress on the Philippine island of Corregidor (Geographic, July 1986) are being restored by U. S. Navy Seabees and the Philippine government. The cooperative effort will preserve the World War II site where U. S. and Filipino forces withstood a siege by the Japanese for five months in 1942. The dome has been painted, vegetation cleared, and the commemorative tablets cleaned. Additional restoration work is under way. Philippine security guards will help prevent further vandalism.

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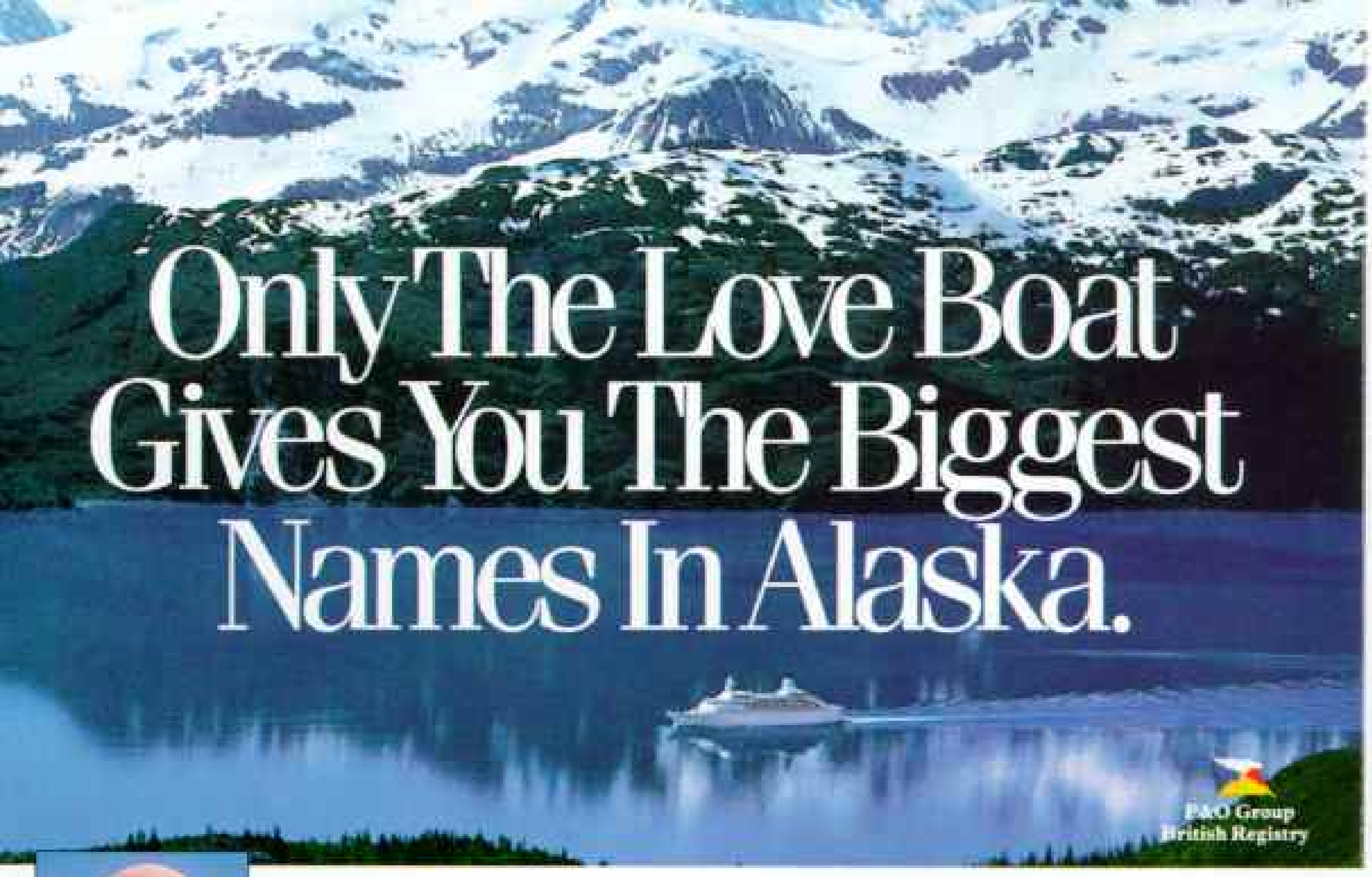

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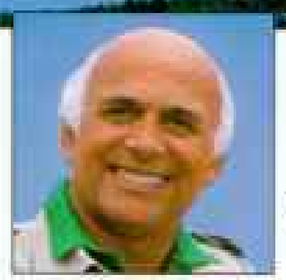

Gavin MacLeod

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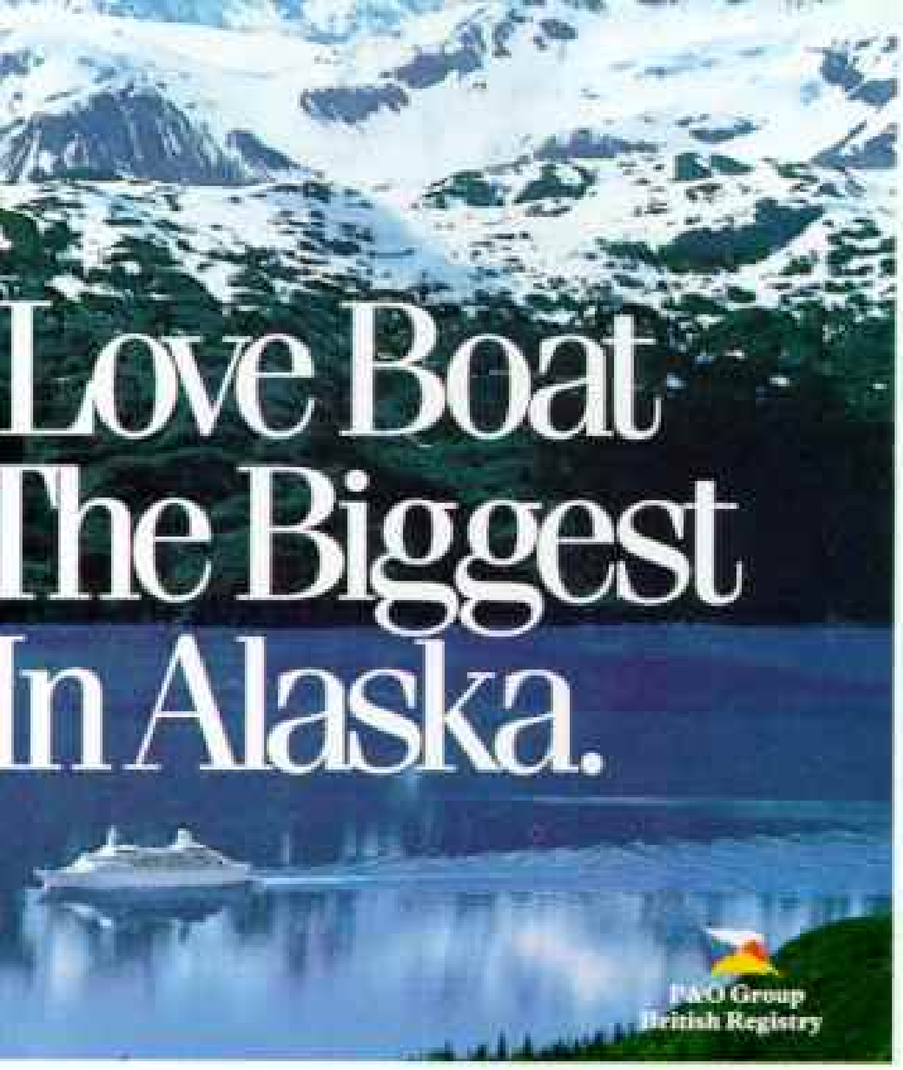

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Gavin MacLeod

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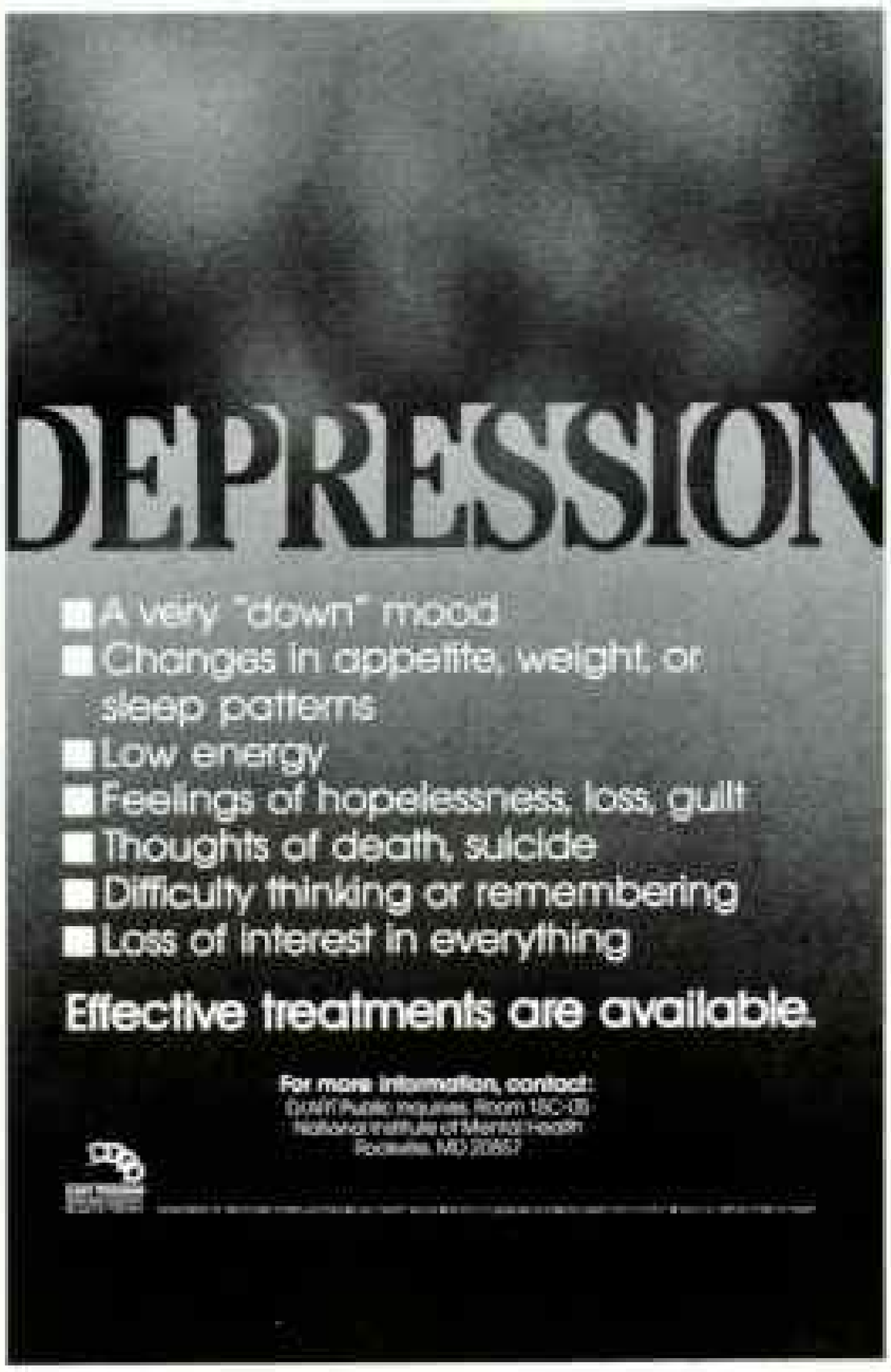


Members Forum

Guatemala

I am writing to express my admiration for your article on Guatemala (June 1988). Griffin Smith, Jr., and James Nachtwey have captured the essence of Guatemala's beauty, its enormous problems, the depth of its social, cultural, and economic divisions, the strength of its people, and their very real hope for a better future.

AMBASSADOR JAMES H. MICHEL
U. S. Embassy, Guatemala City

I was disturbed by the comment that many victims of the violence in the early 1980s "were innocents caught in a murderous cross fire between the guerrillas and the Guatemalan Army." The great majority of the victims were kidnapped by the armed forces and subsequently "disappeared" or were killed in army massacres of the residents of highland Indian villages.

ARYEH NEIER, VICE CHAIRMAN
AMERICAS WATCH
New York, New York

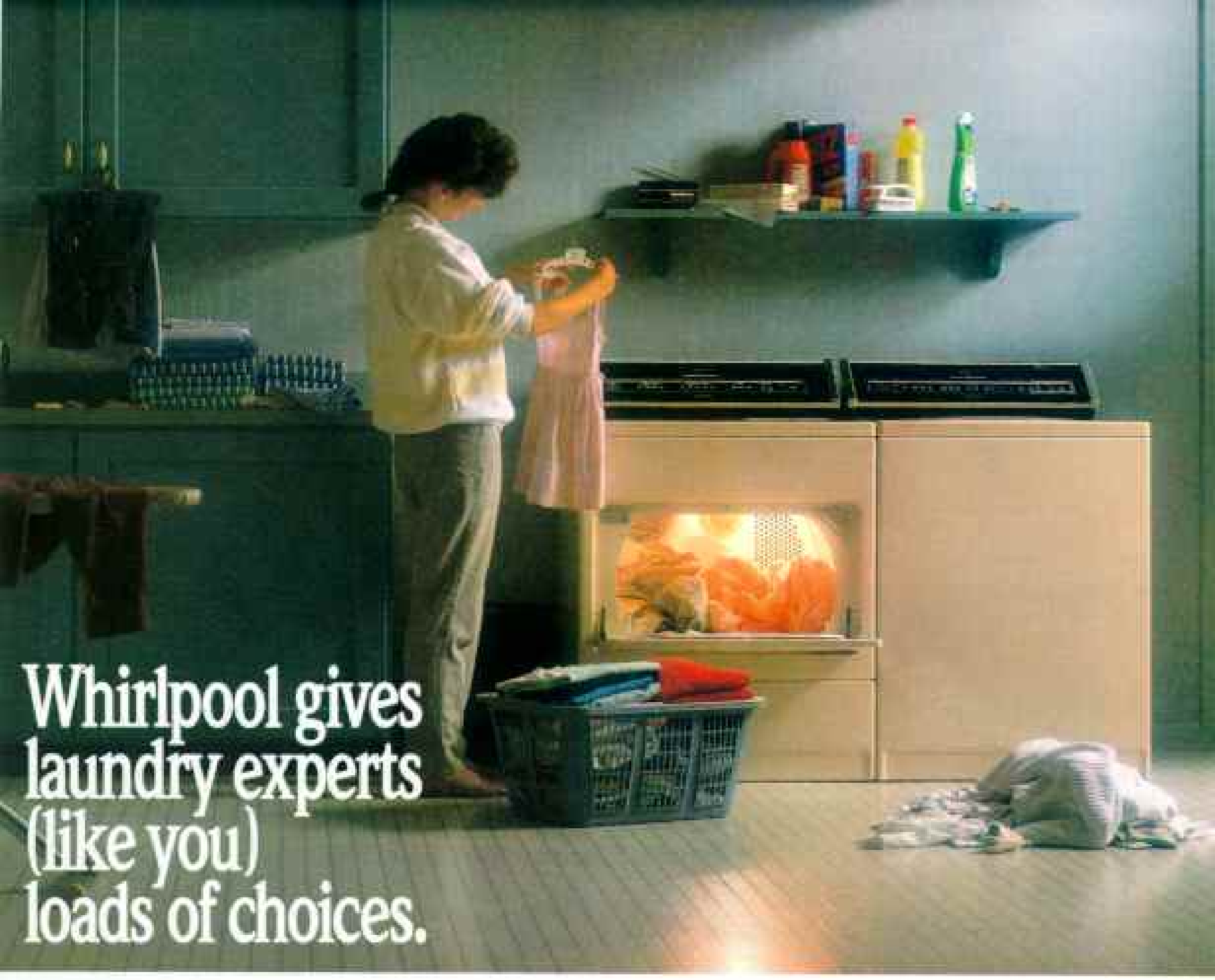
Having worked with Guatemalan refugees in Mexico and having traveled extensively in Guatemala, I have found that the vast majority of campesinos (mostly Indian) offer a completely different point of view than the one you present. You talk about Ríos Montt (president in 1982) as a man of "rectitude and personal honesty." Ríos Montt was one of the country's most ruthless dictators, whose "scorched earth" policy is responsible for the massacre of more than 40,000 Indians (accused of being Communists), the destruction of over 200 Indian villages, and the forced relocation of over 300,000 Indians.

NOAH A. ODERBERG
Boulder, Colorado

Author Smith replies: Many innocent lives were lost in the Guatemalan guerrilla war. To characterize the army's counterinsurgency campaign as deliberate "massacres" of uninvolved citizens is implausible. It does an injustice to Ríos Montt and the governments that followed his.

I am no scholar, but never before have I seen my country's historical, geographical, and sociopolitical intricacies so accurately and beautifully expressed as by Griffin Smith. I left eight years ago to get an education and a job. But I remain a Guatemalan with passion. Your article lets me explain why to my friends.

PEDRO R. CUESTA
Annandale, Virginia



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The author brushed off the formative event of Guatemala's modern history—the CIA-backed coup in 1954. The true reason behind Arbenz's demise was that he angered the United Fruit Company, the largest property owner in the nation, by seizing much of its land under an agrarian reform act.

STEPHEN SCHLESINGER
New York, New York

Mr. Schlesinger wrote, with Stephen Kinzer, Bitter Fruit: The Untold Story of the American Coup in Guatemala, *Doubleday, 1982.*

Etruscans

I was surprised to read that *apa* means "father" in Etruscan (June 1988), because it means exactly the same in Hungarian, another "out of place" language in Europe.

ERWIN FUCHS
Seattle, Washington

The Etruscan calendar of offerings on page 726 appears very similar to the ancient Cretan Phaistos Disk shown on page 174 of your February 1978 article "Greece's Brilliant Bronze Age."

RONALD M. KELLY
Murfreesboro, North Carolina

It is, although a millennium separates the two.

Palio

Despite the ceremony of a church blessing and the statement that "the animal is everything in the Palio" (June 1988), the fact remains that these animals are being raced on a historically treacherous track. I wonder if the man crying over the doomed horse will be moved enough to instigate a change to the track—or if he will follow his ancestral heritage and enter yet another horse in next year's race.

Mary Asproyerakas
Chicago, Illinois

When in Siena, we were advised that if a horse made a propitious dropping in the church while being blessed, the betting would make an IBM mainframe shudder and the entry would jump immediately to the top of the oddsmakers' list.

Jim and Laurie Ruddy
East Windsor, New Jersey

Ellesmere Island

Beautiful juxtaposition! The relationship between the Capitoline wolf in the Etruscans article (page 737) and the standing nursing wolf on Ellesmere Island (page 758) really struck me. The similarity just serves to prove again that time is relative, nature's beauty is eternal, and "it's a small world, after all!"

Kathy Hubbard
Garland, Texas

Coelacanths

Hans Fricke seems to imply (June 1988) that the coelacanths of ancient times occupied a place in the direct line of evolution that led to land animals. Actually, coelacanths belong to a side branch, which apparently "chose" to specialize in the role of "living fossil." It was the coelacanths' cousins, members of the suborder Rhipidistia, that planted their feet—or rather their lobe fins—firmly on dry land and struck out decisively on the road to mammalhood.

TERRELL E. STEWART
Columbus, Georgia

Hooray for "Old Fourlegs," nature's ultimate magician. Now you see him, now you don't. Is it possible the coelacanth has survived unchanged for 400 million years because, when threatened, it rotates to a nose down, immobile position to mimic drifting vegetation? Looks like an unappetizing sea cactus to me.

JOHN COURTLAND
North Hollywood, California

If the coelacanth has survived from an alleged 60 million years ago, then why has it left not a trace in the geologic record since that time?

RICHARD W. IKENBERRY
Kearney, Nebraska

Fossil remains of coelacanths date back nearly 400 million years, but about 60 million years ago the record died out. From that critical period there is a general shortage of fossil-bearing deep-sea sediments.

The claim made by the author about being the first to find and photograph that fish is not accurate. A coelacanth was photographed at a depth of 130 feet off the Comoros in 1966. The photographer was a Frenchman, Jacques Stevens, whose photographs and accompanying article appeared in *Life* magazine on July 22, 1966.

JOSEPH M. DI COLA
Fargo, North Dakota

Several scientists questioned the authenticity of those photographs at the time, as showing a fish amid shallow-water corals, with hook-and-line marks on its mouth, and seemingly moribund. Dr. Fricke found these rare fish only at depths of 400 to 600 feet.

Tidewater Map

The text (June 1988) refers to Maryland, my state, as remaining "officially with the Union." Maryland was held in the Union by federal troops, which occupied the state throughout the War Between the States.

PHILIP A. RIDGELY
Washington, D. C.

You have forgotten that Delaware once was a Swedish colony with the name New Sweden and that Fort Christina (today Wilmington) was founded by Swedish settlers 350 years ago. The anniversary took place last April in the presence of the king and queen of Sweden.

NILS GUNNAR AHLGREN
Strängnäs, Sweden

On the small map just above Number 3 (1780-1865, Rivalries and Rupture), Delaware should be included as a slave state, not a free state.

LEWIS MCCAMMON
Los Angeles, California

A border state that indeed had slavery, Delaware sided officially with the Union. But it was among the last to free its slaves after the war.

Bronze Age Shipwreck

I was thrilled that through the beautiful production of my article on the Bronze Age shipwreck (December 1987), I was able to share our discoveries with so many millions of people. I only want to add that my friend and colleague Donald A. Frey took all but one of the full-page underwater color pictures; through a mix-up he did not receive credit for all of them.

GEORGE F. BASS
College Station, Texas

We regret the mix-up, due to last-minute picture additions. The photographs on pages 728 and 733 were taken by Donald Frey, that on page 732 by Bill Curtsinger.

Through the mail

When I lived on a farm in Geneseo, New York, my uncle Ed used to give us a subscription for Christmas every year. That was 1914, and I was four years old. I learned to read from NATIONAL GEOGRAPHIC and the Sears Roebuck catalogue. I vividly recall the "Valley of Ten Thousand Smokes" (February 1918).

Sears advertised malleable 12-foot sections of pipe. I construed malleable to mean mailable, and I couldn't for the life of me figure out how they were going to put a 12-foot length of pipe in our mailbox. Fortunately they didn't try. I still delight in the contents of the GEOGRAPHIC and intend to take it until the undertaker thinks it should be canceled.

JUDD H. BLACK
Rochester, New York

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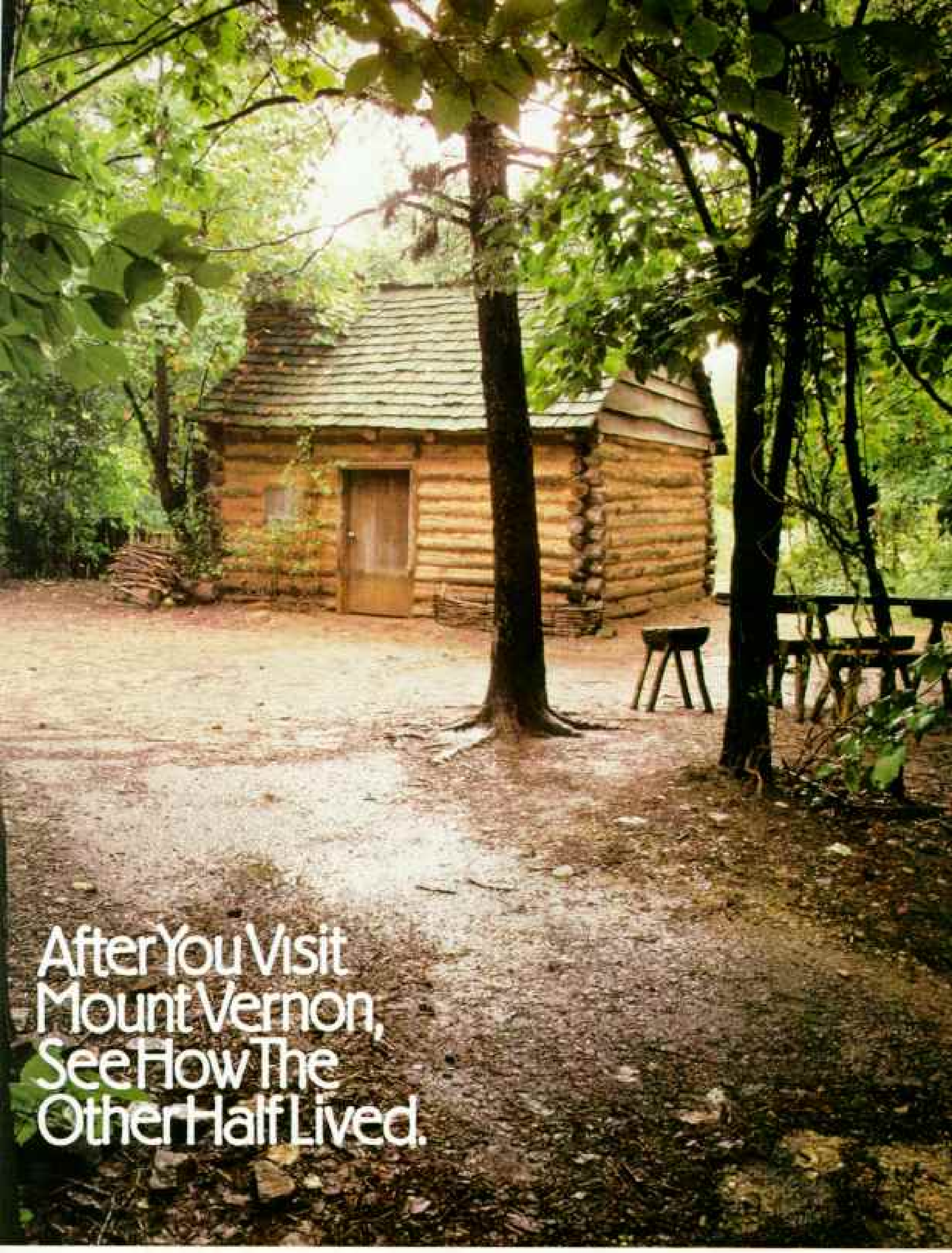

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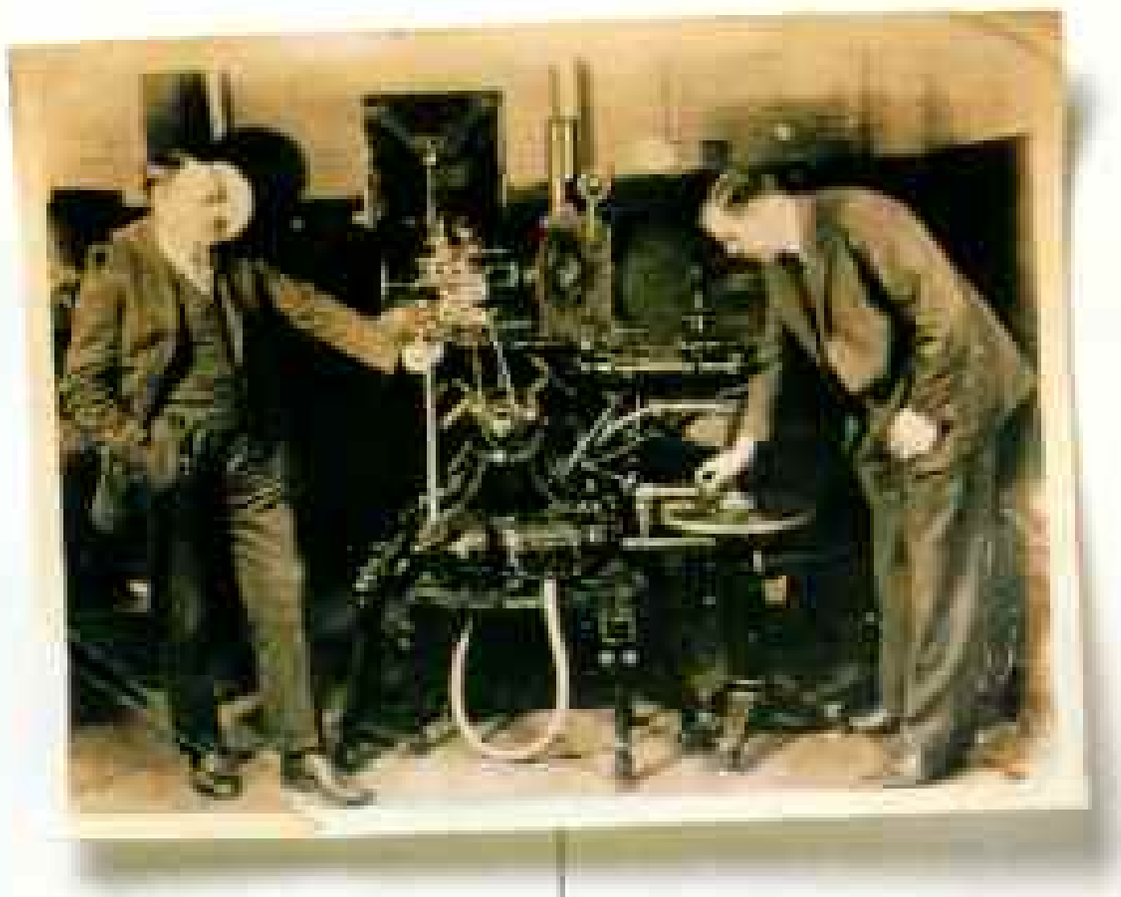

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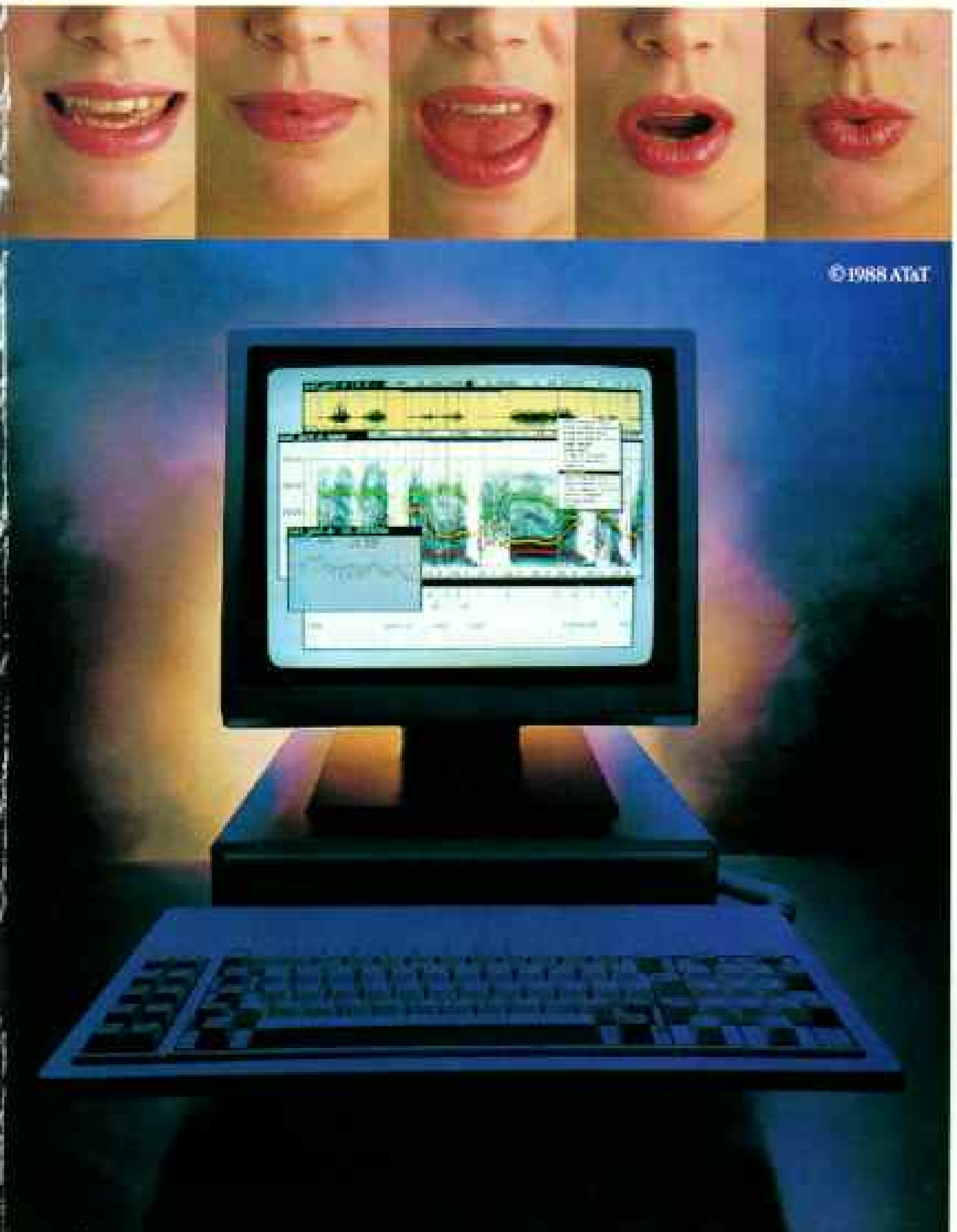

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On Assignment

PHOTOGRAPHS BY SISSE BRIMBERG (ABOVE) AND PETER MACDIARMID

IN THE SEARCH for the origins of modern man, even experienced journalists sometimes lose their way. Senior Assistant Editors MARY G. SMITH and JOHN J. PUTMAN consult a map beside the Dordogne River in southern France. "We each thought the other knew where we were going," Mary explains.

They were looking for Cave 16, a site being studied by Dr. Jean-Philippe Rigaud, director of prehistoric antiquities in Aquitaine, and author of our article on Lascaux Cave. They soon found it, and picked up the fascinating trail that leads through the millennia to today.

As illustrations editor for our reports on Paleolithic man and Lascaux, Mary was pursuing an interest that has brought her into contact with most of today's experts in paleontology.

"This time, more than ever," she says, "I was struck by how intelligent and creative Ice Age humans were. The myth of the brutish knuckle-walker is totally false. Those people had the same conversations thousands of years ago that we have today, just about different things."

As author of the Ice Age article, John was impressed by the multiplicity of disciplines. "One group is busy analyzing fossil pollen to discover which vegetation existed, and thus what climate, while another studies the teeth of a certain species of mice to learn when they arrived in the Middle East. At the heart of it all is the ice, which choreographed a huge ballet of migration over thousands of years."

A knack for putting people at ease gives photographer DAVID TURNLEY unusual access to the lives of his subjects. Knowing enough Afrikaans to exchange pleasantries was an additional asset in his work on our Afrikaners story. "It was a difficult assignment, but I tried to document as fairly as I could the diversity of their culture."

Sent to South Africa by the *Detroit Free Press* in 1985, he reports, "My work covered a wide spectrum of society—news, photo essays on Archbishop Tutu and Winnie Mandela, and on ordinary lives. Then in 1987 I concentrated on the Afrikaners for the GEOGRAPHIC. Thus I very much lived the separation that is South Africa today."