THE MAKING OF AMERICA: TIDEWATER

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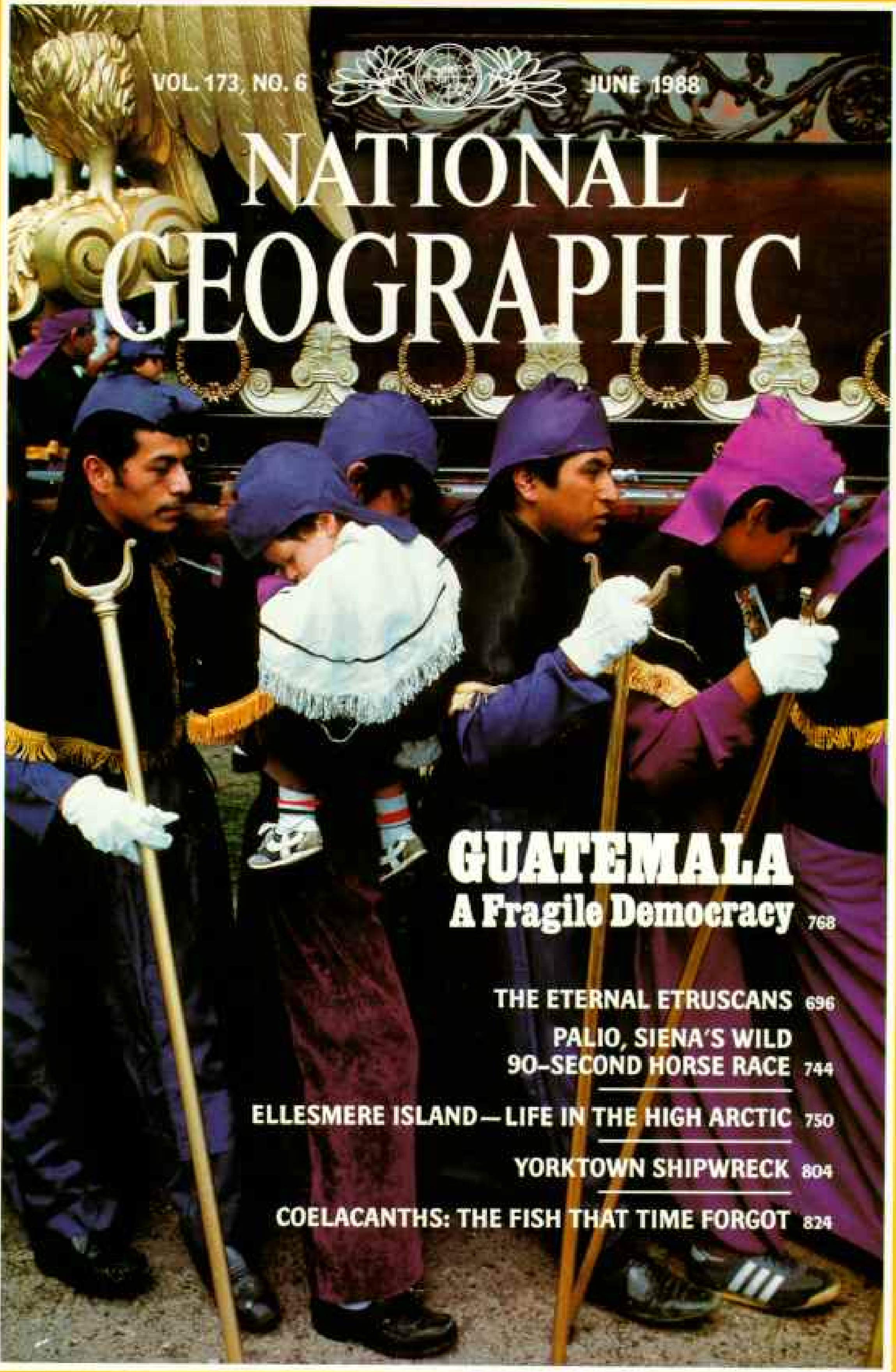

GUATEMALA
A Fragile Democracy 768

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COVER: *Devoted and devout, men of Antigua Guatemala shoulder a float during a Good Friday procession. Photo by James Nachtwey.*

WE HEAR AND TALK a great deal about our children's geographic illiteracy but seldom mention that the main cause may well be adult geographic indifference.

Perhaps no part of the world suffers more from U. S. indifference than our seven neighbor nations between Mexico and South America. Few citizens could name all seven, let alone locate them on a blank map, yet all are as close to Miami as New York City is—perhaps culturally as well as physically. Sarcastically lumping them together as "banana republics," we tend to think that all are ruled by military dictators. Most of us read about them only when trouble catapults them to page one, as with General Manuel Noriega and Panama. Based on the amount of press coverage, Nicaragua would seem to rank second only to the U.S.S.R. as a threat to the United States, yet it has fewer people than metropolitan Atlanta.

Recently, when Costa Rica's President Oscar Arias was asked if receiving last year's Nobel Peace Prize had changed his life, he answered, "Yes, people no longer introduce me as the president of Puerto Rico." Perhaps Costa Rica remains so little known because Arias is *not* a military dictator. The country doesn't even have an army; it was disbanded 40 years ago.

This issue features a report on Guatemala, third largest of the seven. Two years ago it quietly elected Vinicio Cerezo its first civilian head after 16 years of military dictators. Since it was an honest, nonviolent change of government, the event attracted little attention in the U. S. And since there are fewer leftist guerrilla incidents this year than during those years of military rule, Guatemala has practically disappeared from the news.

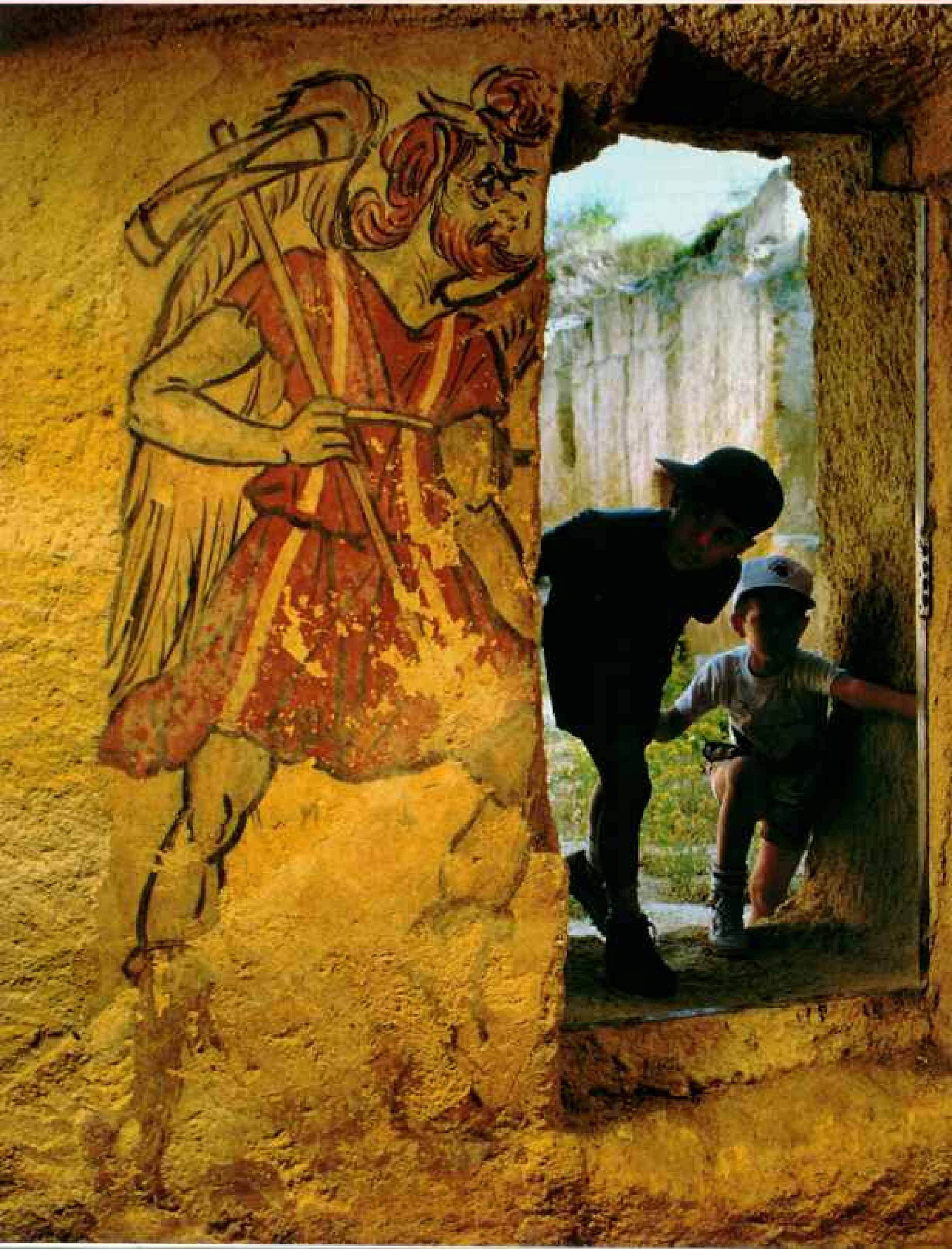
Reading our excellent article by Griffin Smith and looking at the revealing photographs by Jim Nachtwey should dispel any indifference and will certainly increase your geographic knowledge of this fascinating neighbor nation.

I hasten to admit there are plenty of problems in Guatemala and elsewhere in Central America, but freely elected leaders like Presidents Arias and Cerezo are crafting creative, positive approaches that in years to come could put the region on page one with good news.

Wilbur E. Garrett

EDITOR

THE ETERNAL



ETRUSCANS

By RICK GORE
ASSISTANT EDITOR

Photographs by
O. LOUIS MAZZATENTA
SENIOR ASSISTANT EDITOR

Paintings by
JAMES M. GURNEY

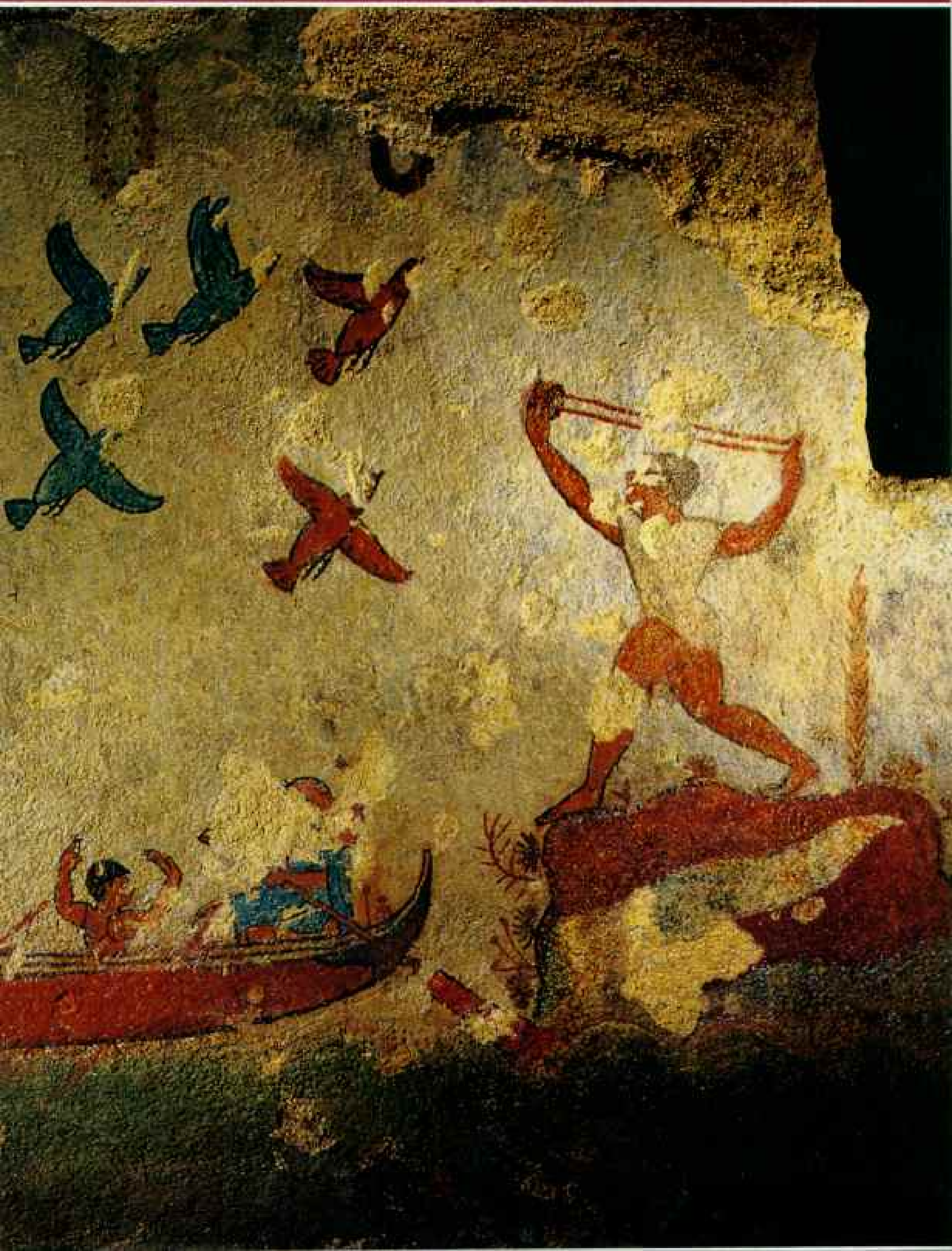
By their tombs we know them: a fun-loving and sensuous people. Borrowing what they needed from the early Greeks, they forged Italy's first civilization. Since only traces of their language survive, paintings and artifacts in burial chambers provide our best glimpse into their world. Two winged demons of the underworld, Charon (left) and his companion, Vanth, flank a tomb entrance at Tarquinia. Painted in the third century B.C., the fresco dates from the final stages of the Etruscans' culture, before it was absorbed by their ascendant neighbors, the Romans.

An eerie assembly reposes for eternity atop sarcophagi at the Etruscan museum in Tarquinia. One figure, in foreground, holds a scroll with 59 words of Etruscan, a

puzzling, non-Indo-European language. It identifies him as Laris Pulena, "son of Larce, nephew of Larth." Limited largely to epigraphs, scholars have deciphered only 300 useful words.

Alive with leaping dolphins, soaring birds, and animated youths hunting and fishing, a sixth-century B.C. tomb painting at Tarquinia retains the spontaneity of Etruscan art

despite the ravages of time. Departing from the idealized style of their Greek contemporaries, Etruscan painters often depicted their subjects in natural, playful settings.



Little survives of Etruscan cities except their names. At Volterra (below) the most celebrated Etruscan remnant is the Porta dell'Arco from the fourth century B.C. (upper right). Three heads

on the arch, all badly eroded, were probably sculptures of gods. They appear again in a relief on a Volterra sarcophagus of the first century B.C. depicting Greeks sacking Thebes.

PHOTOGRAPHED AT GUARNACCI MUSEUM, VOLTERRA

It is the secret of the world that all things
but only retire a little from sight,

subsist, and do not die,
and afterwards return again. RALPH WALDO EMERSON

WHY DOES this bloody-mouthed, black-winged beast surprise me so? The Etruscans always loved a monster. Terra-cotta gorgons gloated from their roofs. Griffins guarded their temples. Satyrs danced in their courtyards. But Etruscan monsters had seemed friendly, almost like pets. They were creatures of inventive delight. This painted demon, lurking on the gloomy walls of a recently excavated Etruscan tomb, screams of hell. It is a creature of guilt and perdition, utterly out of character with what I have seen so far of the Etruscan spirit.

I have descended seven meters (23 feet) into the earth of central Italy on a journalistic mission. New ideas about the Etruscans, the shapers of ancient Italy, are taking hold.

The Etruscans have long been the magical mystery people of antiquity. They rose from the mist of Italian prehistory around 900 B.C. and for some 500 years dominated most of the country from Rome to the Po Valley. Yet, unlike the Greeks and Romans, they left behind a sparse written record—no heroic poems, no histories, no literature, only short official or religious inscriptions. Etruscan art survived because it was buried in tombs. For centuries the only other information on these people has come via the partisan reports of ancient Greek and Roman historians.

Even those writers debated who the Etruscans were and where they came from. The Etruscan language was alien to their neighbors. Their customs were spiritual and sensual. Etruscan women enjoyed uncommonly high status for the ancient, male-dominated Mediterranean world. The Greeks and the Romans considered the Etruscans hedonistic. They were indeed a different people.

In recent years, however, archaeologists have been digging deeper into the Etruscan mystique. They have excavated not only new tombs like the one I have entered, but also Etruscan ports, shipwrecks, houses, and what is left of the great cities. They have been combing the fields and furrows of old Etruria—modern Tuscany and Latium—for clues to Etruscan settlement patterns. New artifacts have been uncovered, while objects long moldering in museum back rooms have been carefully reexamined. Moreover, Italians have taken a keener interest in their Etruscan roots. They celebrated 1985 as the Year of the Etruscans, acknowledging what that passionate observer of things Etruscan, English author D. H. Lawrence, suggested when he toured Etruscan places in the 1920s: "Italy today is far more Etruscan in its pulse than Roman; and will always be so."

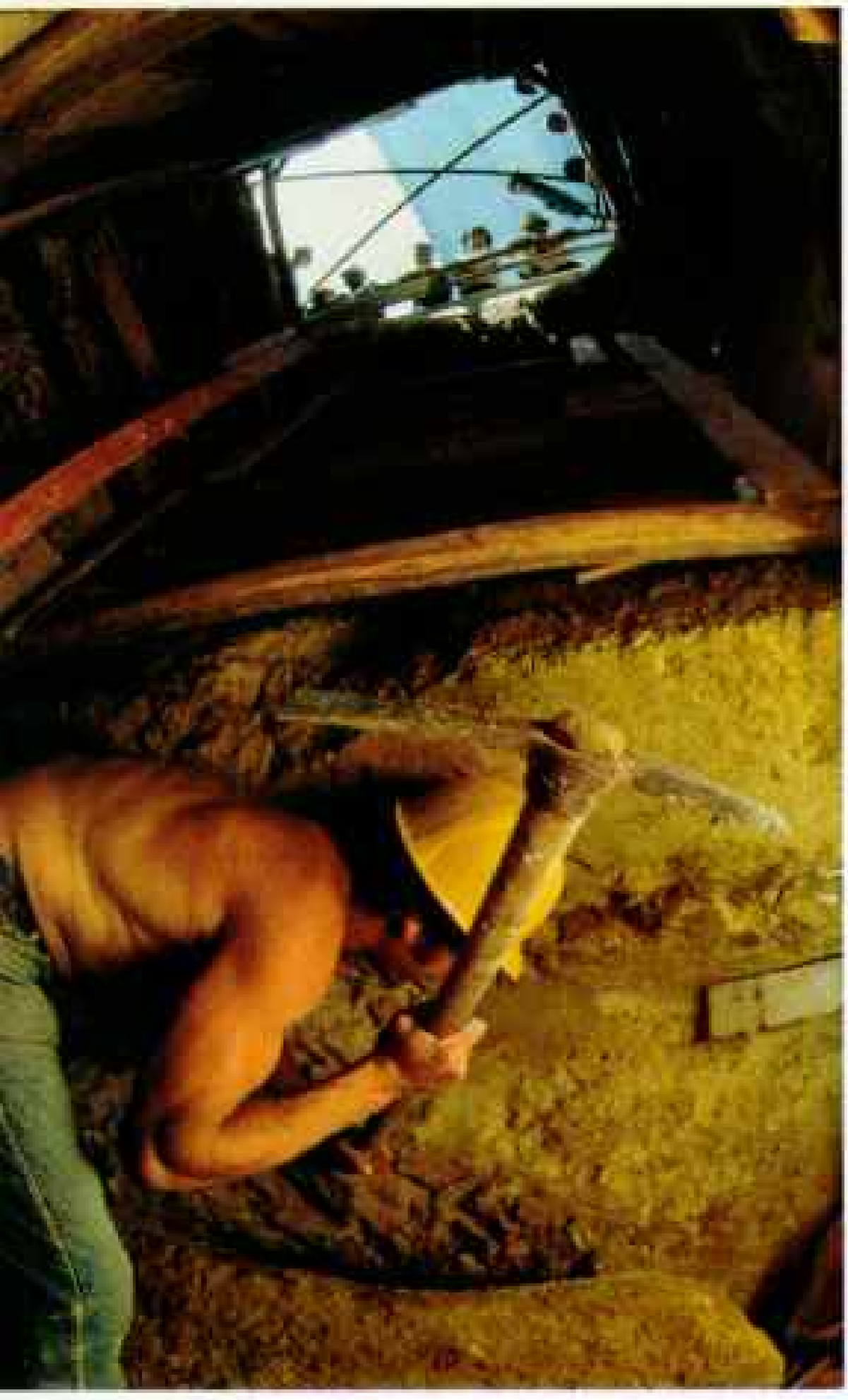
GRIM REAPERS of the underworld, winged and snake-handling demons cavort on the wall of a recently excavated tomb at Tarquinia. The first discovery of its kind in 20 years, the Tomb of the Blue Demons is expected to yield insights into the development of Etruscan tomb art.

Last rites for an Etruscan aristocrat

SMOOTHING THE WAY to the hereafter with rose petals and sweet music, wealthy Etruscans lay a departed relative in the family tomb across from the remains of one who has gone before. To ensure that the next life is as pleasant as that on earth, the tomb is stocked with jewels, clothing, and other prized possessions. Re-creating the images found in the Tomb of the Blue Demons (previous pages), this rendering depicts wall paintings typical of both early and late Etruscan tomb art. On the left wall the bearded deceased is pictured in a procession of friends and musicians. On the back wall he is seen with his spouse at a joyful banquet. In stark contrast, the scene on the right wall reflects a sinister change in the Etruscan concept of death that is now thought to have emerged as early as the fifth century B.C. On the verge of decline, they began to adopt the Greek vision of a demon-infested underworld, approached by crossing the River Styx with Charon, ferryman of Hades.

We are indebted to the archaeological superintendencies of southern Etruria and Tuscany, under the direction of Paola Pelagatti and Francesco Nicosia, for their encouragement and support during the preparation of this article.

— THE EDITOR



UNDER THE ASPHALT of a highway at Tarquinia, a worker picks away at the entrance to the Blue Demons tomb. Above, a team of Italian archaeologists waits eagerly for the opportunity to enter.

SO, WHO WERE THESE PEOPLE? What drove their pulse? I have come to Tarquinia, site of this tomb with the black beast, to discover more than the newest archaeology. Tarquinia, about a two-hour drive northwest from Rome, offers channels to their souls.

Twenty-seven hundred years ago Tarquinia was the cultural capital of the Etruscans. From a plateau it looked in splendor toward the Tyrrhenian Sea. Once 20,000 people inhabited this site. Today only the scant remnants of an excavated temple mark the site of the ancient city center.

"You need imagination," says Edmondo Boni, an employee of the Tarquinia museum. He bends down and caresses a stone in the remains of an old street. "You must imagine a refined and cultured people who loved colors, who took great care with their clothes and bodies. I see women in veils, well-shaved men. I see them parading in their best finery." For the noblewomen, that would have included melon-shaped hats and hinged high-soled sandals with gold laces.

All around ancient Tarquinia and beneath a nearby modern town with the same name lie the old city's vast necropolises, or cities of the dead.

Most Etruscan cities had such necropolises outside their walls. They mirrored the city of the living. Etruscan craftsmen fashioned tombs modeled on houses and gave these cities of the dead streets and even drainage systems. The tombs were typically stocked with favorite objects. The Etruscans apparently believed that life—perhaps a better one than they had known—continued after death. They wanted to be surrounded in that life by what they loved most in the one they were leaving.

The walls of many tombs at Tarquinia were lushly painted. Food. Wine. Musicians. Dancers. Birds on the wing. Lovers. The Etruscans relied heavily on these motifs of life to adorn their chambers of death.

"At Tarquinia we know of about 150 painted tombs," says museum and site director Maria Cataldi. "In all more than 6,000 tombs have been identified, though we suspect there may be two or three times that. Of these about two percent are painted. Only aristocrats could afford painted tombs."

The entrance to the newly discovered tomb, concealed by a corrugated-roofed hut, blocks half the road leading east from Tarquinia. "In 1985 Tarquinia wanted to put a new water main under this road," explains Cataldi. "Since the road cuts through the heart of a necropolis, we had to be sure the construction would not destroy any unknown tombs. We tested the ground and found 29 tomb entrances. Most were small. But the entrance to this tomb was twice as large as the others. We thought it might be important.

"We didn't want to tear up the road to excavate until we were sure. We drilled a hole and sent a camera down to explore. That's how we realized it was painted. It's the first painted tomb discovered here since 1970."

A new painted tomb is both a delight and a problem for Italian archaeologists. Delight in the new clues it offers about this civilization. Problem because opening a tomb triggers rapid decay of its paintings. The ancients made white pigment from chalk, black from charcoal, red from iron oxide, blue from a compound of copper, calcium, and silica. The humidity we release in each breath alters the long-stable climate in the tomb, attacking these pigments.

Combined with vandalism, a century of human visitation has devastated Tarquinia's tomb paintings. Moreover, the sharp temperature increase that human visitors create draws water containing minerals through the tomb walls, encrusting them with salts. Most tombs have been closed to the public.

We contort down shaky ladders into the tomb. Robbers—*tombaroli*—had discovered it decades earlier, so no precious objects remain. Only the puzzling wall paintings, lit by floodlights. In the stale, chilly air a woman technician precisely sketches figures. Scholars cluster in groups, debating and gesticulating. Their main concern now is preservation: how to keep the black beast from coming off the wall.

Other demons prowl this wall. Several are blue, giving the chamber its official name: Tomb of the Blue Demons. One prominent demon holds

Archaeologists were forced to act when a new water line approached the tomb along the Strada Monterozzi Marina. Paola Pelagatti (below, center) and others view photographs taken by lowering a camera through a small hole drilled before the tomb was opened.

WORLD OF THE ETRUSCANS

CHEATED BY FATE out of an enduring archive of their own, the Etruscans must forever be known through accounts of observers, such as the Roman historian Livy, who wrote: "Etruria filled the whole length of Italy with the noise of her name." Today, in fact, their hilltop cities, whose sites evolved into the modern towns of Tuscany and Latium, are remembered by their romanized names.

Who were they, these people who emerged in the classical world at the same time that the Greeks were about to embark on their Golden Age? The Greek historian Herodotus claimed they were Lydians who had immigrated to Italy from Asia Minor. But modern scholars believe the Etruscans evolved from an indigenous population of Iron Age farmers of the Villanovan culture. Exploiting the rich mineral resources of central Italy, they spawned a wealthy merchant class that competed mightily with the Greeks for trade throughout the Mediterranean. On land they extended their influence north to the Po Valley and south to Campania. Like the Greeks, they organized their society into independent city-states. Ruled by kings at first (including a dynasty that would dominate Rome for a century), they later adopted republican government. The Etruscan legacy helped their Latin-speaking Roman conquerors to build one of the ancient world's greatest empires.

ca 900-750 B.C.
Villanovan cultures in Italy. From their hamlets Etruscan cities grow.

750-600 B.C.
Greek colonies exert strong influence over newly urbanized Etruscans.

616 B.C.
Tarquinius Priscus becomes first Etruscan to rule Rome.

550 B.C.
Founding of cities in Po Valley and expansion into Campania.

535 B.C.
Control of Corsica heralds greatest extent of Etruscan influence.

Lago di Garda
Adige
Mincio
Po
LIGURES
VENETI
Placentia
PIACENZA
Manthva (?)
Mantua
MANTOVA
VENEZIA
(VENICE)
PARMA
Atria
ADRIA
Mutina
MODENA
Felsina
Bononia
BOLOGNA
Spina
SPINA
Reno
MARZABOTTO
Ravenna
RAVENNA
Magra
LUNI
NORTH
Ligurian
Sea
Adriatic
Sea
PISA
CAMPI
RISENZIO
Viggiuli (?)
Fanum Vacunae
FIESOLE
VILLANOVA
FIRENZE
(FLORENCE)
Arimna
Ariminum
RIMINI
Velathri
Volaterrae
VOLTERRA
Arno
Tevere
Caere
Saena
SIENA
Arretium
AREZZO
Colline Metallifere
Fufluna
Populonia
POPULONIA
MURLO
Cortun
Cortona
CORTONA
ETRUSCANS
UMBRI
CORSICA
ELBA
Vatluna (?)
Vetulonia
VETULONIA
Lago Trasimeno
Sentinum
(SASSOFERRATO)
Rusellae
ROSELLE
Monte Amiata
1,738 m
5,702 ft
Clevsin
Clusium
CHIUSI
Perusna
Perusia
PERUGIA
MAGLIANO IN TOSCANA
GIGLIO
Velcha (?)
Vulci
VULCI
SOVANA
Velzna
Volsinii
ORVIETO
Cusa
Cosa
COSA
Lago di Bolsena
ACQUAROSSA
MONTALTO DI CASTRO
NORCHIA
SABINI
PICENTES
Tarchna
Tarquinii
TARQUINIA
Lago di Bracciano
Falerii
Falerii
CIVITA CASTELLANA
PYRGI
Vei (?)
Veii
VEIO
Cisra (?)
Caere
CERVETERI
ROMA
(ROME)
OSTIA
PALESTRINA
LATINI
SAMNITES
CASSINO
TERRACINA
Volturnum (Capua)
Capua
SANTA MARIA CAPUA VETERE
CAMPANI
Cumae
(CUMA)
NAPOLI
(NAPLES)
ISCHIA
POMPEII
PONTECAGNANO
Tyrrhenian
Sea

Etruria
Areas of expansion
Major Etruscan settlements
Other settlements
Etruscan name
Roman name
MODERN NAME

0 40 km
0 40 mi

HGS CARTOGRAPHIC DIVISION
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MAP EDITOR: JOHN T. BLEVINS

509 B.C.
Fall of Tarquin dynasty in Rome marks beginning of Etruscan decline.

396 B.C.
Sacking of Veio, after ten-year siege, ends city's long conflict with Rome.

90 B.C.
After centuries of decline, Etruscans become Roman citizens.

33 CENTIMETERS HIGH (13 INCHES); PHOTOGRAPHED AT TARQUINIA NATIONAL MUSEUM

WELL SHOD for their times, Etruscans traded shoes, like these wooden sandals imprinted with the owner's toes, for goods such as this vase with Egyptian-style relief, probably made by Phoenicians.

28.5 CM LONG; PHOTOGRAPHED AT NATIONAL MUSEUM OF VILLA GIULIA

a snake in each hand. To his left a woman and boy have stepped off a boat ferried by Charon across the River Styx. To his right the grotesque black beast rushes toward the newcomers as if to eat them.

"This scene is complex and mythical, but clearly we are in the Greek underworld," says Cataldi.

Scholars knew that fearful creatures of the underworld emerged as a motif in the waning years of the Etruscan culture. But this tomb apparently dates from the late fifth century B.C., when the Etruscan culture was still robust. It is early for such demons. Indeed, the other walls of this chamber are celebratory. On the wall behind me a man, probably the deceased, mounts a chariot in a parade of gleeful musicians and dancers. At a banquet, on the rear wall, he and his friends lounge amid amphorae of wine and garlands of flowers. One man holds up an egg, a favorite Etruscan symbol of eternal life. He stares at it with confidence. Nothing could possibly go wrong with that egg.

The philosophy of this scene is pure Etruscan. Then why this Greek-inspired nightmare?

"There is a moment when you are strong and take what you want from other cultures," says Cataldi. "Then comes the moment when other cultures are forced on you."

I will appreciate that comment better in the weeks ahead as I travel old Etruria. But now the stale air of the tomb closes in. It's time to get back to the light.

ETRUSCAN SPIRITS still inhabit the hills of Tuscany. I can sense them in the shaded solitude of a road near the town of Sovana. A small canyon dug through a volcanic hillside, the road is but one of many Etruscan highways that still crisscross this land of grape and olive.

Master engineers the Etruscans were. As Tim Potter, a British Museum scholar, had told me: "Everyone thought the Romans were such great road builders. They were, but they learned much of their engineering from the Etruscans."

The road leads to the ruins of a tomb complex where more Etruscan spirits survive. Once brilliantly painted, the decaying, overgrown tombs were carved from the hillside to resemble temples. They invoke visions of Etruscan priests, known as haruspices, in their conical hats, studying lightning or slaughtering sheep to divine the future.

Likewise, the cliff temple-tombs of Norchia conjure up dancers in gauzelike costumes in a funeral procession. With them parade flute players. "The Etruscans so loved music," noted the Greek writer Athenaeus, "that they kneaded their bread, practiced boxing, and whipped their slaves to the sound of pipes."

Athenaeus implied a cruel strain in the Etruscans. And Etruscan art does give glimpses of a penchant for brutality: a warrior biting an opponent's head; a sport in which a hooded man is attacked by a fighting dog. The plateau above the tombs at Norchia probably saw such scenes, some possibly including human sacrifice, foreshadowing Roman gladiatorial games. Surviving

artwork suggests the great popularity of athletic competitions among both men and women.

The elegant mirrors found in women's tombs, inscribed with scenes and words, confirm their competitive interest. One depicts a man and a woman wrestling. Another portrays a couple at a game table. An inscription has her saying: "I'm going to beat you." To which he replies: "I do believe you are."

These independent Etruscan women baffled and annoyed the more conservative Greeks and Romans. They even reclined at banquets alongside men. Reported the Greek historian Theopompus, "They dine not with their husbands, but with any man present; and they toast to anyone they want to."

"It is no shame for Etruscans to be seen having sexual experiences," he goes on, "for this too is normal: it is the local custom there."

Whether or not such reports were exaggerated, the Etruscans seemed to have been comfortable with intimacy. "The Etruscans were a civilization of couples," Professor Larissa Bonfante of New York University tells me. As in Greece, the partners were often both male. But, she points out, Etruscan art is striking in its frequent portrayal of loving men and women.

21 CM HIGH; PHOTOGRAPHED AT TARQUINIA NATIONAL MUSEUM

EASTERN IMPORTS, a vase from about 500 B.C. with a smiling female face came from Greece, whereas a seventh-century B.C. ostrich egg from Africa is believed to have been painted in Etruria.

THE ETRUSCAN AURA lingers also in the plowed fields of Tuscany, especially when late afternoon light accentuates the amber furrows. The Etruscans built their power through the plow; agriculture gave them the strength to grow on. They bred a special strain of oxen to work their land. Now and then I spot such beasts, the strikingly white *chianini*, as I travel the Tuscan byways.

Near Volterra I pass another link: a farmer and his young son working their fields together. The boy in the furrows takes me back to the roots of the Etruscan civilization, to a mysterious boy named Tages. This mythical babe with the wisdom of a seer was the first voice of the Etruscans.

According to Cicero the Etruscans believed that Tages sprang one day from a deeply plowed field. He revealed to the astounded plowman secrets, known to the Romans as the *Etrusca disciplina*, that would become the religious and ritual codes of the civilization.

These codes focused on soothsaying—reading omens in the livers of sacrificed animals, in lightning, or in the birth of monsters such as sheep with two heads. The sacred books of the Etrusca disciplina could have survived in the libraries of Constantinople until the sixth century A.D. A writer of that time, Joannes Lydus, discusses the Tages story. The codes flavored many outsiders' views of the Etruscans. "A people more than any other devoted to religious customs," reported the Roman historian Livy.

"They were a fatalistic people," L. Bouke van der Meer, a Dutch scholar, told me. He explained how haruspices foretold the future with sheep livers. *(Continued on page 718)*

17 CM HIGH; PHOTOGRAPHED AT VILLA GIULIA

Exhuming Etruscan treasures

UNDER CONSTANT THREAT from tomb robbers and plow blades, an untold number of Etruscan antiquities stud the fields of central Italy. Many lie near the surface in shallow tombs like the one here near Mantalto di Castro. Learning of the site from police, site director Albertina Corsini (bottom, at right) and other archaeologists moved quickly to excavate, while posting an armed guard at night. In what appeared to be the tomb of an upper-class woman, they discovered several well-preserved pieces of pottery. One, a black-figured amphora (left), is of Etruscan manufacture. Like much Etruscan pottery, it reveals the Greek influence that so inspired Etruscan artisans. A Greek skyphos, or drinking cup (bottom right), with elegantly painted animals was an Attic import. Ironically, more decorated Greek pots have been discovered in Italy than have been found in Greece itself. Also discovered was a bronze mirror (below), seen here as it was plucked from the moist earth. Favored possessions of Etruscan women, such mirrors were decorated with elaborate pictorial engravings. Many of them were also inscribed with Etruscan phrases or proper names, possibly indicating that noblewomen, like their husbands, could read and write.

NECKLACE 55 CM LONG

3 CM WIDE

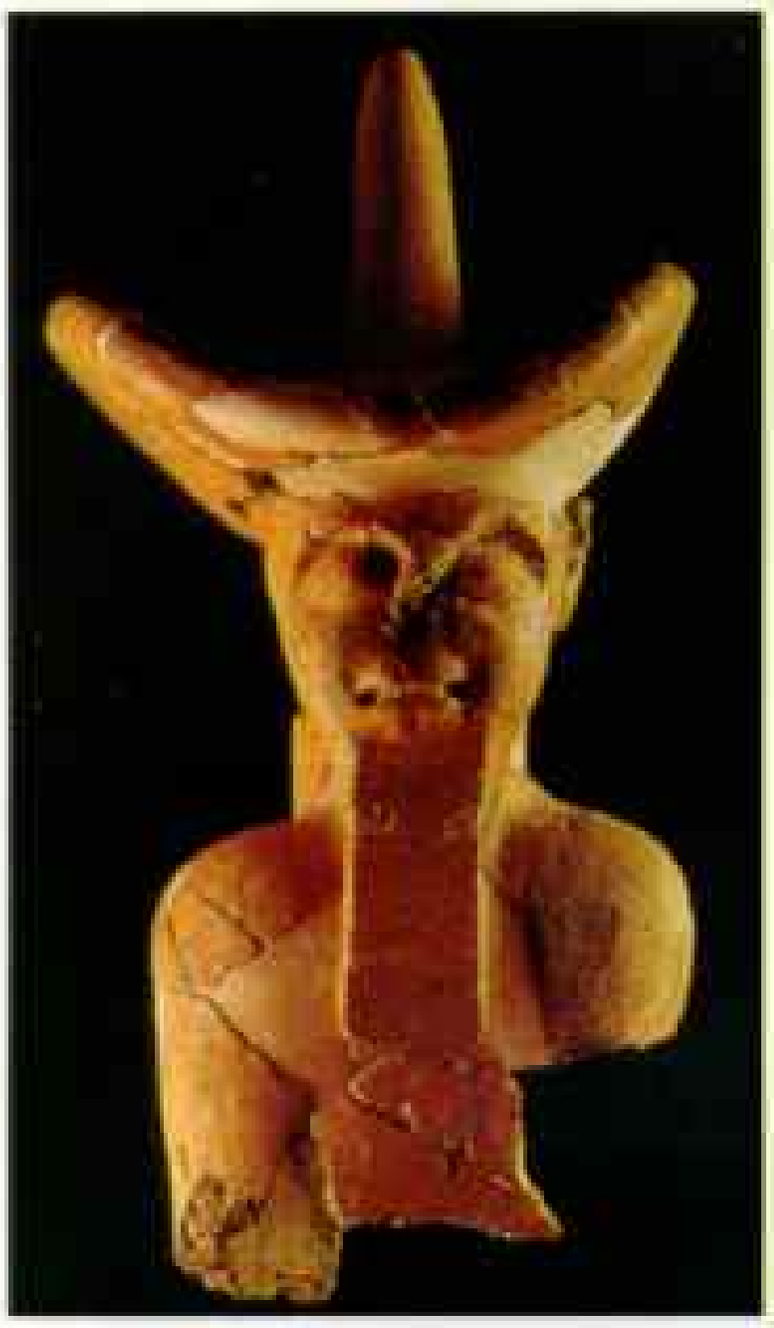
3.5 CM

LUXURY-LOVING Etruscans led their goldsmiths to great heights. Even today experts cannot fully explain the "powder" effect mastered in jewelry such as this brooch (left) with a hoofed satyr on its granulated background. The same effect appears on a necklace with three pendants (above), one set with onyx. Limited to a small ring seal (middle), an artist depicts a worship scene crowded with details, including a lion-shaped fountain.

ONE OF A PAIR, a gold earring (right) features a woman's head, itself bejeweled with earrings and a necklace. Made in Etruria, the piece was probably inspired by Greek goldsmiths in southern Italy, though its design is far more baroque than the simple Greek style.

10.7 CM LONG

ALL PHOTOGRAPHED AT VILLA GIULIA



THE "COWBOY," an enigmatic terra-cotta statue, was pieced together from fragments discovered at Murlo, near Siena. Students clean footprints preserved in soft unfired tiles when a workshop burned there in the seventh century B.C.

88 CM HIGH (ABOVE); PHOTOGRAPHED AT MURLO ARCHAEOLOGICAL MUSEUM

"The liver is the biggest organ. It changes colors easily. Etruscan soothsayers divided it into two main parts and probably further into 16, just as they divided the heavens into 16 realms. Certain gods ruled particular regions of the skies. Those gods would also get into the liver to give signs. When the Etruscans had to make a big decision, the liver told them go or no go."

Another glimpse of Etruscan devotion—and of everyday life—comes through the thousands of little terra-cotta statues that have been found at sacred sites. These votive objects often portray body parts—legs, arms, livers. When people had a health problem, they brought an appropriate statuette and deposited it at a sacred shrine, hoping the gods would heal them. Museum cases are also well stocked with terra-cotta breasts, uteruses, and genitals, implying that fertility, sexual function, and perhaps venereal disease were common concerns in Etruscan times.

A BOY popping out of the fields may have been the Etruscans' way of simplifying the complexities of their origins. The Greek poet Hesiod wrote that they arose from the children of Odysseus and Circe. The historian Herodotus believed they had fled famine in Lydia, a kingdom in western Asia Minor. The Greeks always called the Etruscans the Tyrrhenians, after the prince Tyrrhenus who, according to Herodotus, led them to the shores of Etruria.

Scholars often dismiss such tales as myths. But Herodotus has proved more difficult to discount. One reason is the Etruscans' peculiar language. It is not Indo-European, which most likely evolved in the steppes north of the Black Sea. Around 2000 B.C. migrating Indo-European tribes invaded Europe and Asia Minor, leaving variations of their mother tongue in their wake. In Italy, Etruscan was the only written non-Indo-European language. Thus many scholars have maintained that the Etruscans came from somewhere else.

Still, even ancient scholars countered Herodotus. "The nation migrated from nowhere else," wrote Greek historian Dionysius of Halicarnassus, "but was native to the country, since it is found to be a very ancient nation and to agree with no other in its language or in its manner of living."

Indeed, linguistic studies show that the Lydians could not be the progenitors of the Etruscans because the Lydian language was Indo-European.

Confusion is understandable. The Etruscans emerged during a dark age that blanketed the Mediterranean. The great heroic period of the Greeks, which fostered the Mycenaean palaces and perhaps the Trojan War, ended abruptly around 1200 B.C. Populations plummeted, cities were destroyed, people migrated all across the Mediterranean. The Greeks forgot how to

write. The Hittite Empire of Asia Minor collapsed—no one knows why. Perhaps a new wave of belligerent invaders arrived. Egyptian records mention marauding "sea peoples."

Could one group of those seafaring plunderers, perhaps the Tyrrhenians of Herodotus, have invaded Etruria and overwhelmed the indigenous people? Archaeologists do see changes in Italy around this time. Inhabitants began to cremate rather than bury their dead and started to fortify their settlements. A new culture, if not a new people, had arrived. This hazy Bronze Age culture can be traced throughout Italy from the Alps to Sicily.

Around 900 B.C. it seems to have given rise to another culture, known as the Villanovan. The name comes from Villanova, a site near Bologna where the culture's artifacts were first unearthed more than a century ago. The people of this culture occupied a smaller, more clearly defined territory. Their relics now have been found at nearly every city of the historical Etruscans.

Another complication is the Etruscans' northern connections. Their metallurgy is similar to that of central Europe. Amber artifacts show that they traded with Baltic people. The Etruscan love of horses evokes the steppes.

ALL THIS UNCERTAINTY over Etruscan origins fueled debates. For years, however, Massimo Pallottino, the most respected man in Etruscan studies, has been struggling to end the arguments. The 78-year-old Pallottino, the self-proclaimed "grandfather" of Etruscan scholarship, has devoted most of his career to surveying all available data.

In an encyclopedic book Pallottino demonstrated that, despite the arrival of new customs, there were no archaeological breaks at Etruscan sites from the Bronze Age through the Villanovan period into fully flowered Etruscan times. The sites had been inhabited continuously. There may have been influxes of new people, but no great invasions.

In his office in Rome, Pallottino explains his view. "The beginning of the Etruscan people is back in prehistory, two or three thousand years before Christ. They formed themselves in Italy from a mixture of elements over time. We will never know their exact connections to other races. That information is lost."

How does he explain their language?

"There was a time in Mediterranean prehistory when some people spoke a language like Etruscan. The Etruscan tongue is a relic of that lost language." Most scholars have rallied around Pallottino. Larissa Bonfante explains: "The Etruscans can now be studied as members of the pre-Roman Mediterranean world, rather than as an isolated exotic people."

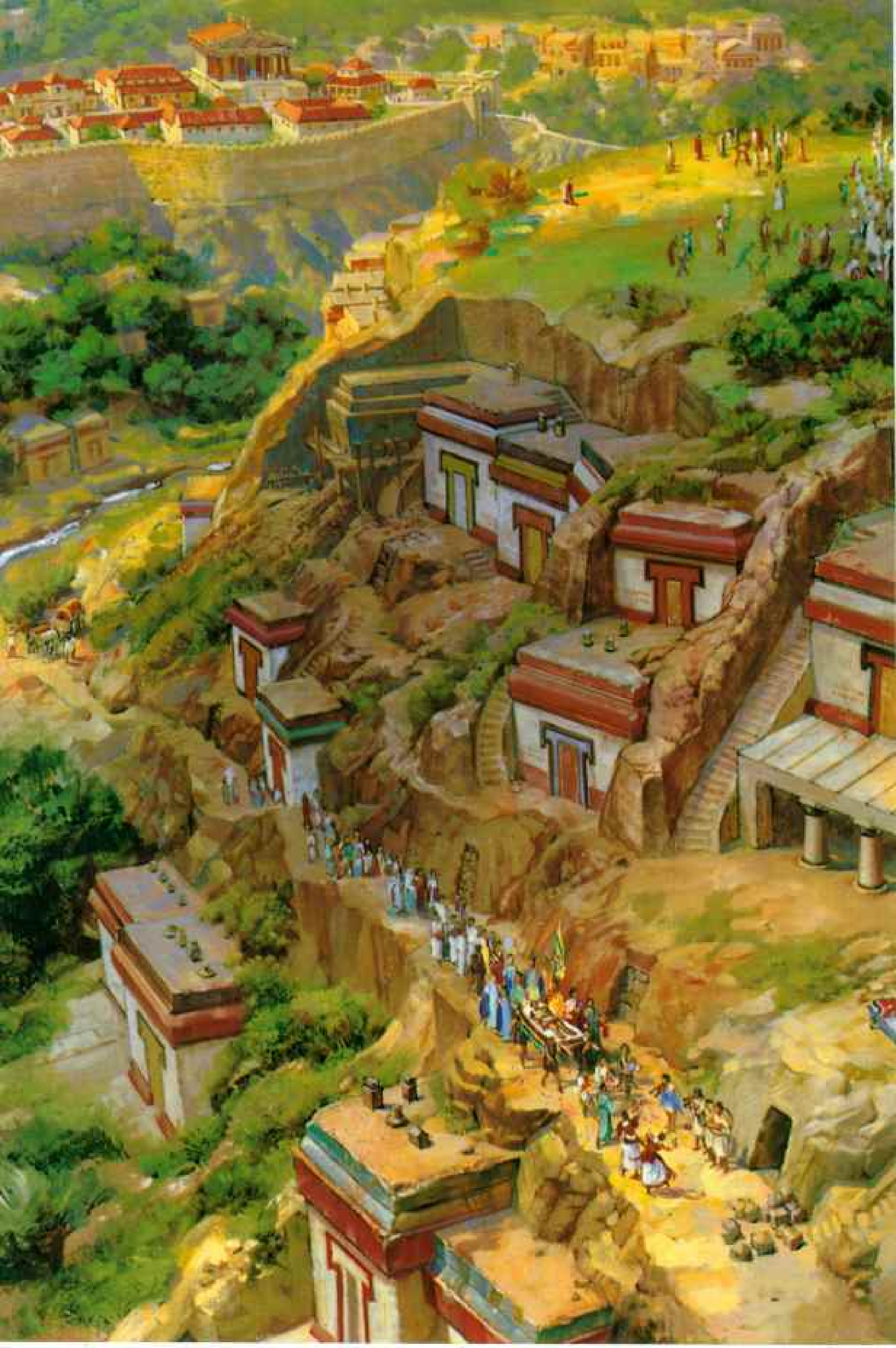
"Etruria in the dawn of the Iron Age was like America a century ago—a melting pot," says Bonfante. *(Continued on page 725)*

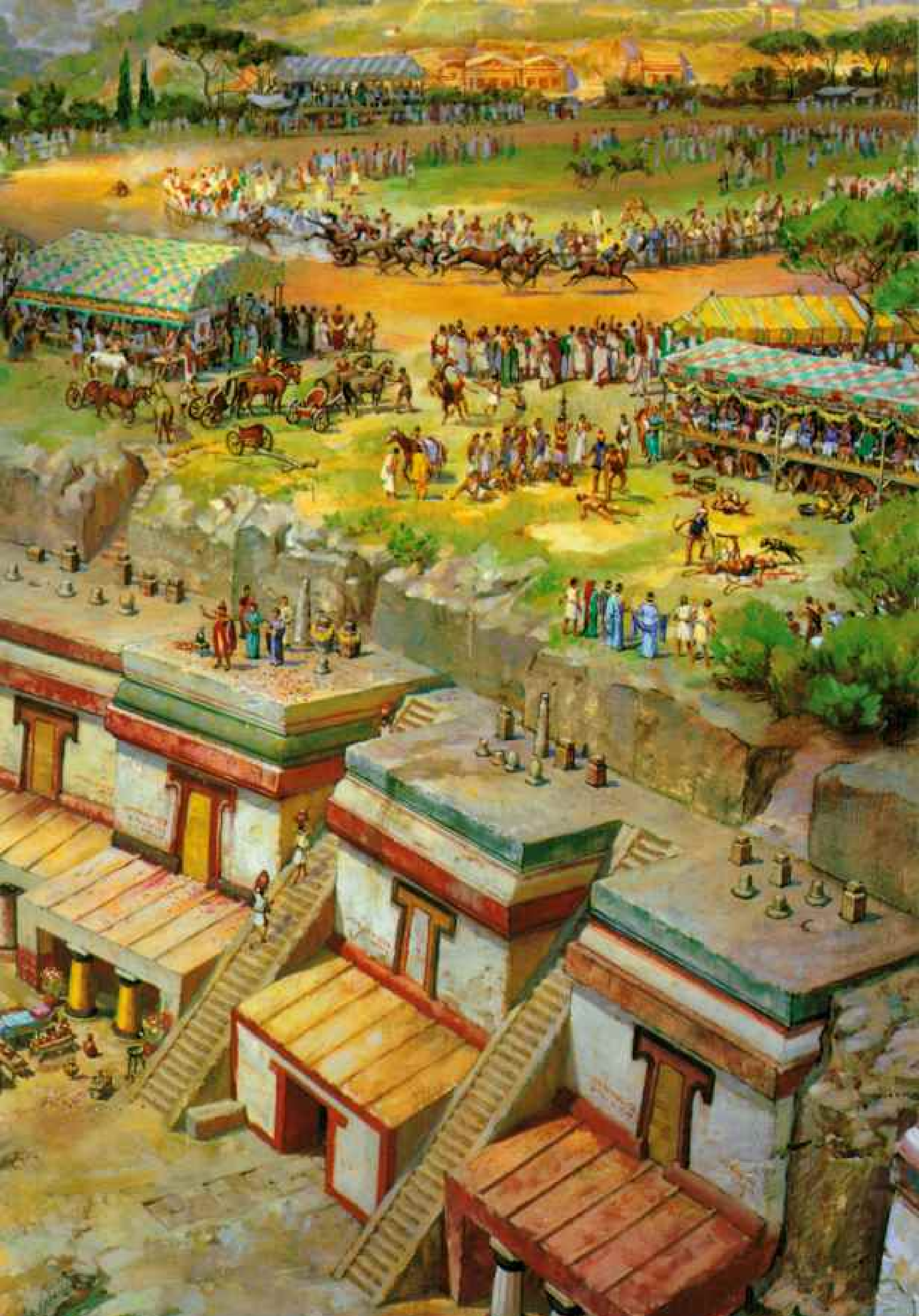
CARVED BY A STEADY HAND, a miniature ivory relief found near Florence may have come from the Murlo workshop, where hundreds of ivory fragments were found. Etruscans used ivory for furniture inlays, dice, and toilet articles.

PHOTOGRAPHED AT ARCHAEOLOGICAL MUSEUM, FLORENCE

OVERLEAF

TEMPLES OF THE DEAD line the cliffs at Norchia, an Etruscan city whose only traces are the ruins of its rock-cut tombs. In this rendering a funeral procession bears a corpse to its tomb, while, on the heights above, horse races and athletic events mark memorial rites for the dead. Across a ravine to the left is Norchia proper, which must have been a prosperous city judging from the size of its necropolis. Like most Etruscan cities it was built on an inland plateau for defense and was probably fortified with a wall.

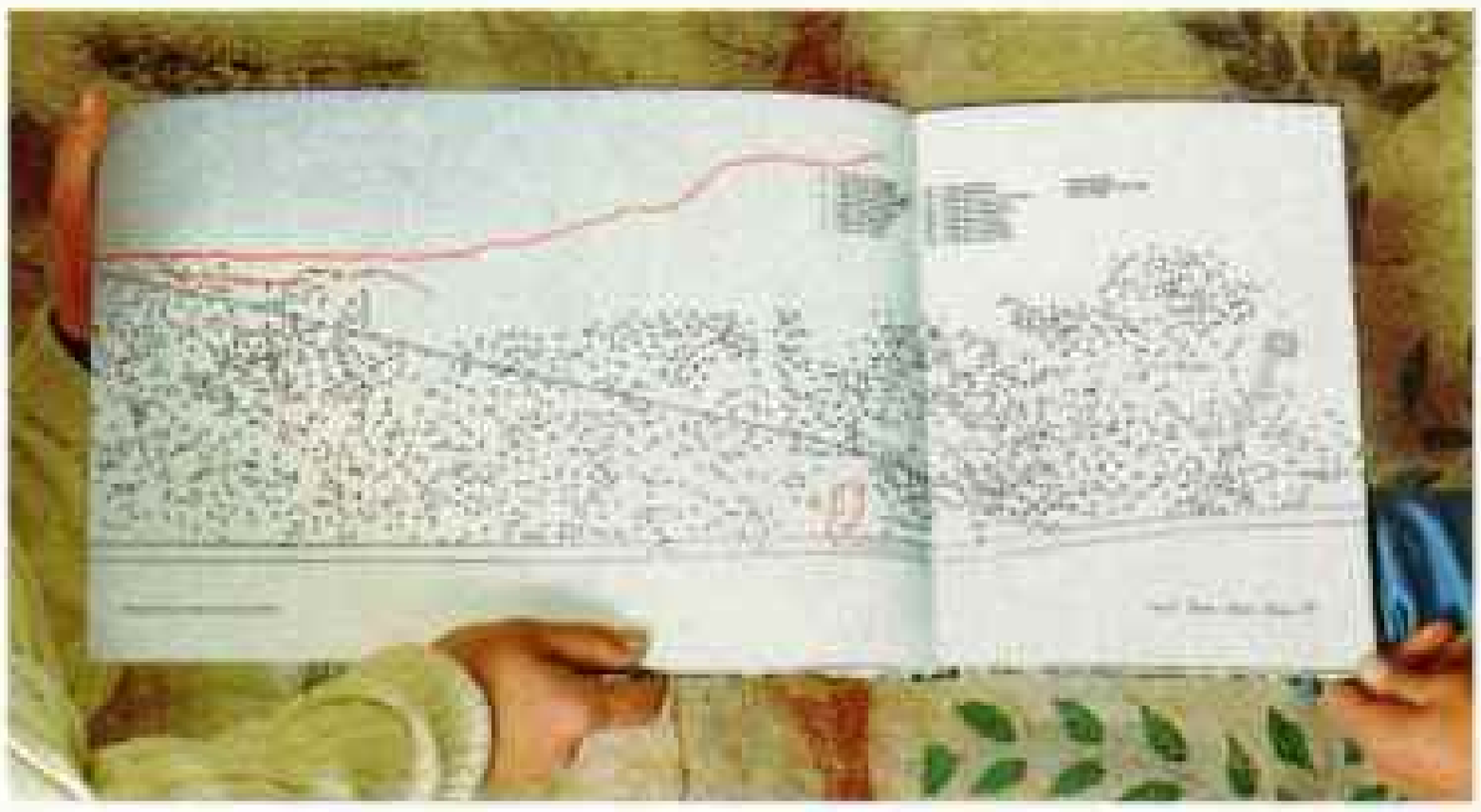




SYMBOL OF IMMORTALITY, an egg is admired by a banqueting couple (above) on a frieze in the Tomb of the Leopards at Tarquinia. Men are typically painted dark red, women white. On the adjacent wall a musician plays a double pipe (right), a favorite musical instrument of the Etruscans. Their passion for music astounded the conservative early Romans, and the Greeks were scandalized by the way Etruscan women joined equally in banquets.

SQUARING OFF above three trophy vessels, naked wrestlers dominate a scene from the Tomb of the Augurs at Tarquinia (above) that depicts the games that accompanied the burial of an Etruscan nobleman around 530 B.C. Holding a staff, the black-robed figure is thought to be a presiding judge. Adding a savage touch to the events, a masked figure directs a contest between a blindfolded man and a fierce dog. Such cruel streaks in Etruscan ceremonies may have foreshadowed the gladiatorial events for which Rome would later become notorious.

Some 6,000 tombs have been charted (below right) in the Tarquinia region, most of them unadorned. Marked by aboveground stairwells (center right), only a few contain wall paintings.



(Continued from page 719) "It had agriculture, sea trade, and immigrants. Then suddenly there was this clicking of a culture."

At Bologna's Civic Archaeological Museum, which houses Italy's finest collection of Villanovan artifacts, visitors can walk through this metamorphosis. To reach the Villanovan room, I pass exhibits on prehistoric Italy. Arrowheads, primitive pots. Stone Age stuff. I turn a corner and the world changes.

Villanovan urns, the pots that the emerging Etruscans used to bury the ashes of cremation, surround me. The urns resemble mushrooms, squat and brown, as if, like Tages, they've just sprung from the earth after a rain.

Many of the earliest urns, dating from about 900 B.C., are plain, but their varied, spontaneous shapes delight. Others experiment with bold geometric designs. Then simple human figures appear. Alongside the urns are bronze tools, utensils, and ornaments, all made with sophisticated ceramic craftsmanship or amazing metalworking skills.

Clearly a new technology had arrived in Etruria. Whether it came on a Lydian ship or over the Alps is irrelevant. As they would do again and again, the Etruscans took what they liked and made it their own.

"They began as an agrarian people," says museum director Cristiana Morigi Govi. "A group of their huts, called *capanne*, were found right beneath where we stand."

"In all we've found 500 capanne—or at least their foundations," adds her colleague Riccardo Merlo. "They were circular, rectangular, or a combination. Some were very large—eight meters long. They had stone bases, wooden frameworks, and roofs of thatch."

IN THE VILLANOVAN ERA the Etruscans had no cities. Villages were small, scattered clusters of capanne. "Basically they grew grains and raised animals," says Merlo.

But something else, so evident in the increasing sophistication of the pottery, was going on. The Iron Age was beginning, the dark age ending. The Mediterranean was coming to life once more. The Greeks were learning to write again from the Phoenicians. Their city-states were developing, sending settlers westward to establish colonies. Both Greeks and Phoenicians were catalyzing a world that once again wanted to trade.

In Bologna's museum a simple goblet testifies to early Greek links with the Etruscans. Discovered in the last century but neglected until a few years ago, the goblet is inscribed with Greek letters. The words, however, are Etruscan.

"*Ana mini sinake remiru*," reads the inscription. "Ana Remiru has made me."

The narrative continues: "I am the little vase of Venu and Uku Zarmi. I was given by Remesalu."

32 CM. HIGH; PHOTOGRAPHED AT VILLA GIULIA

EVERYDAY ITEMS fill a model of the deceased's home in the Tomb of the Reliefs at Cerveteri. There the Banditaccia tombs, covering hundreds of acres (facing page), form the most impressive necropolis yet excavated. Etruscans of the Villanovan period often kept ashes of their dead in urns shaped like their thatched huts (top).

19 CM HIGH; PHOTOGRAPHED AT VILLA GIULIA

GOLDEN CLUES to the Etruscan language abound in three gold tablets found at Pyrgi, the port of Cerveteri, in 1964. The two at right are inscribed in Etruscan; the other is in Phoenician, the language of Carthage, Etruria's ally and trading partner. Commemorating the rule of Thefarie Velianas, the tablets are not literal equivalents of each other but have helped scholars certify a number of Etruscan words. The longest Etruscan inscription, at middle, reads in part: "This is the temple and this is the place of the statue which he has dedicated to Uni-Astarte, the lord of the people, Thefarie Velianas." Scholars have confirmed the verb, to give, and the number three. They have also proved that the Phoenician goddess Astarte and the Etruscan Uni were the same.

8.3 CM HIGH; PHOTOGRAPHED AT ARCHAEOLOGICAL MUSEUM, FLORENCE

CALENDAR OF OFFERINGS to the gods, some 70 words spiral inward on both sides of the Magliano lead, one of more than 13,000 known Etruscan inscriptions.

Around 700 B.C.—only half a century after the Greeks rediscovered writing—literacy burst across Etruria. As with everything they borrowed from the Greeks in their early years, the Etruscans changed the Greek alphabet to suit themselves.

"The Etruscans had no *g* sound, so they made it a *c*. That's why we have *abc* rather than alpha, beta, gamma," explains Larissa Bonfante. "The Etruscans passed some of their alphabet on to the Romans, who passed it on to us."

Etruscan paintings and sculpture often depict books—probably of folded linen. So we assume that the Etruscans wrote copiously. At least 13,000 examples of Etruscan writing still exist. Unfortunately most are less interesting than "*Ana mini zinake remiru.*" They tend to be short inscriptions in tombs or on pots. Many are religious or official notations. The longest writing sample is a sacred ritual book of about 1,200 legible words. It was written on a linen cloth that was used later to wrap an Egyptian mummy. How the book reached Egypt is unknown.

Scholars can read Etruscan, as I can read Italian. But like my comprehension of Italian, they don't know enough words to understand much of what they read.

"What would be known of the English language if there were

almost nothing but tombstones to read?" asks Bonfante. "We don't even know the word for husband. Only recently has father—*apa*—been deciphered." Other known words include *puia*, wife; *clan*, son; and *rasenna*, the Etruscan word for themselves.

AS WRITING SPREAD through Etruria, so did other Greek introductions: elaborate houses and temples, urban planning, and the concept of a well-organized society. During the seventh century B.C. powerful cities—Cerveteri, Tarquinia, Vulci, Vetulonia, Veio—sprang up. Etruria had grown wealthy.

"This simple agricultural society was transformed," says archaeologist Graeme Barker, director of the British School at Rome. "It's a classic example of the formation of a state. The process fascinates a lot of scholars these days. But we know little about it."

To learn more, Barker and his British colleagues practice "landscape archaeology."

"It's the archaeology of the unspectacular," he says. "We go out with a team of students and walk the fields five to ten meters apart, looking at whatever the plows have turned up: clusters of bricks, sherds, pieces of mosaic from a villa. We pick up everything from prehistoric to modern."

They look for settlement patterns. What kind of home did the Etruscan live in? What was a farm like? Were there local markets? How densely was the area inhabited?

"Field surveys suggest when things start and when they finish. The dating is based on pottery," explains the British Museum's

HEIRS to the Etruscan legacy, Italian youngsters admire the Sarcophagus of the Married Couple at the Villa Giulia in Rome. A masterpiece of ceramic sculpture, the terra-cotta piece was produced at the end of the sixth century B.C. in Cerveteri, where it is likely that Etruscans first began using sarcophagi a generation earlier. While the man's squared shoulders and the woman's rounded face bespeak a Greek influence, the tender connubial theme is entirely Etruscan. An almost identical sarcophagus, perhaps by the same artist, is on display at the Louvre in Paris.

WITH A DEMON GRIN and Medusa-like snakes, a gorgon antefix (right) shows the Etruscans' fondness for the grotesque in their temple ornaments. Reflecting an enthusiasm for the sybaritic side of Greek mythology, another antefix (left) depicts Silenus, the satyr, cavorting with a maenad. Also drawn from the Greek pantheon, life-size statues adorned the roofs of Etruscan temples. The most famous is the Apollo of Veio (below), thought to be a work of the master sculptor Vulca, the only Etruscan sculptor whose name has survived.

18.5 CM HIGH (LEFT); 46.5 CM HIGH (ABOVE)

Tim Potter. Potter has studied the region near Veio, which sat across the Tiber River from Rome. Veio, like most southern Etruscan cities, made the transition out of the Villanovan era earlier than the more isolated inland northern villages.

"In Veio we see several villages coalescing into one city in the eighth and seventh centuries," says Potter. "The countryside becomes much more populous. At the same time, they were learning to exploit farming on a massive scale and building roads to connect their cities."

IN THE PLOWED FIELDS that surround the excavation called Acquarossa, I try my own landscape archaeology, walking the furrows with Florentine archaeologist Luigi Donati. The pickings are easy. The earth here seems to grow pottery sherds.

"It's such a shame," says Donati as he picks up a piece of a pot. "The plows go so deep now. A meter or more. They not only break pots, they destroy the buildings buried below."

But the buildings might fare no better if excavated. Acquarossa holds many well-preserved remnants of Etruscan houses from the seventh century B.C. Only one, perhaps a noble residence, is protected by a canopy. Even the foundations, built from friable volcanic rock, gradually dissolve in the rain.

"We have too many old things in Italy," says Donati. "The problem for us is not to excavate but to preserve. But preservation costs so much."

Enough rubble survives at Acquarossa to give glimpses of Etruscan village life during its heyday. The foundations of the smaller houses are grouped together. They are small—three rooms, each scarcely larger than a monk's cell.

"The villagers spent most of their lives outdoors," says Donati. "The house was used mainly for sleeping and shelter from the rain."

The noble house was much larger and elaborately decorated. It testifies to a major economic and social change in Etruria.

"In the seventh century we see three magic words in Etruria," says Potter. "Wine. Olives. Cereals."

Grains had long been in Etruria. Scholars debate about the grape and the olive.

The Eternal Etruscans

1.8 METERS HIGH (6 FEET); ALL PHOTOGRAPHED AT VILLA GIULIA

REMNANT of Etruscan engineering skills, a bridge near Vulci was largely rebuilt by the Romans, who learned road building and water diversion from the Etruscans. The use of money in Etruria was sporadic, occurring chiefly in coastal cities like Populonia, where this gold coin was probably minted.

I. S. CH. ACRIDER, PHOTOGRAPHED AT ARCHAEOLOGICAL MUSEUM, FLORENCE

"It used to be thought the Greeks brought both," says Graeme Barker. "But it's pretty clear now that olives and grapes had been growing naturally in Italy. It is the Etruscans who began to cultivate them systematically and made them important locally."

Grapes had value at home and as an export. Larissa Bonfante notes: "Etruscans helped teach the Gauls, who would become the French, to drink wine."

Olive oil's rich load of calories added fuel to the Etruscans' diet, nourishing their growing population and their rise to power.

Both crops require systematic rather than subsistence agriculture. Organized agriculture in turn inspires a landed aristocracy and a manor system. Princes and peasants. That is precisely what emerged in seventh-century Etruscan Italy and perhaps thrived in the manor and fields of Acquarossa.

The soils of Etruria held another treasure for which the Mediterranean world hungered—iron. This coveted metal, more plentiful than bronze, could be fashioned into a wide array of tools and weapons. Etruscan hills, along with their island of Elba, held the western Mediterranean's richest iron deposits.

CLOUDS OBSCURE ELBA, ten kilometers offshore, as I walk the bay at Populonia. Today only windsurfers ply the tranquil waters. In the sixth century B.C. this coast would have been dotted with the sails of commerce. Then Populonia served as the key portal of Etruria's iron industry.

"Try to imagine the smoke and grime and industry here," says my companion, American archaeologist Rick Bronson. Bronson is in Italy on a National Geographic research grant to study Etruscan tomb paintings, which peaked at the time of these ironworks. "The furnaces were right on the beach. Boats from Elba, laden with ore, were pulled ashore by several yokes of oxen. Meanwhile, cartloads of wood were coming from the interior to fuel the furnaces. The Etruscans must have rapidly deforested this area."

Etruscan slag still carpets the beach. It creates artificial hills behind us. By the third century B.C. it was even mounded over their sacred cemeteries.

"By modern standards the Etruscans did a poor job of removing iron from the ore," says Francesco Piantini, an assistant at the archaeological zone. "They left 60 to 70 percent of it in the slag."

"What they left behind helped supply Fascist Italy," says Bronson. "They gave Mussolini a source of iron for tanks and bombs."

The Etruscans extracted enough iron to attract Mediterranean merchants from afar. From the Near East, Phoenician traders brought shiploads of luxury items—ostrich eggs, gold, silver, and ivory—that ennobled Etruscan life-styles and stocked their princely tombs. Also from the east came the motifs of fantastic monsters, the griffins and gorgons that inspired Etruscan fancies.

From Greece the Etruscans imported huge numbers of exquisitely

decorated Attic and Corinthian vases. In fact, most Greek pots we have today came from Etruscan tombs.

The Etruscans' golden age began as the Mediterranean was recovering from its dark times. Scholars call this the Archaic period, based on Greek pottery styles. Ancient writers describe the Etruscans as fierce pirates. Accounts mention naval alliances between the Carthaginians and the Etruscans. But the archaeological record for Archaic seafaring is scant.

SOURCE of Etruscan wealth, iron and copper ingots are raised from a ship that sank about 600 B.C. south of Populonia, Etruria's great mining center. Recovered from the same wreck was a bronze Greek helmet, here shown before and after cleaning.

IN 1981 Oxford archaeologist Mensun Bound spotted a scrap of pottery that a scuba diver had recovered from a wreck in Etruscan waters. Bound's training told him immediately that the pottery, and probably the wreck, were from the Archaic period.

With his colleague and wife, Joanna Yellowlees, Bound launched a crusade to recover the ship, now known as the Giglio wreck for the isle where it struck a reef, perhaps during a late summer storm, around 600 B.C.

Today a length of the Giglio's keel and pieces of planking soak in a vat of water in a laboratory at Cosa. Its cargo—pots, flutes, calipers, arrowheads, amber, iron bars, and lumps of copper—sits in trays on a nearby table. Much was lost to looters before and even during the excavation. (An Etruscan amphora can bring $1,000 on the black market, an Archaic Greek vase $15,000.)

Giglio is the first Archaic ship to be extensively excavated. Moreover, Bound believes it is Etruscan.

"This wreck fits into one of archaeology's black holes," he explains. "It gives us a glimpse at the mechanics of Archaic trade. I don't see it as a tramp ship, traveling from port to port. Its cargo was rich and complicated—goods from Samos, Chios, Asia Minor, Sparta, Corinth, as well as Etruria. It's not likely that the ship picked them all up in one season. So I see a fairly sophisticated depot system. Onloading. Offloading. Schedules. Manifests. These people were great merchants."

From Cosa I head with Bound to the Tarquinia museum to view a rarely glimpsed painting of a fifth-century ship that had been removed from a wall of the Tomb of the Ship. The painting had been deteriorating. So, using glues, conservators transferred it onto canvas in 1958 and stored it in a back room.

The painting is indeed in bad shape, but Bound is mesmerized. "This painter knew something about ships. You can see how the Etruscans attached stays. Along the yard are guides for raising the sail. This is our first evidence for two-masted ships. The depth of the hull is remarkable. It's clearly a merchant ship, like Giglio, built for capacity rather than speed."

PAUL ARBITER, OCEAN IMAGES (ABOVE AND BELOW); MENSUN BOUND, MARE, OXFORD UNIVERSITY

GRIME AND SMOKE from a great ironworks fill the air over Populonia at dawn. Fired up for the day, rows of smelting furnaces face the city's harbor, which is crowded with boats from the island of Elba, the richest source of iron ore in ancient Italy.

Into each furnace workers pour baskets of charcoal and ore. Using bellows of animal hide, at left, others heat the furnaces to 1100°C (2000°F). Inside, droplets of iron coalesce into "blooms," which, when removed, are heated and hammered to drive

out the slag. Good for only a few firings, the furnaces are frequently knocked down and rebuilt, as at right, where a large bloom is retrieved. Finished ingots are taken by oxcart to warehouses under the commanding heights of Populonia proper, the largest Etruscan coastal city. Experts believe that at least 10,000 tons of ore annually were worked here for more than 400 years. The slag heaps left behind were rich enough in unextracted iron that Italians mined them during both World Wars.

38 CM HIGH; PHOTOGRAPHED AT VILLA GIULIA

Bound is interrupted by a museum guard who tells him of a pot recently rediscovered in the back room and put on display. It also depicts a ship. Once again Bound is delighted.

"It's an Etruscan fighting ship," he says. "That's what we haven't got. And there's good detail." Wicked-looking but beautiful, it has an ornate mast and a tail curved like a scorpion's. Most important, it appears to have a ram.

"Pliny the Elder wrote that the Etruscans invented the ram," says Bound. "Since we had no evidence, most scholars dismissed his claim. But this early vase makes me reevaluate Pliny. The Etruscans surely did not design the first beaked prow. But they were such predatory seafarers. Perhaps they were the first to realize its potential as a tactical offensive weapon. In 480 B.C. Greek skill with the ram helped defeat the Persians. Had the Persians won, we probably would not have known the Golden Age of Greece. So, if Pliny is right, Western civilization is in debt to the Etruscans."

The ships that fascinate Mensun Bound sailed at the peak of Etruscan glory. It was also a time of intense competition with Greek colonies in southern Italy and Sicily for control of the waters of the western Mediterranean.

The Etruscans never had a national navy, in fact never considered themselves a nation.

"No Etruscan would have said 'I'm an Etruscan,' " explains Francesco Nicosia, superintendent for archaeology in Tuscany. "He would have said 'I'm from Populonia. Or Cerveteri. Or Tarquinia.' "

Thus these city-states had their own fleets and armies, their own princes and ruling aristocracies. There was an Etruscan league, a union of 12 cities that periodically met not far from Orvieto. But this was basically a religious federation, focused on ritual. The cities often squabbled. They could be divided politically with ease.

But in their golden age, life was unclouded. The Etruscans defined culture and sophistication in Italy. They became master craftsmen. We still marvel at their meticulously detailed goldwork. They perfected granulation—bonding tiny pieces of gold to one another. They even used gold bands to attach replacement teeth to natural teeth. Their shoes were exported across the Mediterranean. So was their bucchero, a lustrous black pottery.

Perhaps their greatest legacy was Rome.

ROME, BY LEGEND, was founded in 753 B.C. by Romulus. But Bronze Age ceramic fragments have been unearthed near the Forum revealing that a settlement had previously existed around Rome's seven hills.

Legend, reported by Livy, also says that in the late seventh century B.C. a wealthy Greek-Etruscan, Lucius Tarquinius Priscus, moved from Tarquinia to Rome on the urging of his formidable full-blooded Etruscan wife, Tanaquil. In 616 B.C. Tarquinius was somehow chosen to be king of Rome. Etruscan kings then ruled for the next century, until ousted in 509 B.C.

"Until the 19th century, scholars thought the Tarquin legends were true," says historian Filippo Coarelli of the University of Perugia. "Then a powerful German school declared that everything written about events before 400 B.C. was myth. Now archaeology is confirming some of the ancient writings.

National Geographic, June 1988

"We can't say that the legendary Etruscan kings of Rome—Tarquinius Priscus, Servius Tullius, or Tarquinius Superbus—actually existed. But we can say that in the sixth century B.C. the Etruscans did rule Rome.

"For instance, Servius Tullius supposedly founded important centers of worship in Rome. No one believed it. Now we've found them. Two Etruscan temples at the Forum Boarium on the Tiber."

It's not easy to locate the remains of Etruscan Rome. I walk the Tiber to the Ponte Palatino and cross that bridge, headed for the Forum. Beneath me two men fish from a parapet in front of two drainage arches in the river wall. The larger arch is recent. The second is old and covers the Cloaca Maxima, which the Etruscans built to drain marshes on the site of the Forum.

I walk on, climbing Capitoline Hill to look down on the magnificent remains of the Forum and the Colosseum. Rome's first monumental temple, to Jupiter, also built by the Etruscans, once crowned this hill. I need the help of scholar Antonella Magagnini to find the few surviving stones of the temple base.

Nearby the Capitoline Museum features the famous snarling bronze she-wolf, whose defiant eyes made her the symbol of Roman might. "She was made in an Etruscan workshop," says Magagnini. "Only later did the Romans adopt her."

And that's about it. Few other traces remain of the people whose engineering and culture helped transform Rome from a cluster of villages into the Eternal City. And who also gave to Rome the triumphal rites, the procession, the toga that would mark the empire, and the bishop's staff that survives today.

Roman writers imply that the vibrant and luxurious culture the Tarquins brought was resented by the Latin residents.

The status of Etruscan women, suggests Larissa Bonfante, also would have galled the locals. A woman of early Rome tended to the household and her spinning. She had no name of her own, only her father's followed by her husband's. Etruscan noblewomen, such as Tanaquil, not only went by their own names, they probably could own property and may even have had the right to raise children on their own.

THE UNIVERSE lay revealed in the liver, Etruscans believed. This bronze model of a sheep liver was probably used by an Etruscan priest, or haruspex, to teach neophytes. Priests used fresh livers, still steaming, to divine the planning of cities and other important events. In accordance with Etruscan belief, the liver was divided into 16 celestial provinces, each ruled by its own god.

12.4 CM ACROSS. PHOTOGRAPHED AT CIVIC MUSEUM, PIACENZA

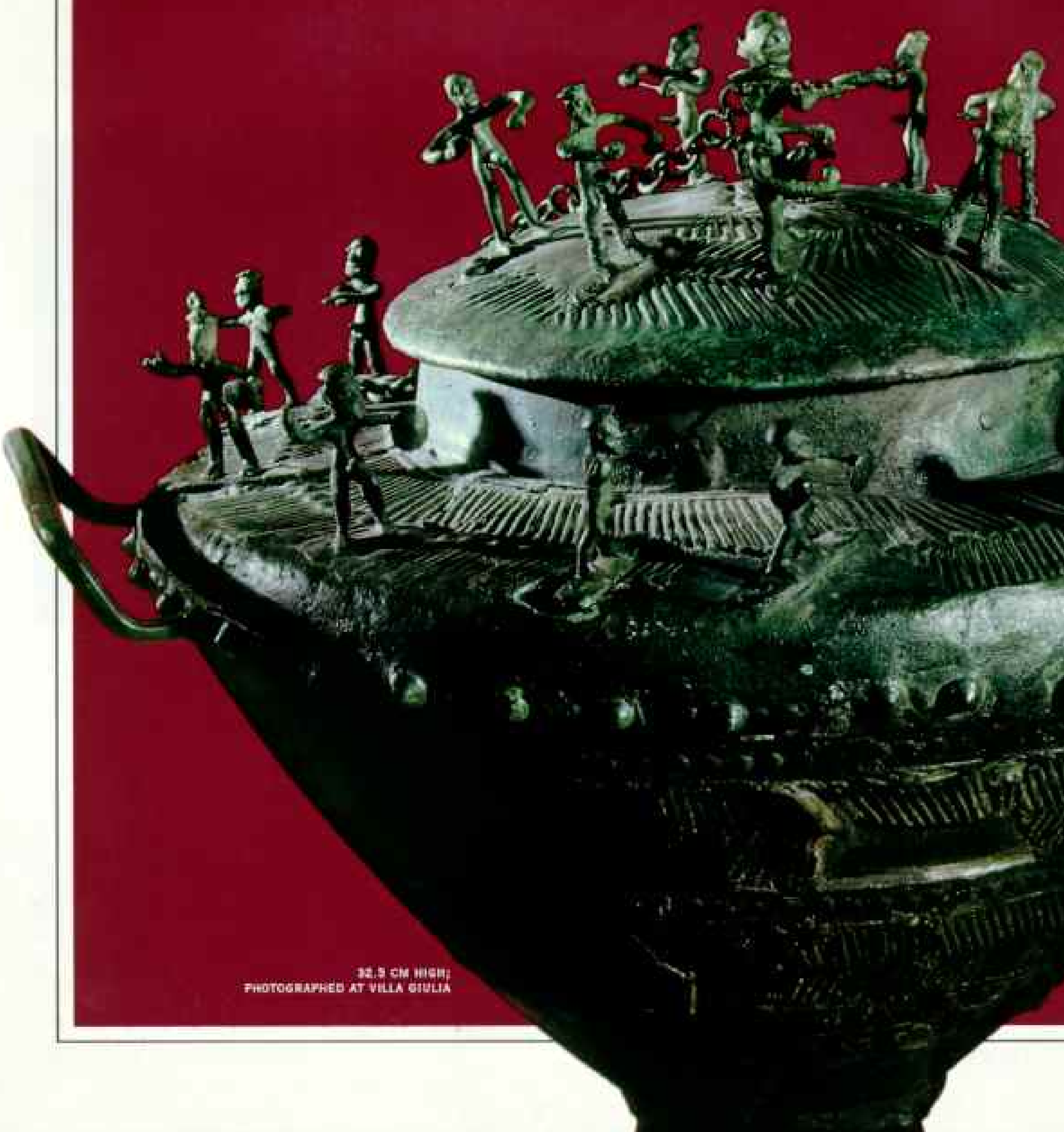
A bronze model of a haruspex from the second century B.C. (facing page) shows the elongated style sometimes used in late Etruscan sculpture.

DRIVING BACK TO TARQUINIA, I can sense the rigidity that I associate with Rome slowly fading. I am eager to return to the tombs, where Etruscan exuberance still prevails. It's all there in the paintings. Occasionally the erotic couplings titillate. But the harmony of the Etruscans' tombs, their magical sense of color and movement and even humor, their unabashed love of life, quickly dispel any sense of pornography. These were a people at peace with themselves and

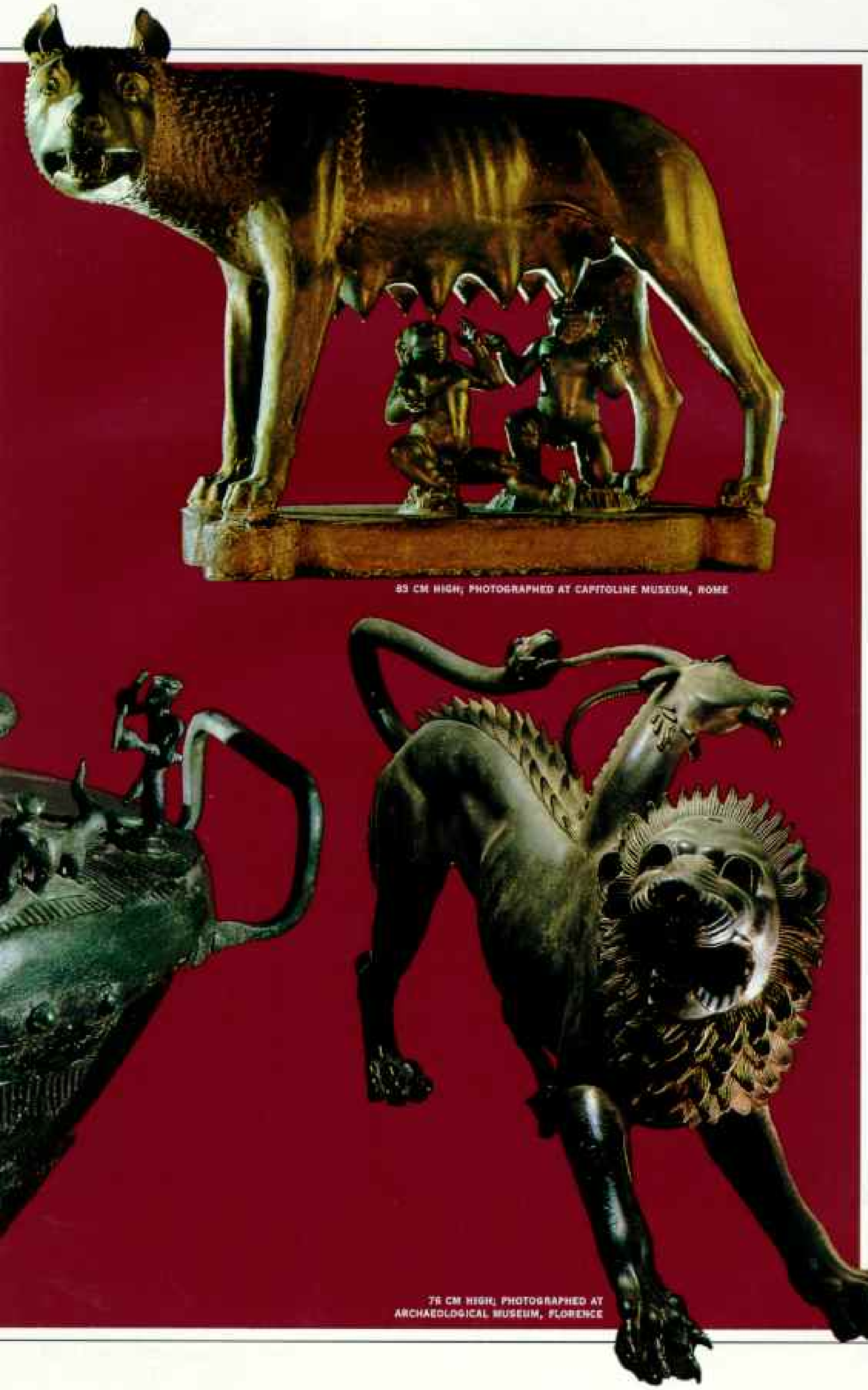
PAGAN DANCES and fantastic beasts bracket four centuries of sculpture in bronze. From the early days of Etruscan civilization—the late eighth century B.C.—a lidded vessel from Bisenzio shows tiny figures doing a barbaric dance around a chained animal. Foreshadowing Etruscan battle dances, the ritual may represent the pre-hunt ceremonies of Villanovan tribes.

Symbol of Rome, the Capitoline wolf was probably the product of an Etruscan school in that city in the fifth century B.C. The figure of Romulus, legendary founder of Rome, and his twin, Remus, were added 20 centuries later by a Renaissance artist. With her defiant stance and angry eyes, the wolf may have celebrated Rome's recent liberation from Etruscan rule.

Discovered in the 1550s at Arezzo, a Chimera from about 400 B.C. boasts a lion's body and a snake for a tail, with a goat's head sprouting from its spine. Its discovery inspired Italian Renaissance scholars to reexamine their Etruscan past.



38.5 CM HIGH; PHOTOGRAPHED AT VILLA GIULIA



53 CM HIGH; PHOTOGRAPHED AT CAPITOLINE MUSEUM, ROME

76 CM HIGH; PHOTOGRAPHED AT
ARCHAEOLOGICAL MUSEUM, FLORENCE

CLEANING UP THE BYWAYS of a Cerveteri necropolis, volunteers from the Gruppo Archeologico carry on a centuries-old interest in Etruscan archaeology. One early find, an alabaster urn from Volterra (detail, facing page), depicts soldiers with a fallen comrade. Said to have been owned by Michelangelo, the piece may have influenced his "Pietà."

their world. As D. H. Lawrence saw them, they were "sensitive, diffident, craving really for symbols and mysteries, able to be delighted with true delight over small things, violent in spasms, and altogether without sternness or natural will-to-power."

So why did they develop demons? I had asked Maria Cataldi that question many weeks earlier as we stood in the dank underworld confronting the black beast.

"They began having serious problems," she had replied. "Their way of being was threatened. They started imagining life after death very differently. In this painted tomb we see clearly the Etruscans have begun accepting the Greek mentality. And we see now it began in the late fifth century B.C., earlier than we had thought."

PHOTOGRAPHED AT ARCHAEOLOGICAL MUSEUM, FLORENCE

Painting expert Rick Bronson elaborated: "The sixth-century tomb paintings imply that the Etruscans were interested in Greek myths but didn't take the underworld too seriously. But by the fourth century the Etruscans were obsessed with Greek religion and philosophy." This reflects what was happening to their world.

At the turn of the fifth century the Etruscans lost control of Rome. In 474 B.C. they were routed by the Greeks of Syracuse in a sea battle off Cumae near Naples. The Greeks thereby ended the Etruscans' dominance of their own home waters, triggering hardship in the mercantile cities of the south. Meanwhile, the Gauls were threatening the northern frontiers. And strident new merchant and plebeian classes were challenging the Etruscan aristocracy.

On the heels of the Greeks came the Romans. In 396 B.C. Rome conquered its Etruscan neighbor Veio. By 295 B.C. and the Battle of Sentinum, Etruria's fate was decided, although the decline continued for 200 more years. Over this long run the Etruscans were their own most insidious foes.

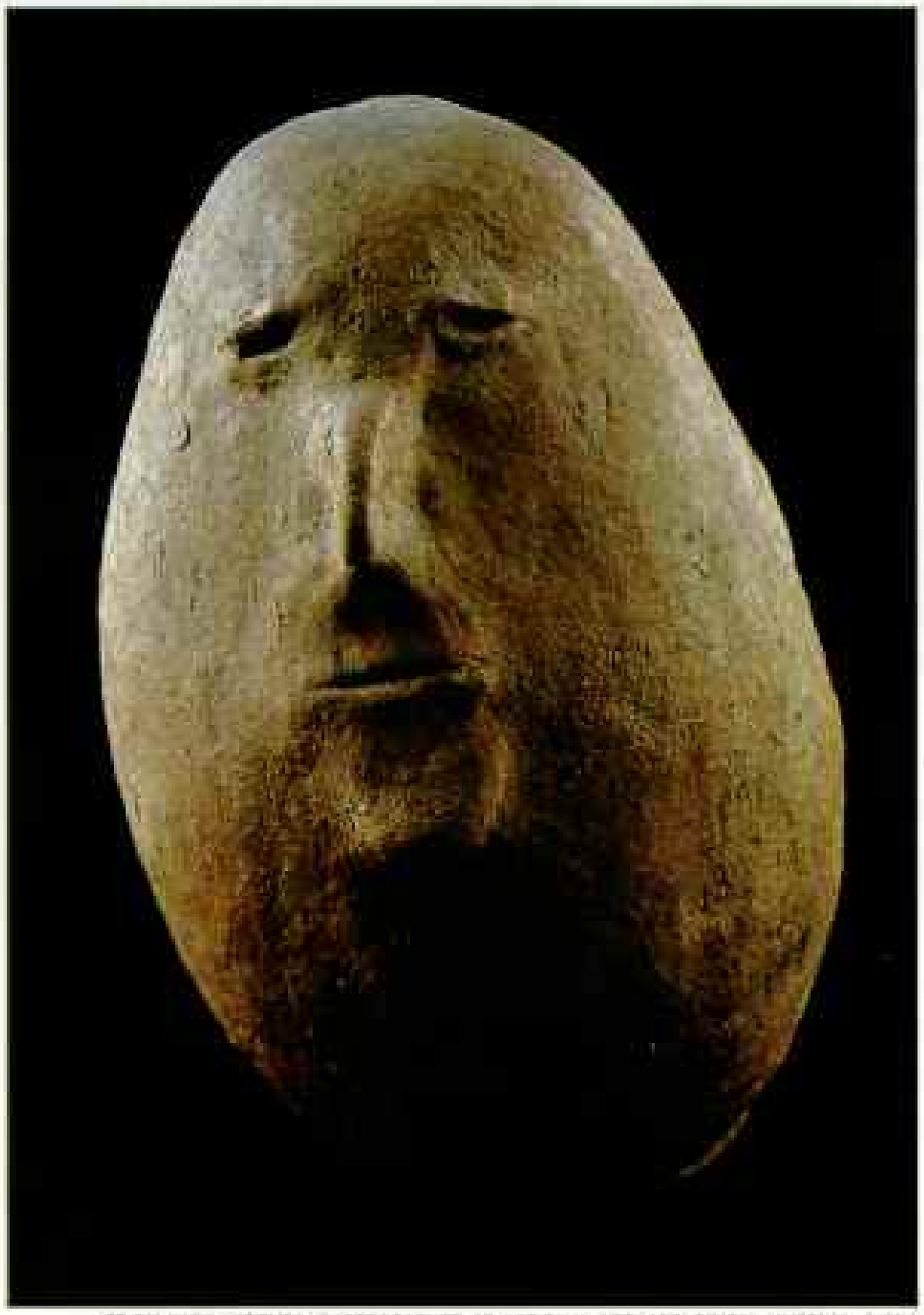
Increasingly, ancient reports indicate, their superstition grew. "The Etruscans developed a closed view of history," says Filippo Coarelli. "According to Roman writers, they believed that their civilization had only eight 'centuries' to live, and that in each century the same patterns recurred. This belief in cycles did not let them deal creatively with reality."

"It was a collective suicide," observes historian Mario Torelli. "Toward the end their priests would interpret such things as insect swarms as signs that the 'last Etruscan century' had arrived. At the end they just wanted to merge with the Roman world.

"The Romans were socially inventive. They solved problems.

When the plebeian class arose in Italy, Rome gave them land and political power. This in turn gave Rome a large landed citizenry. They could therefore raise large loyal armies. The Etruscan city-states remained princely fiefdoms that could seldom unite on matters beyond religion."

Before leaving Tarquinia, I visit the Tomb of the Typhon, which dates from the second century B.C. It is huge, built to hold many sarcophagi. The painted figures now wear Roman-style togas. The inscriptions are in Latin as well as Etruscan. Clearly the final Etruscan century had arrived.



35 CM HIGH (ABOVE); PHOTOGRAPHED AT NATIONAL ARCHAEOLOGICAL MUSEUM, SIENA

CRUDE CARICATURE, perhaps of the deceased, a funerary urn from near Siena displays the simplistic style of early Etruscan artists. Retaining the practice of cremation longer than others, the people of Chiusi fashioned a variety of such urns. One (facing page) has the figure of the deceased rising above her ashes. She holds her left hand to her girdled tunic, as if in supplication.

89 CM HIGH (FACING PAGE); PHOTOGRAPHED AT NATIONAL ETRUSCAN MUSEUM, CHIUSI

IT IS THE LAST DAY of my fieldwork. I have traveled to Volterra, one of the northernmost cities of Etruria and among the last to yield to the Roman armies. Over the millennia the steep hill on which Volterra sits has continued to protect the city from outside influences. Thus Volterrans still see their city as a preserver of Etruscan culture. They thrive on an alabaster industry they trace back to their Etruscan ancestors.

At Volterra's Guarnacci Museum I find a remarkable bronze statuette. It is the figure of an Etruscan boy. But he has been stretched, elongated like a shadow in the last light of day. In fact this boy has been named "Shadow of the Evening."

"He is the symbol of Volterra," says Franco Porretti, a student of local history who has immersed himself in things Etruscan. "One legend says the statue is the protector of lovers, another that he is the guardian of those who must travel at night."

To me the "Shadow" symbolizes the very spirit of Etruria. He is the boy Tages, lengthening as he proceeds toward twilight.

Porretti takes me out to the edge of Volterra, to the cliffs that sculpt the plateau on which the city sits. Known as Le Balze, the cliffs are collapsing. Time is eating away Volterra's foundation. A large piece of an Etruscan wall has fallen into an abyss at the edge of Le Balze. A group of homes are perched precariously, ready to go.

"The city just continues to fall away, piece by piece," says Porretti. "We Volterrans don't think it's possible to stop the process. Our philosophy is like the Etruscans'. They would not have considered these landslides a problem. It would have been destiny, just like the end of their own civilization. A modern man would try to do something, to challenge destiny with his notion of progress. The Etruscans accepted their fate."

The Etruscans, however, have had more staying power than their high priests might have dreamed. I have met their shadows often. They live on, for instance, in Italian churches, in the enduring Italian dedication to religion.

Larissa Bonfante observes that the angels and dreadful devils

that decorate the great Tuscan medieval churches look like direct descendants of Etruscan monsters and winged creatures. Roman artists did not dwell on such monsters, she notes, nor did they have much use for another Etruscan motif that dominates Italian religious art: the seated Mother and Child, the Madonna.

"Greek art is rational. One step follows another," says Paola Pelagatti, superintendent of archaeology for southern Etruria. "Etruscans mixed everything up. They were not rational. There was always disproportion. They were very Italian."

Etruscan spirits persist as well in the celebrated craftsmanship of Italy's shoe factories and goldworks, and certainly in its vineyards and kitchens. I could swear I was talking to an Etruscan when I dined in Florence at Il Latini, a trattoria that has been managed by the same family for a century.

"The Etruscans may have been interested in the afterlife," said co-owner Giovanni Latini, as he served up a mushy grain soup thought to be typical of a common Etruscan's diet. "But they were interested in the here and now. They liked eating well. They were like the Florentines today."

Even in death Etruscan attitudes persist. "Just think of what we spend on our funerals!" said my guide, Ercole Zapicchi, as we toured the elaborately carved tombs of Cerveteri. "We are still very attached to our dead."

And so, although the shadow of evening continues to lengthen, the sun still has not set on the Etruscans. Perhaps D. H. Lawrence perceived their secret best. "There seems to have been in the Etruscan instinct a real desire to preserve the natural humour of life," Lawrence wrote. "And that is a task surely more worthy, and even much more difficult in the long run, than conquering the world or sacrificing the self or saving the immortal soul." □

STALKING THE FIELDS of Tuscany, tomb robbers like the one seen here hiding behind a votive sculpture have harvested untold numbers of Etruscan artifacts. Omero Bordo (left), a reformed tombarolo, now crafts and sells reproductions in Tarquinia. Meanwhile, moisture and leaching mineral salts continue to degrade the precious tomb paintings (left, top), further diminishing Italy's rich Etruscan legacy.

PHOTOGRAPHED AT MUNIZ ARCHEOLOGICAL MUSEUM

SIENA'S CENTURIES-OLD 90-SECOND HORSE RACE

PALIO

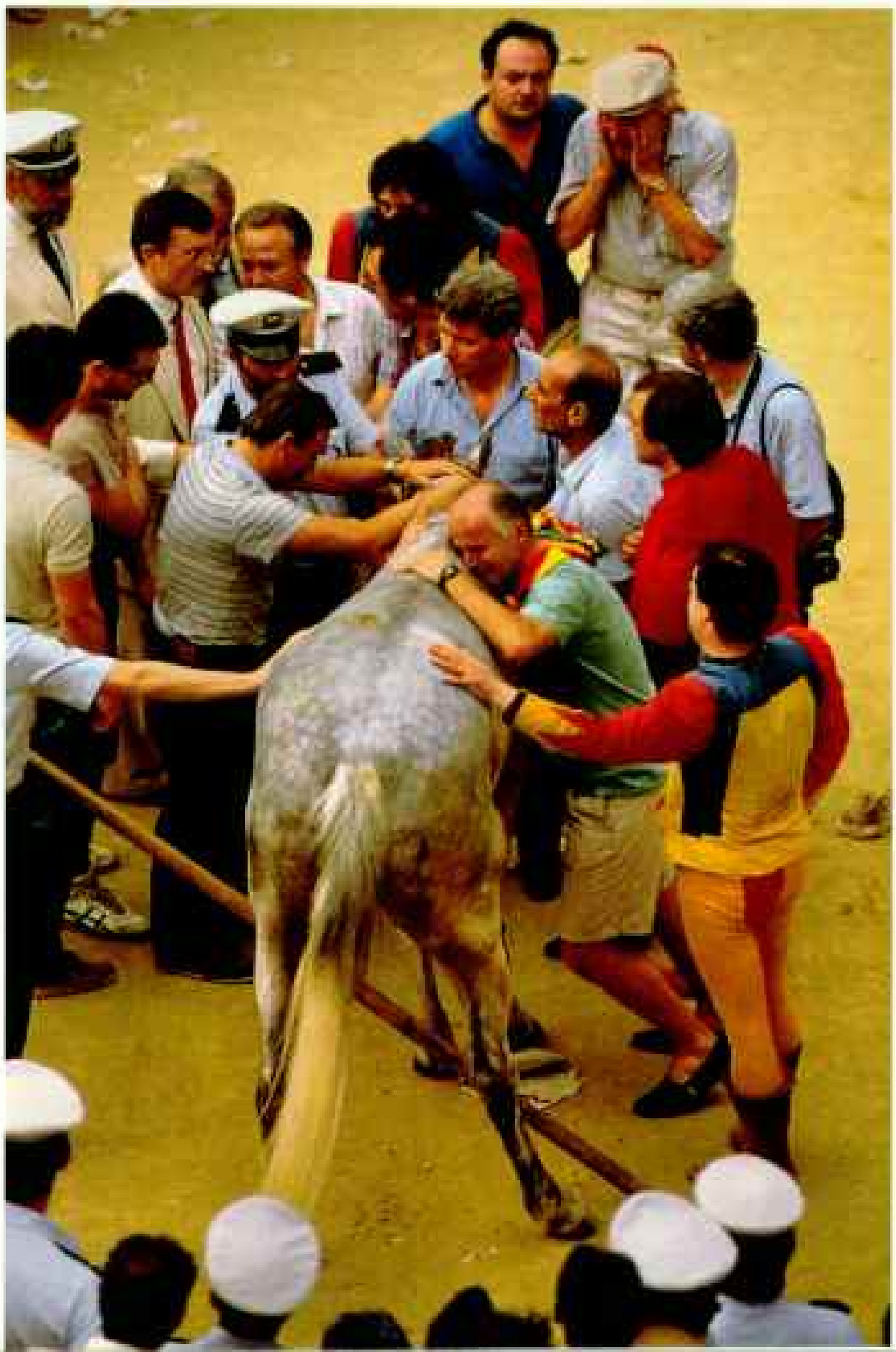
Photographs by O. LOUIS MAZZATENTA

ANCIENT ETRUSCAN SETTLEMENT, the walled city of Siena has released its passions each summer since the 1600s with a raucous horse race around Piazza del Campo pitting the city's neighborhoods, or *contrade*, against one another. Each has its flag, colors, and symbol (Ram, Wolf, Turtle, Snail). With some rivalries centuries old, the race often resembles a Renaissance free-for-all.

On the day of the race, horses and jockeys are led to the altars of neighborhood churches and blessed, with emphasis on the horse (left). "The animal is everything in the Palio," says a local expert. "The jockey is only a mercenary." In the main event (right) jockeys ride bareback around the course, often careering into mattress-cushioned walls as they round a turn. A sixth-century B.C. Etruscan frieze (top) seems to mirror the race. A religious banner is the coveted prize. Explains one lifelong fan: "The Palio is a serious matter. It's the very life of our *contrada*."

TRAGEDY STRIKES two-time winner Brandano, a prize gelding racing last year for Chiocciola, the contrada of the Snail. As sometimes happens, several horses went down while rounding Curva di San Martino, a sharp turn opposite the finish line made all the more difficult by its downward slope. Brandano suffered a broken leg (above) and had to be destroyed—a crushing blow to members of the Snail (right). Five jockeys were injured in the accident.

On loan from local owners, the horses for the Palio are distributed among the city's contrade by lottery three days before the race. Then the real action begins, as neighborhood leaders plot strategy and form numerous *partiti*, secret race-day alliances designed to help their own causes and hinder others. Almost anything is fair game: whipping an opponent, blocking, even



bribing an opposing jockey. The first horse to complete three laps around the square—with or without its rider—wins the race. □

Life in Ellesmere Island

PROWLING pack ice, a polar bear hunts for seals during summer's thaw. The author, a biologist who has lived with the arctic wolves of Ellesmere Island, now reveals how its other animals survive on the rim of the Arctic Ocean.

By L. DAVID MECH Photographs by JIM BRANDENBURG

the High Arctic

THAT ANIMALS can eke out a living in a forbidding land such as Ellesmere Island is a real testament to biological tenacity.

Here in the largest and northernmost of Canada's Queen Elizabeth Islands the earth presents two basic faces—light and dark. During the arctic summer the sun rotates around the horizon each day, bathing Ellesmere with continuous light for four to five months. It is a time of relative plenty. Polar bears take advantage of open water to seek food. Caribou and musk-oxen, both herbivores, enjoy the fruits of the growing season. Newborn hares provide prey for arctic wolves.

How those creatures and others survive the ensuing four to five months of darkness is the real question. So barren is Ellesmere that the nearest tree grows some 1,200 miles to the south, below the Arctic Circle. Although much of the island is covered with a mantle of ice more than half a mile thick, it receives only two to four inches of precipitation a year and consequently is classified as desert.

Nearly as big as England and Scotland combined, this vast country, lonely but spectacular, features huge ice fields, glaciers, mountains as high as 8,500 feet, and icebergs such as this one rearing from the pack ice.

Ellesmere is no more hospitable to humans than to wildlife. It counts only about 350 people, including short-term military and scientific personnel as well as the Inuit of a single village at the island's southern end.

Most visitors first set foot on Ellesmere at Eureka, one of the island's two important weather stations. Eureka was built on the west coast in 1947 with U. S. assistance. Braving a minus 50°F day there in March, an electronics technician (below right) is one of a nine-man crew that gathers

meteorological data for Canada's Atmospheric Environment Services.

Many of Ellesmere's people provided invaluable support to help photographer Jim Brandenburg and me achieve our prime objective: to find the wildlife. The island's meager resources support only seven species of land mammals. With vegetation so sparse to begin with and snow-covered for nine months a year, the plant-eaters—collared lemmings, arctic hares, Peary caribou, and musk-oxen—must move almost constantly just to find enough to eat. This also means hard work for the carnivores—ermines, arctic foxes, and wolves.

It was the wolves, of course, that captured our attention.* For 30 years, most recently as a biologist for the U. S. Fish and Wildlife Service, I have studied wolves in northern Minnesota and on Isle Royale, in Lake Superior. There the north woods obscures these elusive animals. For 12 weeks on Ellesmere's naked terrain I saw things I never thought I would live to see.

Once, 100 feet from a wolf den, I was watching seven adults and six pups that were sound asleep when an arctic hare suddenly popped up over a ridge not 30 feet from the nearest wolf. If a hare can display a look of utter consternation, this one did. It froze for a moment, then shot straight up the ridge. Only one wolf awoke to give halfhearted chase, but the adrenaline-charged hare easily outran its groggy pursuer.

The idea of witnessing this little vignette from beginning to end in the north woods is just not conceivable.

*The author's "At Home with the Arctic Wolf," with photographs by Jim Brandenburg, appeared in the May 1987 GEOGRAPHIC.

Fit for a miniature sleigh, a pair of Peary caribou blend into a spring snowfield. Once the elfin creatures, perhaps young females, realized that we were not their major predators—wolves—we were able to walk right up to them.

Males weigh no more than 400 pounds in this subspecies (*Rangifer tarandus pearyi*), smallest of all caribou, which ranges throughout the Canadian high Arctic. It was named for Robert E. Peary, who used Ellesmere as the base for his 1909 expedition to the North Pole. Between 1905 and 1909

Peary's men shot nearly 100 caribou for use as food. Although this animal's reproductive rate is high, so is calf mortality. The most recent survey in 1961 estimated the island's caribou population at only 200. Canada has classified it as a threatened animal.

Peary caribou are constantly on the move to find food—arctic willow, sedges, forbs, mosses, and lichens. They paw through snow with their front hooves to reach vegetation underneath but face a crisis during June calving if lingering ice seals off their forage.

Ellesmere Island

EARTH'S tenth largest island covers 75,767 square miles, reaching beyond 83° north latitude and stretching some 500 miles from north to south. Temperatures span a giddy range from 70°F in summer to minus 70° in winter.

ELLESMERE PIONEERS

The 19th-century route to the top of the world ran north through Baffin Bay and Smith Sound into Kane Basin. In 1854 Isaac Israel Hayes, a member of an American expedition led by Elisha Kent Kane, first set foot on the island.

■ Fossil forest

0 100 km
0 100 mi

NGS CARTOGRAPHIC DIVISION
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MAP EDITOR: GUS PLATIS

Arctic Ocean
Ward Hunt Island
Cape Columbia
Lincoln Sea
Alert
(weather station; military base)
ELLESMERE ISLAND NATIONAL PARK RESERVE (PROPOSED)
FORT CONGER
Fossil Plateau
Hazen Plateau
Lake Hazen
Q U E E N E L I Z A B E T H I S L A N D S
Nansen Sound
Greely Fjord
Eureka
(weather station)
Meighen Island
Axel Heiberg Island
Eureka Sound
Kane Basin
PACK ICE
Bache Peninsula
ARCHAEOLOGICAL SITE
Kennedy Channel
Robeson Channel
Ellef Ringnes Island
Amund Ringnes Island
King Christian Island
NORTH MAGNETIC POLE
Hassel Sound
Greenland (DENMARK)
Smith Sound
Qaanaaq (Thule)
Cornwall Island
Norwegian Bay
Graham Island
APPROXIMATE LIMIT OF MULTI-YEAR ICE
NORTH WATER POLYNYA
Grise Fiord
Baffin Bay
Bathurst Island
Coburg Island
Jones Sound
Wellington Channel
Cornwallis Island
Devon Island
Resolute
Barrow Strait
Northwest Passage
Lancaster Sound
LANCASTER POLYNYA

POLYNYAS

Some polynyas, open areas in frozen seas, remain so year round. They attract seals and waterfowl and were crucial to early Arctic hunters.

NORTHERNMOST POINT of North America, Ellesmere's north coast lies just 480 miles from the Pole. A combined Canadian weather station and military base called Alert is closer to London than to Toronto, as a signpost reveals (below right).

Relatively balmy summer conditions have created a startling phenomenon—the tourist season. Each year entrepreneurs fly a few travelers from Resolute on Cornwallis Island to Ellesmere's Lake Hazen, 44 miles long and framed by spectacular vistas. South-facing mountain slopes act as giant solar receivers while the lake, ice covered well into summer, reflects additional heat, creating a thermal oasis. In 1986 Parks Canada designated 15,251 square miles of Hazen Plateau a future national park (map, in red). The decision was controversial. Those in favor cited a need to control access to fragile permafrost areas, where footprints may last decades. They envision only 50 to 60 visitors a year. Opponents claimed a park would draw too many people—including bureaucrats—thus negating the region's truly wild nature.

Could the frosty face of Ellesmere once have been a warm primeval swamp? At one of four fossil forests so far discovered, Dr. Jack McMillan of the Geological Survey of Canada (above right) works near a fallen dawn redwood. Not petrified, a little coal-like but still woody, the tree and others nearby probably date from between 40 million and 65 million years ago. Other evidence reveals that during the Eocene large lizards and constrictor snakes, tortoises, alligators, tapirs, and flying lemurs—now found only in Southeast Asia—lived in Ellesmere forests. What could explain such a radically different climate? The causes remain a mystery.

Reunion with Ellesmere wolves

THE INTIMATE WEEKS we spent with a pack of the island's arctic wolves during the spring of 1986 was the experience of a lifetime. When we checked up on them a year later, would they remember us?

They were still using the same den, a rock outcrop that their ancestors may have used for decades. As I approached, two wolves trotted excitedly toward me and came within 20 feet. From the way they advanced, I knew they recognized me.

Although we had trouble identifying some of our old companions, I picked out Mom, believed to be the mother of last season's litter of six, here nursing a new batch of five pups. We delighted in watching the bouncy beige mini-wolves romp over the tundra. One morning as Mom watched from five yards away, a pup waddled toward my camera tripod. I froze. The little whelp began tugging at my bootlace—and eventually untied the bow.

Mom creeps toward a dozing Jim (below), who takes a break from filming a TV special on Ellesmere wolves. The coproduction of the National Geographic Society and the British Broadcasting Corporation is scheduled to air later this year.

STEPHEN DUPUY

ICE AGE THROWBACKS showing their classic defense posture, a herd of musk-oxen press tightly together in a line. They may also form a semicircle or a full circle to protect themselves from wolves, their chief predators.

No one really knows how many of these burly beasts inhabit Ellesmere, since the expense of working this far north precludes an in-depth survey. In 1965 John Tener of the Canadian Wildlife Service estimated a population of 4,000, nearly half the total for all Arctic islands. By way of comparison, explorers in the region around the turn of the century killed more than a thousand musk-oxen for food. In 1986 I counted 183 on about 600 square miles of good range, or one animal for every 3.28 square miles.

This underscores how musk-oxen and other land mammals survive here, by living in relatively low densities and covering a lot of ground. The first musk-oxen I ever saw on Ellesmere disappeared the next day, even though it was April and I could see over the snow-covered ground for miles.

It was clear from studying their tracks, however, how the shaggy creatures earn their daily supply of sedges and arctic willow. They frequent windblown plains in winter and lower, wetter areas in summer, paw out the vegetation, munch it down, shuffle around a bit, and paw for more. Though Peary caribou eat some of the same foods, they feed on higher ground and avoid competition with musk-oxen.

John Tener once judged that even those portions of Ellesmere suitable for musk-oxen may yield only a fraction of the forage produced on territory farther south. It is hard to believe that such a large herd animal can survive in any numbers on so spare a diet. Bulls may weigh 600 pounds, females 400, and calves in summer about 100.

If there is something about a musk-ox that makes it seem not all of one piece, that may be because it is related to both the genus *Ovis* (sheep) and the genus *Bos* (cattle), but belongs to neither and has its own classification—*Ovibos*. Its nearest living relative is the takin, a goatlike creature of the Himalayas.

The breeding season begins in June when bulls start to fight for possession of one or more cows; the impact of their head-on crashes has been heard half a mile away. Mating generally occurs in August, and calves are born from mid-April to mid-June. Most cows bear their first calf when they reach the age of four. From then on they generally breed each year, except when winters are unusually severe.

Wolf predation on musk-ox calves plays a significant role in the fluctuation of the herd's population. Our wolf pack led us on one incredible hunt during which they killed three of a herd's calves within a few minutes! But musk-oxen are by no means defenseless. Jim found a wolf skull with the tip of a musk-ox horn embedded under the jaw.

THE HUNTED depend on coloration and concealment. Arctic foxes would relish a rock ptarmigan and the eight to ten chicks cloaked within her feathers; one curious youngster peeks out. When the snow flies, the hen's plumage will turn white to match.

The arctic hare on Ellesmere, however, wears a white coat year round. A female nurses her young, known as a leveret, whose stony gray coat matches most of its surroundings—good camouflage against wolves, a major predator. But a sharp-eyed wolf may take a second look, realize that a pile of look-alike rocks are good to eat, and attack. The young hares remain frozen and may be doomed—unless the nearby adult succeeds in diverting the charging carnivore.

Arctic poppies may catch the eyes of the hares themselves—they nibble the flowers in summer.

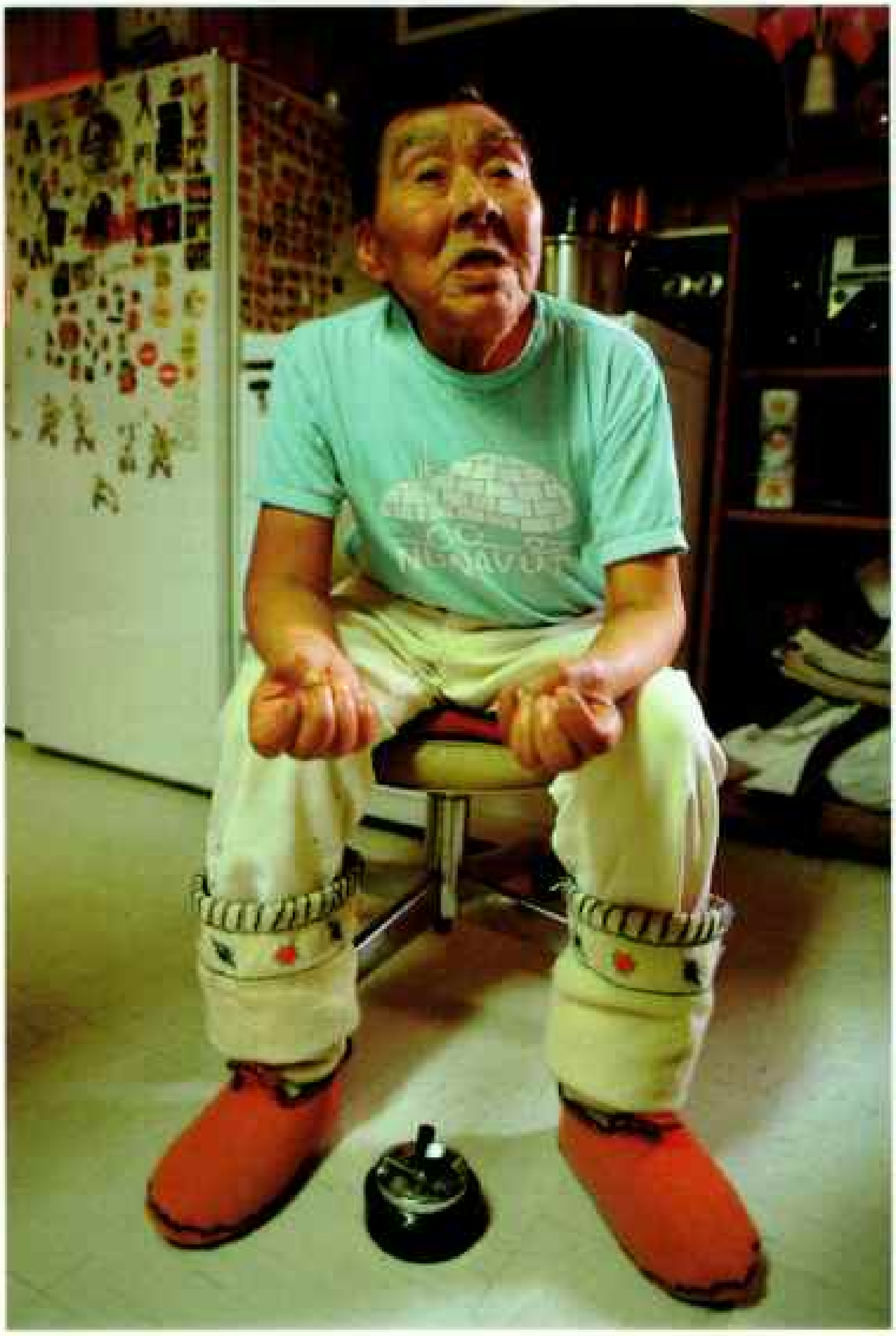
BENEATH towering cliffs on the southern coast, an Inuit kayaker maneuvers near his village of Grise Fiord, population 101.

Here Ellesmere's only Inuit seem to have successfully integrated their traditions with the white man's materialism. Most fishermen use outboards, and hunters travel on snowmobiles, using rifles to fill their front yards with musk-ox hides and sealskins destined to be sold. Dog teams are legally required when Inuit lead visitors on spring polar bear hunts, regulated by permit; guides may receive a bonus of up to a thousand dollars for a successful hunt. The Inuit also depend on government benefits, including a school (right).

To bolster its sovereignty in the high Arctic, Canada established Grise Fiord in 1953 by transplanting Inuit families from the Hudson Bay area. One of those who was later relocated, Philipoosie Novalinga (below), met pioneer filmmaker Robert Flaherty in 1920 and became a young role model for Flaherty's landmark documentary, *Nanook of the North*.

Although these are the first Inuit to inhabit the island in about 250 years, a rich archaeological record shows that Arctic peoples had inhabited eastern Ellesmere for more than 4,000 years.* As early as 2300 B.C. a culture traceable to Siberian ancestors made its way eastward across Alaska and through the Arctic to Ellesmere's Bache Peninsula. From there Greenland lies just 25 miles across open water in summer or solid sea ice in winter. Ellesmere thus offered a natural crossing point between two great landmasses.

By about A.D. 1000 the initial Arctic culture had given way to



a second eastward flow of a people now known as the Thule. The record reveals more. Apparently the Norse visited Ellesmere as early as the 12th century and traded with the Thule, evidenced by chain mail, boat rivets, knife blades, and other artifacts turned up near Bache Peninsula. Around 1700, during a 50-year period of brutal winters, the Thule abandoned Ellesmere for Greenland.

*See "Eskimo and Viking Finds in the High Arctic," by Peter Schledermann, in the May 1981 GEOGRAPHIC.

WHAT TALES the little outpost of Fort Conger has to tell. Base for the route to the Pole used by pioneer explorers, it recorded absorbing pages in the lives of Robert E. Peary and others who had broken trail for him.

In 1875 Capt. George Nares set up the first base on Ellesmere. Six years later U. S. Army Lt. A. W. Greely led a scientific expedition that headquartered near the site where one of Nares's vessels had overwintered. Greely called it Fort Conger. The outpost seems quite snug in May 1883 (right), meteorological equipment in place. The dark and the cold were offset by a trencherman's larder. One Christmas menu: "Mock-turtle soup, salmon, fricasseed guillemot [a seabird], spiced musk-ox tongue, crab-salad, roast beef, eider ducks, tenderloin of musk-ox, potatoes, asparagus, green corn, green peas, cocoanut pie, jelly cake, plum pudding with wine sauce, ice cream, grapes, cherries, pineapples, dates, figs, nuts, candies, coffee, chocolate! Eggnog, rum and cigars were handed around later."

But when two resupply ships in succession failed to arrive, the 25-man expedition made an ill-fated retreat south in 1883. Only Greely and six others survived.

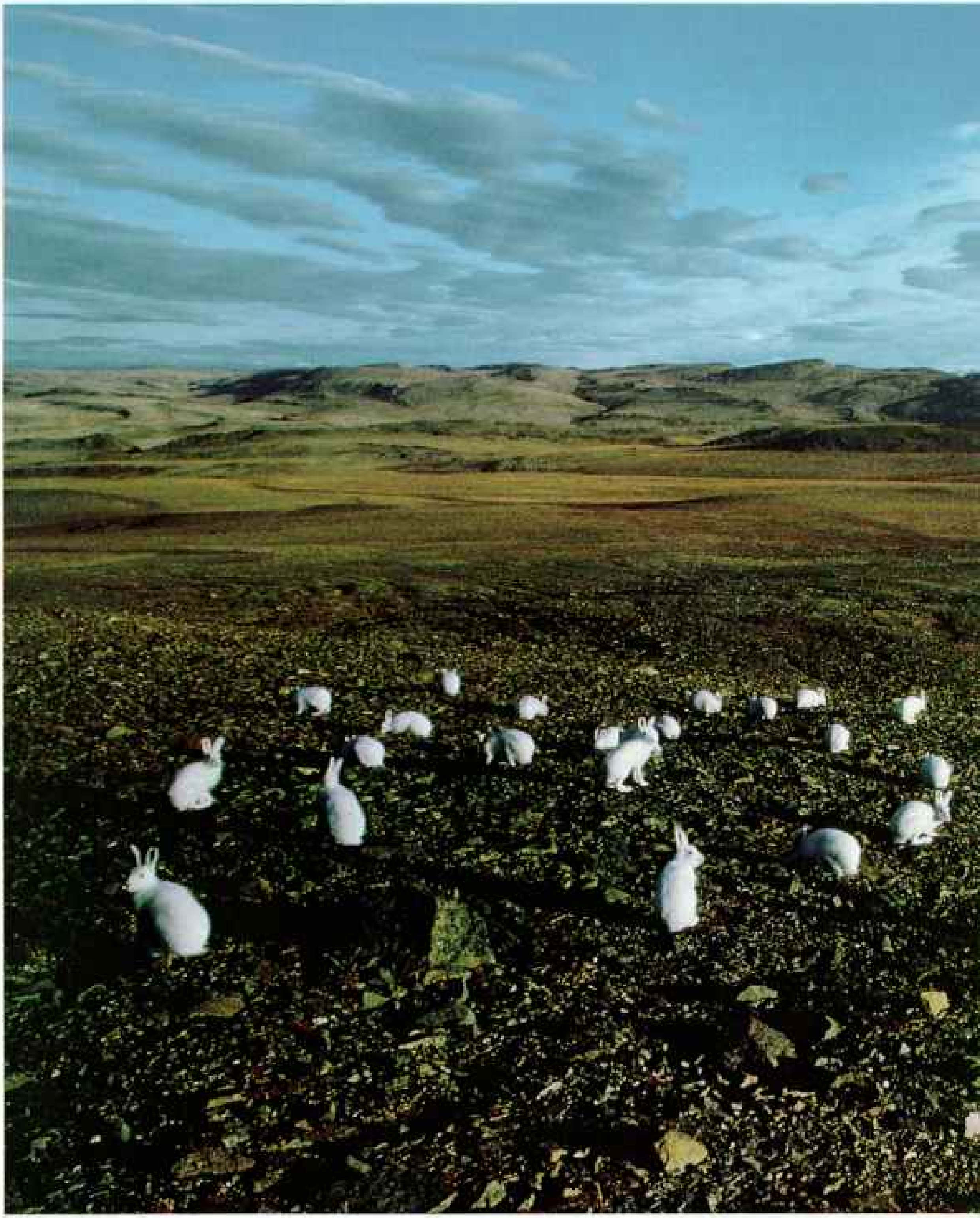
The fort, preserved nearly intact by the pervasive cold, seemed only recently abandoned when we visited it a century later. An aerial view shows the outline of Greely's station, converted into three tiny houses by Peary during his 1898-1902 expedition. He lost some of his toes here, frozen during that unsuccessful venture. One house contained an old stove and a

crate stenciled "ROALD," intended for Roald Amundsen, who from 1903 to 1906 first navigated the Northwest Passage. The crate was part of a cache left in 1920 by Danish naval personnel for an expedition that Amundsen had planned but never made.

Modern adventurers have also reached the Pole from the island's north coast, using everything from motorcycles to ultralight aircraft, notably including the dog teams of Will Steger's expedition in 1986.*

*See the September 1986 issue.

ENGRAVING (TOP) FROM "GENERAL GREELY, THE STORY OF A GREAT AMERICAN," BY GEN. WILLIAM MITCHELL. G. P. PUTNAM'S SONS, NEW YORK, 1936



THEY CAN'T HIDE, but they can run, and arctic hares, spread over a gravelly plain, also find safety in numbers. As many as a thousand have been reported together. Brown young hares lose their camouflage when they turn white at about four weeks, but by moving from low country into the highlands and grouping up, they regain some defense against predators.

Weighing as much as 12 pounds, these hares feed largely on arctic willow, pawing sprigs out from under the snow. In late June females give birth to five or six young, born with their eyes open and a good deal of fur. For their first two weeks they are

relatively immobile, helpless, and vulnerable to wolves.

The hare's habit of frequently rearing up on its hind legs serves it extremely well on Ellesmere. Such a lookout can detect a wolf a mile or more away. If it does, it vacates the vicinity by hopping furiously on its hind legs like a kangaroo, dropping to all fours only occasionally. This gives it more maneuverability as well as a better chance to keep an eye on the pursuing wolf.

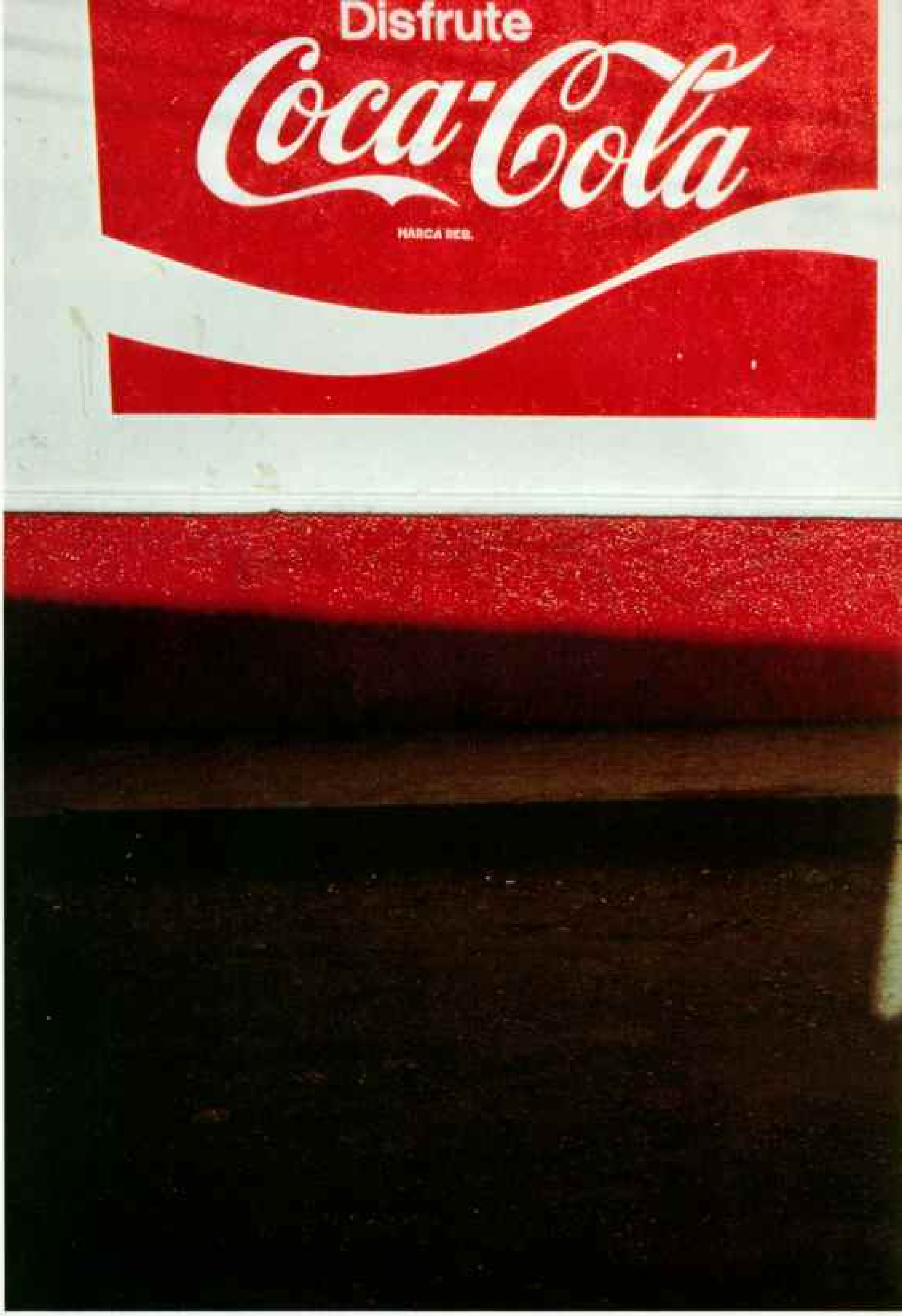
On subsequent visits I plan to continue my study of wolf behavior. I hope to keep returning for several years. The pack—and its unforgiving but intriguing island—has much to teach us. □

By GRIFFIN SMITH, JR. Photographs by JAMES NACHTWEY MAGNUM

GUATEMALA

Hardened by life in the cane fields, a campesino wears a peasant's wariness on his sooty face. After years of dictatorship, civil war, and terror, Guatemalans cultivate hopes for peace under their first civilian government since 1970.

A Fragile Democracy

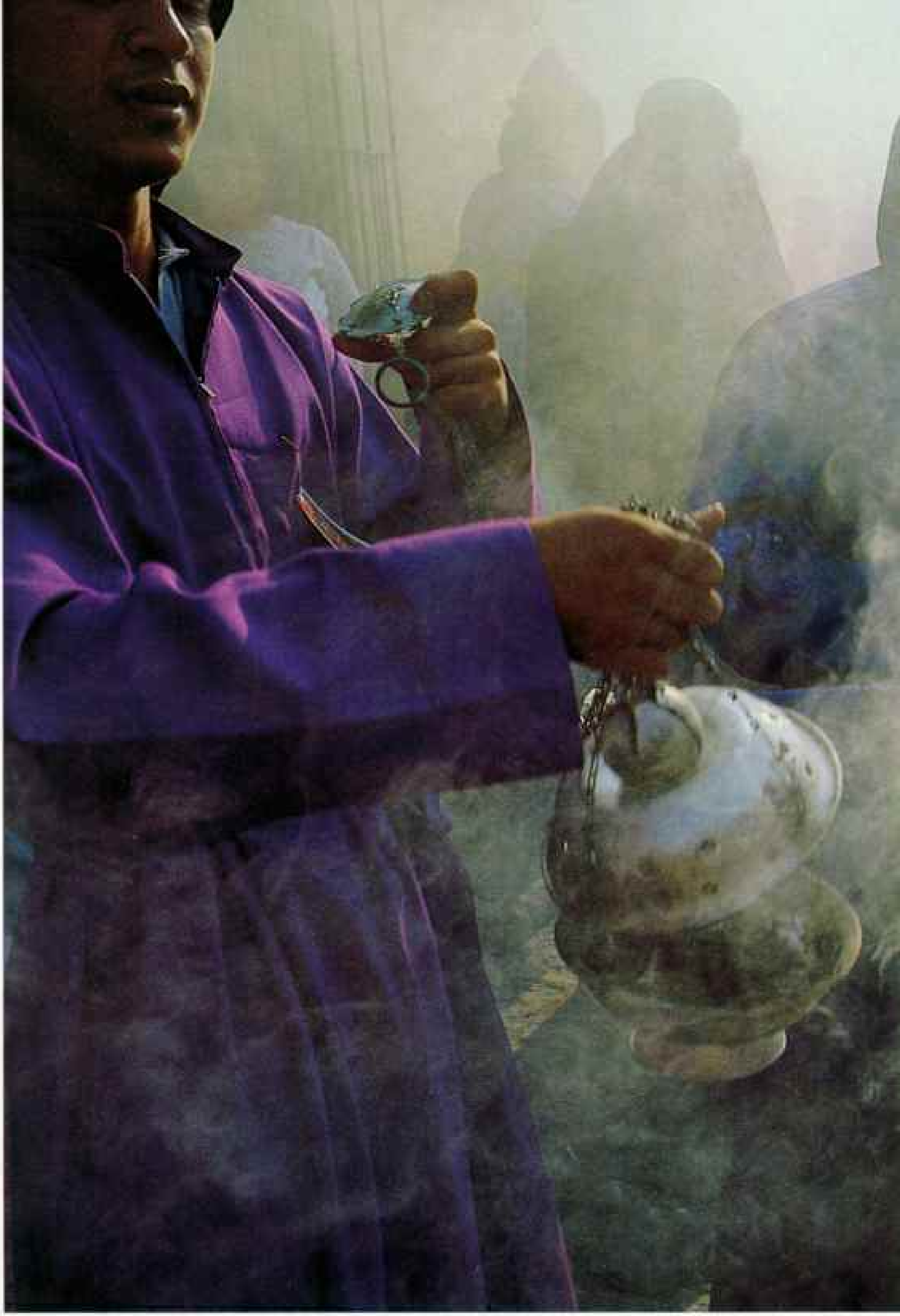


Pop culture from the north reaches only the surface of Guatemala's complex, divided society. Separated by race and history, an Indian majority and a largely Spanish

ruling minority have given rise to a ladino culture that accounts for about 45 percent of the population. Deep gulfs between rich and poor also impede a national identity.

Where land is life, highlanders turn mountainsides into terraced fields, here readied for potatoes. Subdivided over centuries, small highland plots sustain the country's

greatest rural population density. In a nation where a wealthy handful own half the farm acreage, land reform has been a major fuse of national turmoil.



Swinging censers, Roman Catholic worshipers lead an Easter procession through the streets of Antigua Guatemala. Although Catholicism has been dominant since the

16th-century Spanish conquest, Maya beliefs have remained strong, and in recent decades evangelical Protestantism has made large gains, claiming nearly a third of the population.

DUSK WAS SETTLING over Cobán, the small capital of Guatemala's department of Alta Verapaz, when the policeman on the main plaza motioned the two buses to proceed. They were decrepit, wheezing, discarded old U. S. school buses, their tops piled high with gunnysacks and cardboard boxes. The buses shuddered to a stop alongside the cathedral, leaving their engines running.

Most of the passengers had never seen Cobán before. Indian families native to the border province of Huehuetenango, they peered out with patient wonder at the commotion their arrival had caused. The governor of Alta Verapaz was there, and from the church, so were the Sisters of Mercy.

This is the century of refugees—India, Pakistan, Germany, Russia, Armenia, Afghanistan, Ethiopia, Indochina—the list goes on. A short time ago those aboard the buses had been living in Mexico, refugees from the ferocious Guatemalan civil war, which had reached its peak in 1982 and now was in remission. Some of them had surely collaborated with that homegrown, but Cuban-inspired, insurgency; others just as surely were innocents caught in a murderous cross fire between the guerrillas and the Guatemalan Army. Now they had been given fallow, state-owned lands at Playa Grande, a day's journey beyond Cobán, lands that the new elected government hoped would be secure from attack. Tonight they would sleep on the floor of the Catholic convent, and tomorrow they would start another life.

For half an hour they sat uncomplaining in the buses, waiting to be told what to do. After nightfall a door opened onto a narrow, unlighted staircase leading up to the building's second story.

I watched the refugees file out. An old man holding a box of chickens, a mother carrying a baby, they clasped the hands of the nuns for a moment as they passed by. A teenager with his guitar, a blind girl gently guided by a friend, a man cradling the family cat, a woman whose most treasured possession seemed to be her vinyl water jug—through a veil of weariness they smiled at me. In the light at the top of the stairs the nuns waited, radiant, directing each in turn to makeshift quarters. One little boy in a baseball cap gripped the shirttail of his father, who drew a flashlight from his pocket to lead them both through the shadows. It was just one night in Cobán, Guatemala, but for a moment they were universal: The endless line of 20th-century refugees, clutching their belongings, winding across the world, climbing the dark stairs toward the light.

As I think about them now, they seem a metaphor for their country. Guatemala has lately climbed some very dark stairs and, to the surprise of many who know it best, may at last be emerging into light. An intermittent but stubborn quarter-century-old leftist insurgency appears to have been mastered by a policy of

"rifles and beans"—combining material aid to impoverished villagers and a remorseless military campaign—though not without the loss of tens of thousands of lives.

Army officers, the dominant caste for more than three decades, have voluntarily yielded power under a new, popularly drafted constitution that expressly forbids military men from serving as president. Free elections in 1985 gave a decisive majority of almost 70 percent to the centrist Christian Democratic

Heirs of the Maya, highland villagers mix suit jackets and lace with multi-hued Indian wear in a wedding near the town of Santiago Atitlán. In a mountain region where 11 native tongues are spoken, clothes traditionally identify home villages. Having resisted change during centuries of domination, Indians stand on the bottom rung of the economic ladder.

AREA: 108,889 sq km (42,042 sq mi). **POPULATION:** 8,600,000. **CAPITAL:** Guatemala City, pop. 793,000 est. (metro area 2,000,000 est.). **RELIGION:** Roman Catholic, traditional, Protestant. **LANGUAGE:** Spanish, many Indian languages. **LITERACY:** 55%. **LIFE EXPECTANCY:** 61 years. **ECONOMY:** Industries: food processing, cement, textiles, mining. Export crops: coffee, cotton, sugar, bananas, meat. Domestic consumption: corn, beans. **PER CAPITA INCOME:** $1,200.

Colors denote zones of vegetation in Guatemala. At center, the relatively dry Motagua River Valley (brown) is flanked by highlands (dark green) and, beyond them, lowland rain forests of the coasts and the Petén (pale green). Coffee, sugarcane, and cotton plantations have replaced much of the Pacific rain forest, while logging and farming threaten much of the jungled Petén.

▲ Volcano
Archaeological site
Airport
Port
Oil field

0 50 km
0 30 mi

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Guatemala

Temperate highlands, tropical lowlands fronting two coasts, and the flat, jungled Petén region give geographic variety to the most populous nation in the unsettled house of Central America. A claim to Belize was omitted from the 1985 constitution, cooling a long-simmering dispute that pitted Guatemala against world opinion and Belize's protector, Great Britain. Regionally strategic as Mexico's southern neighbor, Guatemala has been convulsed by the longest running insurgency in Central America, now in its third decade.

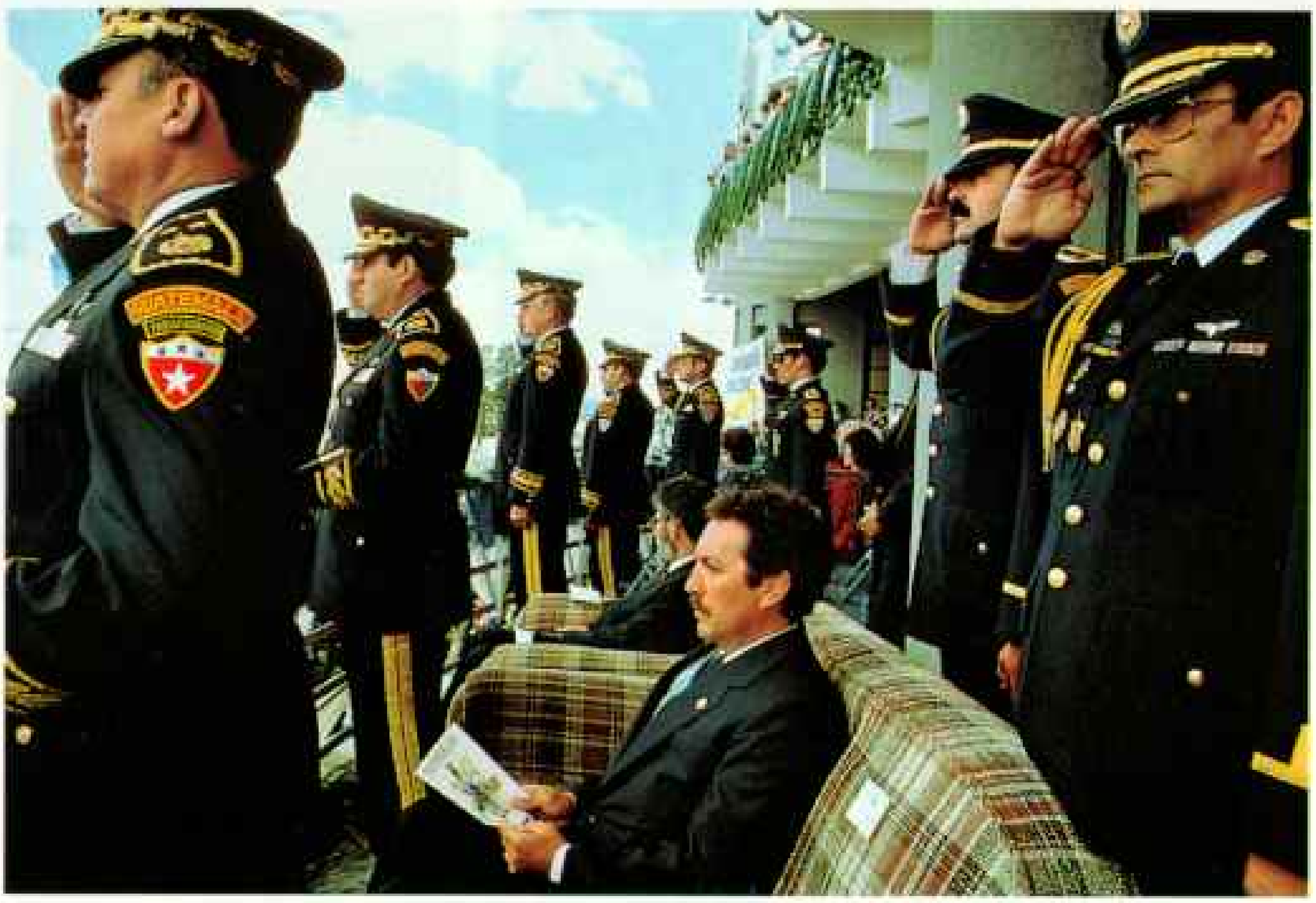
Party candidate. Although the army still holds more than enough behind-the-scenes power to reimpose its rule, I met no Guatemalans who were betting that that would happen soon. The unrealistic hopes of instant change that flourished in the postelection euphoria have faded now, but a guarded optimism persists.

"We're working to build a democracy. It's really hard, I can tell you," says Vinicio Cerezo, the 45-year-old lawyer who began his third year as president on January 14. "We have to establish the rule of law and the institutions to support it. If the United States were starting democracy now, think how many institutions you'd have to create."

WHAT IS MOST SURPRISING about this turn of events is that almost no one saw it coming. As recently as five years ago the experts were predicting catastrophe: A downward spiral of ever harsher repression, said some; inevitable revolution, said others.

The experts had the evidence on their side. By 1982 Guatemala was coming apart at the seams. The discredited government of Gen. Romeo Lucas García had not shown itself capable of dealing effectively with the guerrillas, and its record of graft and corruption was unexampled even by Guatemalan standards. At the height of their power, guerrilla groups ranged with impunity over two-thirds of the country. Guatemala City was a free-fire zone for rightist political zealots, leftist sympathizers, private armies of thugs, organized criminals, and amateur gunmen out to settle personal scores; random shootings went unchallenged, and after sunset no prudent man went out. "By 1982 this city was flanked by guerrilla roadblocks," congressional deputy Edmond Mulet, whose rural district encircles the capital, told me. "You couldn't drive to Lake Atitlán or even to Antigua without being stopped by them."

Again and again, in nearly identical words, Guatemalans told me they felt the biggest



Seated by free elections, President Vinicio Cerezo joins military chiefs at a reviewing stand on Army Day. He was inaugurated in January 1986 as the first civilian chief of state in 16 years, signaling the military's concession of absolute control in the face of international isolation, economic distress, and U. S. pressure. Military leaders, industrialists, and wealthy landowners continue to hold the balance of power, a fact of Guatemalan politics that Cerezo acknowledges. "The role of this government is to create conditions in which everybody can live," he says.

Enjoying an affluent intimacy once reserved to the elite, leading lights of the middle class lunch at an exclusive club in Guatemala City (below). An oasis of light and cosmopolitan polish, Sixth Avenue's commercial artery gleams at rush hour in the heart of the largest urban population between Mexico City and Medellín, Colombia.

change in their country had been the "relaxation of terror" on all sides.

Five years have wrought a remarkable transformation. That's the good news. The bad news is that Guatemala, despite its natural beauty and economic potential, remains a deeply troubled place.

Guatemala is as close to New Orleans as New Orleans is to Chicago. A glance at the map shows it to be the cork in the Central American bottle: Whatever unrest might bubble northward from that turbulent region must pass through Guatemala first. Guatemalans cast an uneasy eye toward Nicaragua and El Salvador and wonder about the future.

Almost one-third of the people of Central America live in Guatemala. It is blessed with remarkably fertile volcanic soil, a cosmopolitan middle class, and the largest manufacturing base on the isthmus. Yet it has never lived up to its potential.

Consider education. Guatemala's Nobel laureate in literature, Miguel Ángel Asturias, is what a countryman sadly calls "a prizewinner in a nation of illiterates." Nearly half the

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GRIFFIN SMITH, JR., who practices law in Little Rock, Arkansas, wrote about Dallas in the September 1984 GEOGRAPHIC. JAMES NACHTWEY's most recent assignment was "Nicaragua: Nation in Conflict," December 1985.

adults in Guatemala cannot read or write. Only 20 percent have gone to high school.

Or consider health. Guatemala grows enough food to export meat and vegetables to the United States and Central American countries, yet of every hundred Guatemalans who die, about 40 are children under the age of five who perish because of malnutrition.

Or distribution of wealth. In 1984 the wealthiest 20 percent of Guatemalans received 57 percent of the income, while the poorest 20 percent received 5 percent. Eight years ago, after three decades of growth, Guatemala's economy began to decline. "The standard of living now is about what it was in the early 1970s," one businessman told me, reflecting a widely shared consensus. With an annual population growth rate of nearly 3 percent, the country each year has 200,000 more mouths to feed—twice as many new Guatemalans as there are new Guatemalan jobs.

Or consider politics. The Spanish colonizers, like the Indian nobles before them, ruled from above with a firm, bureaucratic hand. Independence in 1821 brought more than a century of bickering and dictatorships, ending with a revolution in 1944 against the eccentric strongman Jorge Ubico.

But within ten years this social-minded revolution turned sour. The president in 1954, a

tight-lipped colonel named Jacobo Arbenz, aroused rightist opposition by allowing Communists in positions of power among peasants, labor unions, even the government itself. Feeling threatened, he ordered four million pounds of Czech arms, enough to fill 119 boxcars. But by the time a Swedish freighter delivered them, purportedly as farm machinery, Arbenz had lost effective leadership of the nation.

A U. S.-supported force of Guatemalan mercenaries invaded from Honduras; the army refused to defend the government. Arbenz fell, to be replaced by 30 years of largely uninterrupted military rule.

Landowners who at first had encouraged the army to take a hand in politics discovered that the officers richly enjoyed their newfound privileges. As one Guatemalan technocrat told Piero Gleijeses, a journalist for the *New Republic* magazine, "the army, which had entered the partnership as the bride, gradually grew whiskers and developed huge muscles."

PROBLEMS ENOUGH for any country but a staggering burden for Guatemala, which (even including the thinly populated northern third of the country called the Petén) is only about the size of Ohio.

"Is there any other country this small that has so much diversity?" asked a well-traveled friend who chooses to live in Guatemala. I could think of none. Though its language of rule and its dominant culture are Hispanic, it is the only state in North America with a predominantly Indian population. Its prevailing Roman Catholicism, long commingled with indigenous ritual, is being challenged by a lively evangelical Protestant movement that now claims the adherence of 30 percent of the country's people. The urban-rural split is sharp. Guatemala City is a modern Third World capital 20 times larger than any provincial city; the countryside is decades, some would say centuries, behind.

Even the geography does not seem all of a piece. Climatically, topographically, it is three countries: *tierra caliente*, the humid tropical lowlands of the Pacific littoral, the Atlantic coast, and the Petén; *tierra fria*, the chill cloud forests of the highlands and volcano-dotted Sierra Madre; and lying between these the *tierra templada*, a congenial region of cool nights and warm days, ranging in elevation from 3,000 to 6,600 feet, healthful and invigorating.

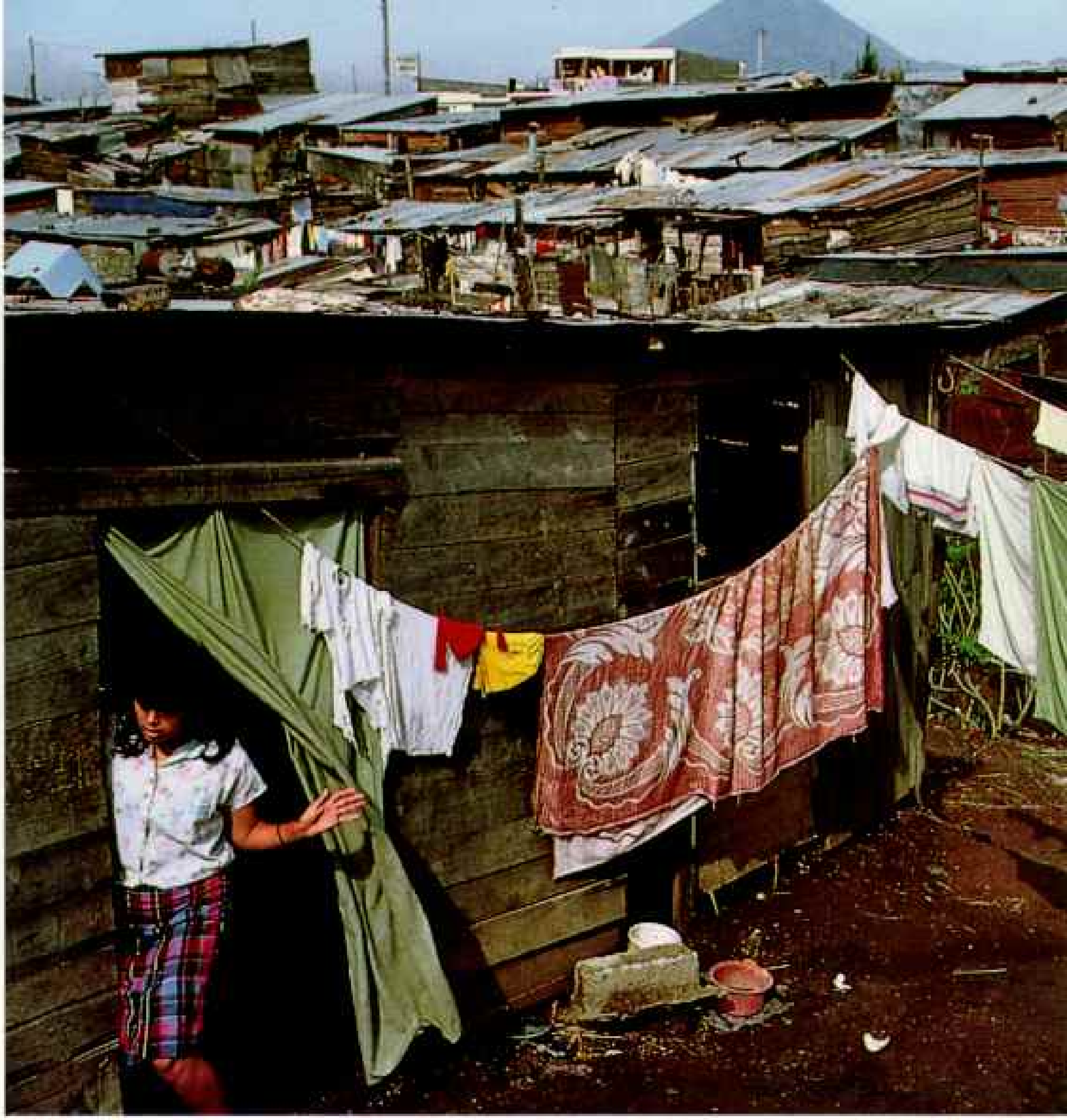
In the *tierra templada* around Guatemala

Hopes and hard necessity have brought country people to the capital, where an Indian child plays on the sidewalk (facing page) beside posters sold by her mother. Among thousands of street orphans, a lucky few have found John Wetterer, who runs a home where 250 children receive shelter and education.

City, something is always blooming—in January the flaming yellow palo blanco tree, in February the bougainvillea, in March the purple nazareno, and so on through the seasons.

Underneath this riot of color the capital is a study in rich and poor. Urban growth has quadrupled its size in 28 years, from 500,000 in 1960 to about 2,000,000 today.

"Since 1910 our city has grown uncontrolled, without any plan," says Don Alvaro Arzu, the elegant and urbane mayor of Guatemala City. Among the dark Spanish furnishings in his high-rise office, a desktop computer



Desperate for a place to live, 45,000 squatters invaded El Mezquital (left) in 1984-85, as others had done elsewhere around the city following the 1976 earthquake. Still expanding, the capital has even grown into ravines (below). Scavengers at the city dump search for food as well as for things to sell.

sits like an alien invader, its green cursor flashing as we talk.

"My aim," he says, "is just to repair our infrastructure, to rebuild what we have—the water supply, the sewers, the roads. It's a cruel mission because I can't start any great new projects by which I would be remembered by my grandchildren. Our municipal budget for all that works out to two centavos per person per day, for everything."

With or without jobs, Guatemalans move to the city seeking a better life. Some have come because the 1976 earthquake destroyed their villages; others to escape the turmoil of civil war; still others because they can no longer subsist on their tiny parcels of land.

Antonia González Gómez, a seamstress, has been living at No. 30-84 Avenida del Ferrocarril, zona 8, tending her pots of ivy, for 18 years. Does the address sound imposing? It is no avenue at all, but a railroad right-of-way. As far as the eye can see, rows of squatters' shanties line both sides of the track, coming to within a few feet of the rails. Between trains, the roadbed serves as playground and plaza.

The capital has grown so fast that the main city dump, formerly on the outskirts, is now close to the city center. I went there one Sunday morning. It was not hard to find; great waves of smoke rise from the rubbish, day and night; bulldozers shove new garbage from place to place; buzzards hover hungrily over all. This vast Dantesque plain, a mile or more in length, half that in width, is constantly

combed by a whole subculture of scavengers seeking anything of value. In the midst of the dump I met a group of men collecting bits of plastic. They had built a little house of cardboard tubing for shelter beside their hoard.

Then, inexplicably, I heard music. A bright-eyed boy about eight walked toward me, playing a harmonica. Did he say his name was Julio? He had been looking for bottles, he confided, when he saw the harmonica lying in the dump—what luck! Now he was learning to play it. Did I think he was any good?

"Yes," I thought to myself, "I believe you've got it." As I watched, amazed, he turned and trotted happily off across the desolation, keeping a watch for bottles, making a ragged tune.

THE CAPITAL lies in a level valley deeply eroded by ravines (page 784). Twenty years ago visitors remarked how the growing city was spreading, finger-like, between them. Now the ravines too are filling in with people.

I followed a paved walkway down one steep slope into a squatter community called La Limonada—no paradise, but nothing like the wretched slums of Rio de Janeiro and Caracas either. A father and four well-dressed children came by, bound for church, and then a group of clowning teenagers, high on glue. Nearly every rooftop had a television aerial.

I paused beside one of the more substantial houses, where a plumpish woman of genial mien was hanging laundry out to dry. Antonia Fabiana López, recently widowed, was an old-timer in La Limonada; she and her husband came from Quetzaltenango years ago, "searching for better salaries." She had first been a cook; now she took in washing.

"My husband built this house himself," she said proudly. "It survived the earthquake."

She invited me inside. I asked how life was treating her. "In Guatemala everything is too

Leaving a war that no longer makes headlines, two wounded soldiers and a dead comrade fly out in a helicopter from a brush fight with leftist guerrillas. Ruthless army campaigns in the early 1980s rooted guerrillas out of large areas. Perhaps a million villagers have been displaced and 100,000 lives lost. Fighting continues in remote areas, and 45,000 refugees remain in camps in Mexico.

Trying on a new life through a government amnesty program, former guerrillas and supporters receive donated clothing at Cobán army base, where they will begin indoctrination toward resettlement in government-established villages.

Little hope is held for 35,000 citizens who have vanished in two decades of political kidnappings and murders. Relatives at demonstrations held by the Mutual Support Group (right) demand accountings for victims like the girl pictured, but crimes under former regimes are rarely investigated.

expensive," she said. "I used to pay 3.50 quetzales a month [about $1.44 U. S.] for water and electricity. They raised that to five and a half quetzales. But for my washing, I still get paid the same." Each piece of laundry earned her six centavos—about 2.5 cents.

Leaving, I started down the path that led deeper into the ravine. Señora López stopped me. "Please don't go that way," she warned. "There are many thieves down there."

The wary attitude of Guatemalans is summed up in an English-language bumper sticker: YOU LOOT, I SHOOT. Indeed, the first thing that impresses a visitor to Guatemala is not its tropical foliage or its spring-like air, but its reliance on the gun. The blunt presence of armed men is everywhere, coolly observing your comings and goings at office buildings, shops, factories, and private homes. Guns decorate the national seal. They are portrayed on every Guatemalan coin. A stroll down prestigious Avenida la Reforma took me past a security service named Magnum, whose logo was a bullet, and a sporting goods store called Safari Shooting.

The Guatemalans get used to it, and so did I. Soon it did not seem odd to see armed guards in front of McDonald's drive-in window on a treelined suburban street, or find that the skyscraper housing FUNDESA, a business consortium to promote foreign investment, had an elaborate display of shoulder holsters in its lobby. Waiting for an elevator, I mentioned this to a bystander. "If you think there are a lot of guns here," he said, "you ought to see El Salvador."

In the southern suburbs, television satellite dishes dot the rooftops—"the national dish of Guatemala," one wit called them. Impossible to conceal, they announce not only the owner's wealth but also his American orientation. "In the past the poor listened to the radio and the rich watched local TV," one Guatemalan doctor told me. "Now we're growing further apart. We watch things like Cable News Network and HBO from the United States, while the poor watch imported Mexican soap operas on the Guatemalan stations. They're even starting to use the same expressions Mexican comedians use."

Lately many of the satellite signals have been scrambled. One Guatemalan congressional deputy lamented this trend. "It's sad," he said. "We miss out on many of those cultural programs now. I'm sure if the Soviets were our neighbors, they'd give us all the channels free. They'd love for us to be influenced by them. But Americans are more commercial. If you don't pay, you don't get it."

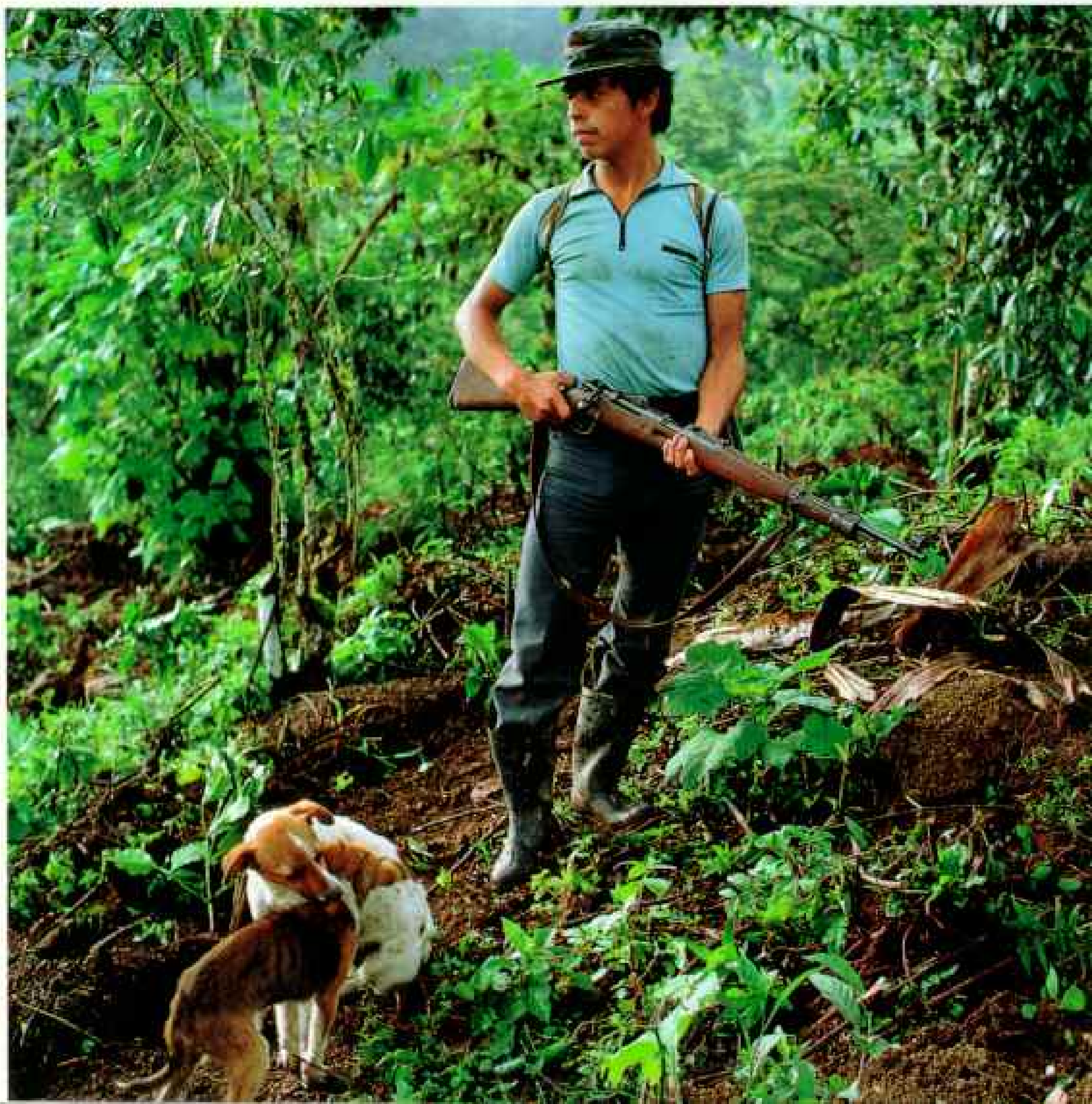
GUATEMALA was born in the violent clash of Spanish conquistadors and a Maya-speaking highland civilization. By the time Cortés conquered Mexico in 1521, the classic Maya culture of the lowlands had already been defunct for 600 years. Its sophisticated cities—vast Tikal, El Ceibal, and dozens more—had crumbled, nearly forgotten beneath the ravenous lowland forests.

One of Cortés's most flamboyant lieutenants, a brash redhead named Pedro de Alvarado, marched into what is now the Guatemalan

highlands in 1524, bent on conquest. Combining bravery, ruthlessness, and duplicity, he deftly played the rival Indian tribes against one another. A decisive victory came in battle against the massed warriors of the Quiché tribe at a river in western Guatemala that they afterward came to call the "river of blood." Nearby, legend says, Alvarado faced the great Quiché leader Tecún Umán in hand-to-hand combat. Only one man walked away, and it was not Tecún Umán.

The effects of that conquest remain. Some 55 percent of Guatemalans are pure Indian, only 0.5 percent pure European, and almost 45 percent *mestizo*, a mixture of Indian and European stock. But racial distinctions matter less than cultural ones. The word *ladino* was coined to describe anyone who has become "Latinized," adopting Western clothing, mores, and ideas, regardless of whether he is racially Indian or mestizo. Thus the word Indian can be a tricky one in Guatemala, meaning, according to its context, someone who thinks and acts like an Indian or merely someone who is of Indian stock. Complicating this etiquette still further, some Guatemalans of European ancestry will take offense if called ladinos, reasoning that because they were born to their Western ways, there is nothing for them to have been Latinized from.

FOR SEVEN WEEKS I traveled the length and breadth of Guatemala, visiting 20 of its 22 departments, trying to understand the character of the place and learn where it was headed. I met farm workers and coffee planters, shop foremen and industrialists, bishops and country priests, soldiers and scholars. Everywhere, I encountered the unexpected.



Hearing marimba music one morning in the Parque Central in Retalhuleu, on the steamy south coastal plain, I followed the sounds to a practice hall two blocks away. There a band of seven men, lost in their art, hammered out the traditional melodies with fiery obsession. At a sugar mill called Madre Tierra, Enrique Guevara walked me through each stage of the noisy, steamy, hellish process by which fresh-cut cane is transformed into hundred-pound bags of granulated sweetness.

Near Palín I hiked the slopes of Volcán de Pacaya, one of Guatemala's several active volcanoes, as it puffed and coughed gray ash onto the surrounding homes. Returning to Guatemala City at rush hour, I glimpsed at first hand the every-man-for-himself approach Guatemalans take to social obstacles. A truck had overturned on the four-lane road, blocking inbound traffic. Drivers quickly grew

Protecting their own, campesinos on Finca La Perla (below left) formed a defense force to guard against guerrilla attacks that have taken 20 lives. In most villages protection is provided by army-controlled civil patrols, into which nearly a million peasants have been conscripted. On 11,000-acre Finca La Perla, owner-administrator Enrique Arenas Menes (bottom) and his brothers made their workers 40-percent shareholders. Their innovative model is an exception in a country where some 3 percent of the population owns half the farmland.

A different approach is advocated by Father Andrés Girón, here christening the first child born in a settlement created by his National Association of Peasants for Land. This group, some 100,000 strong, uses nonviolent tactics to urge communal settlements for landless peasants.

impatient, crossed the median, and raced up the other side. It worked for the first few, of course, but soon the result was chaos, as opposing lanes of traffic faced each other with no place to go. It took the police an extra couple of hours to untangle the snarl.

Around Jutiapa, a remote one-story ladino town in the country's seldom visited *oriente* region, where even in the best of times tempers run hot and blood feuds seethe, I witnessed the soul-destroying effects of a withering drought, as people sat by the roadside without hope and without spirit.

In the market outside the glittering white shrine of Esquipulas, I bought bite-size tablets of "pregnancy clay," embossed with the image of Jesus, two for a nickel. "When the woman wants a child she eats this," the shopkeeper assured me, "and the man too, one each day." And does it work? "*Bueno!*"

Guatemala's variety was always close-at-hand. An hour's drive above the arid valley of the upper Motagua River, where cactus thrives, the high misty forests of Verapaz shelter the endangered quetzal bird, whose iridescent red-and-green plumage is considered the most beautiful of any winged creature. In these mountains San Carlos University has set aside a biological preserve where visitors, following several miles of well-maintained trails, can try their hand at sighting this shy symbol of Guatemalan liberty.

Another hour or two down the Motagua Valley, by contrast, led me to the tropic torpor of the Atlantic lowlands, where Del Monte, successor to the much criticized United Fruit Company, exports two billion bananas a year from plantations that stretch for miles. From nearby Lago de Izabal, a freshwater inland sea, local rancher Rick Bronson and I set out in his small motorboat across El Golfete, where sharks have occasionally been sighted. There we were caught in a sudden afternoon wind that roiled the lake waters into four-foot swells; when at last we rounded the shore into the sheltered Río Dulce and caught our breath, he said, "Congratulations. You've just had an absolute repeat of Cortés's journey."

The great conquistador, having come down from Mexico in search of a lost colony on the Guatemalan coast, unwisely tried to lead his party across El Golfete in canoes. Winds turned their voyage into a harrowing one too. "We were in danger of being lost," Cortés later wrote the king of Spain, "but it pleased Our Lord to bring us safely to land."

The Río Dulce, meandering through deep limestone canyons draped with hardwoods and lianas, teeming with egrets, pelicans, and other aquatic birds, led us to the seaside town of Livingston. Unlike every other place in Guatemala, it has large numbers of blacks, descendants of Carib Indians and African

Golden crop of coffee beans drying in the sun constitutes the leading farm export, grown mostly on large plantations. Though the nation produces a surplus of meat as well as extensive commercial crops, inequities ensure that more than half the children under five are malnourished.

slaves. It has the character of a West African village. Trails lead off into the jungle and music emanates from every door. The women wear head scarves; the men mostly relax, resting up from long stints of working overseas. But the stories I had heard—that it is a matriarchy, that its women speak a language incomprehensible to the men—are just myths, University of Maryland ethnologist Nancie González told me later.

NEAR COBÁN I followed a winding dirt road to Sarraxoch (rhymes with coach), one of the "model villages" in the "development poles" established to resettle rural farmers and frustrate guerrilla activity. It was a tidy planned community, with wooden houses, a school, and an air of permanence. Indians from five villages had been relocated there after their homes were ravaged by repeated army and guerrilla incursions. Catarino Cu invited me into the town office, where a yellowed U. S. newspaper article by Jeane Kirkpatrick ("The Communists Violate Human Rights") was taped to the wall. "We have some land here," he said, "but most of us still farm our *parcelas* near our original communities. For some that means a walk of an hour, each way. But on balance this is better, because it's safer. The army was withdrawn last year."

At Paxcamán, in the Petén, I stopped by the roadside to chat with members of a civil patrol. Such patrols proliferated during the presidency of Efraín Ríos Montt, a general with a reputation for rectitude and personal honesty who came to power in the darkest days of 1982; I talked with many Guatemalans who credit him with turning the tide against the insurgents and steering the country toward eventual democratic rule. In Paxcamán there were nine 20-man patrols, each expected to protect the village for 24 hours every nine days.

"It's fine if we have nothing else to do," one middle-aged man allowed. "But if we have work to do, farming, it's not so nice." Said Margarito Morales, who had served in the patrols since they began in March 1983, "Thanks to God we have had no problems with guerrillas here. *Nada, nada.*"

"It is not completely voluntary," one young man later confided to me, out of earshot of the others, "but it is a matter of protecting our small town."

Underneath the patterns of daily life I found the ancient rhythms and whimsical oddities of Guatemalan popular culture largely unchanged. Rounding a bend in the road near the brickmaking village of El Tejar, I came upon a crowd of two or three hundred people blocking both lanes of the Pan American Highway.

An auto wreck? Bandits from the hills? I approached with caution.

Tinny music blaring from a sound truck told me this was no wreck, and no band of highwaymen either. Smiling and laughing, the crowd completely surrounded a group of masked dancers whose vivid costumes beggared description: clowns, space cadets, teddy bears, cartoon characters. The dancers had formed an oval and shuffled slowly around in time to the music, shifting their weight from side to side.

Four implausibly tall figures towered above the diminutive Indians. One seemed to be a 12-foot-tall woman in a purple dress, another a mustachioed man in a flowing robe; but their faces were of plaster, and their clothing was draped over wooden frames that rested on the shoulders of four perspiring members of the troupe.

These figures, I was told later, were *los gigantes*—the giants, the feature attraction in this road show of merrymakers. They accosted passing buses, cavorting outside the high windows, evoking grins and applause. Despite the ill-concealed hands and faces of the men who carried these weird figures, the illusion was successful. The masks, not the men, seemed real.

At Zunil, a farming village in the western highlands, a very different experience awaited me. The Samalá River Valley is partitioned into hundreds of tiny vegetable plots, meticulously terraced, whose owners irrigate them by hand using a long wooden paddle with an open box fastened to one end. In one continuous motion they scoop water into the box and twirl it in 20-foot arcs onto their crops. So intricate are the irrigation channels that no part of the field is more than a paddle's pitch away. As I gazed down the valley, I saw dozens of men, each moving to a steady rhythm of his own, filling the air with shimmering arcs. It was a scene of timeless grace.

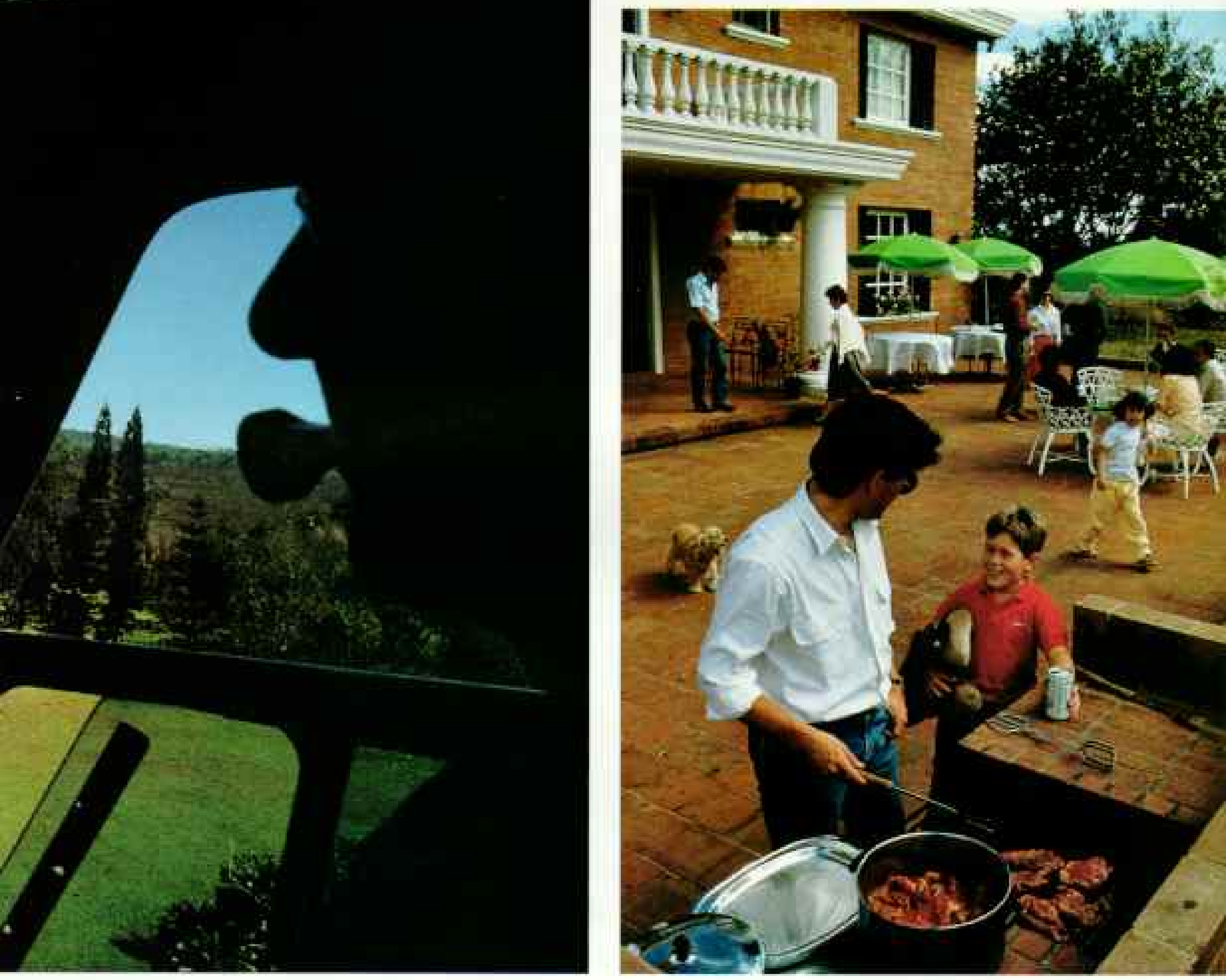
On a narrow cobbled street high above Zunil I paid a call on a village curiosity, a much venerated department store mannequin known as San Simón, who has a cult following in many parts of Guatemala.

Impassive and smug, San Simón sat on a high wooden chair in a bare concrete room ablaze with candles, dressed in a business suit, gloves, dark cowboy hat, and dark glasses. A radio in the background played country and western music, entertainment for two men in their 20s who kept watch over the mannequin during the intervals between visitors.

A young man and his wife—he in ladino garb, she in traditional Indian dress—arrived as suppliants, carrying candles and a flask of a fiery distillation called *aguardiente*. She knelt beside the idol, resting her head on his arm in a gesture innocently seductive; her husband methodically tapped the candles on the tips of San Simón's polished shoes, whispering secret prayers. After a few minutes they arose. Aided by one of the keepers who stepped forward to tilt the chair, they emptied the rum into the idol's mouth, where it gurgled down into a hidden container. Reverently, they added the discarded bottle to a glistening heap of empties in the corner.

DURING Holy Week Guatemalan religious expression reaches its highest intensity. By Thursday shops close; traffic vanishes; Guatemala City is as deserted as a U. S. city on Christmas Day. Driving westward from the capital, I turned onto a dirt road leading to the obscure village of Santo Domingo Xenacoj. An elaborate costumed procession had just begun. I was the only outsider in the town.

The dusty streets were strewed with fragrant green pine needles, and the air was thick with incense. Two aged men led the way, one playing the *chirimía* flute, the other beating a bass drum carried before him on the back of a small boy bent double by its weight. Behind them were the dignified Indian elders; the first held a silver monstrance, vessel for the



Flying his own helicopter, a landowner visits a family finca near Fuego volcano. In Guatemala City the international style of the well-to-do shows in shirt-sleeve informality at a cookout in businessman José Schlosser's backyard.

eucharistic bread and hence a symbol of authority, and the second a silver cross. Heavy floats depicting the Virgin Mary, the suffering Christ, and other saintly figures passed slowly by, borne on the shoulders of villagers. A chorus of women sang into a microphone held by a priest walking in front of them, their voices amplified by a stereo set underneath a float.

Rambunctious adolescent boys in white robes played the part of saints, wearing hand-lettered metal halos ("San Andrés," "San Bartolomé") fastened around their heads. Bringing up the rear, a three-wheeled, gasoline-powered electric generator on an extension cord provided the current for the lights and sound.

Late in the day the old chirimía player yielded his place to another and sought me out. "Come back tomorrow," he smiled, resting his hand on my shoulder. "It will be even better then."

On Good Friday some villages in the Indian highlands reenact the Crucifixion itself, tying a surrogate Jesus to a cross. But the grandiose processions in more orthodox Antigua Guatemala are the most renowned of all. Immense hand-carried floats, magnificent patterned carpets made of colored sawdust painstakingly sifted onto the streets, Roman soldiers, spear-carriers, a cast of thousands—it is a real-life Cecil B. DeMille epic. Surging crowds jam the city from dawn to dusk.

I stayed awhile to watch, but then I decided to take the old flute player's advice and go back to Xenacoj, just 30 minutes' drive away.

"Their beauty was . . . the beauty of witches," wrote traveler Paul Theroux of Guatemala's menacing volcanoes. Fuego and, beyond it, Pacaya are among four now

active in one of the world's most violent geologic areas. The 1976 quake destroyed 58,000 houses in the capital alone, while wracking more than 300 villages.

The villagers greeted me like an old friend.

Overnight these streets had been laid with colored sawdust carpets too—some of them four blocks long. The crowd knelt and prayed as the procession reached each station of the cross. At the sixth station the old flute player himself came over to shake my hand. "See," he said proudly, gesturing toward the reverent throng and the carpet that stretched into the distance, "what did I tell you?" I left Xenacoj much moved; the little village seemed a window to much that was simplest and best in the Guatemalan soul.

From the dreamlike world of Guatemala's traditional life, I returned with a jolt to the lively ferment of public affairs. The new generation rising to power in government and business is trying, cautiously, to deal with problems that baffled their elders: Recovering from war, nurturing democratic institutions, addressing volatile issues of labor and land ownership and taxation, forging a sense of nationhood among a fiercely individualistic people.

"There was but one side to politics in Guatimala," wrote J. L. Stephens, a sharp-eyed observer whose classic work, *Incidents of Travel in Central America, Chiapas, and Yucatan*, appeared in 1841. "Both parties have a beautiful way of producing unanimity of opinion, by driving out of the country all who do not agree with them."

By modern times the process had been simplified even further, with opponents being disposed of on the spot. Against this background, President Cerezo's appeal to "change the way we discuss problems and resolve them" takes on special meaning. "In the past," said Roberto Alejos, the 27-year-old congressional deputy from Jutiapa, "if you said something bad about another party, you might be killed in two or three days." Now Guatemalans are learning to agree to disagree. "Members of different parties can sit at the same table for hours and hours, we can even have lunch together," Alejos told me.

The Congress itself is a fragile institution. As in most Latin American countries, it is executive power, not legislative power, that traditionally commands respect. The president's National Palace is the imposing focal point of the capital, approached across a wide plaza that it shares with the cathedral. By contrast the unimpressive congress hall sits a few blocks away on decidedly unfashionable Ninth Avenue, sandwiched between a costume jewelry shop and a photographer's studio.

In a corner suite at the National Palace, Ana Catalina Soberanis, then minister of labor, grappled with the day-to-day problems that most affect ordinary Guatemalans. An attentive, birdlike woman who began her political career as a student activist, she showed me the morning's employment statistics for Guatemala City—as revealing for their categories as for their numbers: "7.4 percent, no work of any kind; 17.2 percent, part-time work, underemployed; 11.4 percent, workers who are underpaid." In Guatemala underpayment is a relative thing. The average minimum wage in industry is 5.80 quetzales a day—not an hour. Lunch at McDonald's—a Quarterpounder, fries, and soft drink—costs 4.16 quetzales.

I FIRST SAW Father Andrés Girón, the current leader of Guatemala's land reform movement, as he led a demonstration to the National Palace, striding dramatically in his white cassock across the great plaza, straw-hatted campesinos respectfully in his wake. Later I met him in person.

"Land is an old problem, not a new one," he told me. "In my parish, Nueva Concepción, huge amounts of land have been taken by the rich, and they planted *cotton!*" He fairly spat the word. "For the Indians, work was a communal thing, but the Spanish introduced all this legal stuff they call private property, which is a sacred cow for the capitalist system. We do not believe in that. What we are trying to do is get back the land and give it to the people to use as they used it before."

Despite his fiery talk, Girón has moved carefully, seeking to obtain fallow lands and government-owned acreage for his followers through legal means. He has shown ordinary farm workers that they can speak up for their interests without evoking the wrath of the government, no small achievement here.

"When the land belonged to the Indians," he went on, "it was paradise. You see, if you

Fragile designs of sawdust and flower petals will vanish beneath worshipers' feet in a Good Friday procession in Antigua. Baroque churches and ruins from frequent quakes—one of which in 1773 ended its reign as capital—give the city a colonial atmosphere.

go to an Indian village, when they plant corn or whatever, they always have some rituals. They see the Mother Earth giving birth. The Spanish took away our Mother. We must go and look for Her and get Her because we need Her."

When the Catholic faithful hear such words, I thought, their confusion must be very great. I asked Father Ventura Lux Herrera, the Quiché-speaking young priest at the church in Chichicastenango, where ancient Maya rituals are performed on the church steps and colorful feathered images are brought into the sanctuary, how he reconciled the Indian culture of his flock with orthodox church doctrines.

"It is one of the greatest challenges we have," he said. "In the past there was no respect for the Maya ritual. Their priests were considered sorcerers, just because they had a different world view and a different conception of God. Now we are trying conciliation among the two ways of thought." When I attended the Saturday night Mass, marimbas enlivened the service; and the sermon, like the singing, was in Quiché.

FOR GUATEMALA the Indian is the central, insurmountable fact. Outwardly meek, to all appearances a conquered people, the Indians have inwardly kept the values of late Maya society.

"We have two cultures sharing the same territory but not sharing the same cultural values," says Professor Juan Bendfeldt, echoing the view of many other Guatemalans. The gulf has persisted for close on five centuries. Indian and ladino live side by side; but in their traditions, their language, their dress, and their attitudes toward social obligation and

Cultural tides of the Caribbean lap the northern coast near Livingston, the only town of Guatemala's black Carib minority. Fishermen and sailors who speak an Arawak language as well as Spanish, they derive more from the West Indies than from the rest of Guatemala.

moral order, they inhabit two different psychic universes.

Partly by choice and partly because he often had no choice, the Indian has distanced himself from Guatemalan society. "When Alvarado came, he defeated the Tzutujiles near what is now the town of Santiago Atitlán, which was given the name of Spain's patron saint," Federico Fahsen, a businessman, told me. "Yet now, today, 30,000 Indians there don't speak Spanish. That's willpower."

"The Indians are incredible entrepreneurs," says Bendfeldt. "Many of the buses are run by Indians. But they can only go so far in improving themselves economically. Past a certain point, personal success becomes a threat to the cultural traditions of their whole community. So they stop—or conceal it very well." An image began to form in my mind of the Indian combining outward docility with an inward refusal to accept European ways, thus guaranteeing himself the worst of both worlds, ensuring that he could be exploited by a social order he elected not to join.

Guatemala's aboriginal tribes are as unassimilated a people as yet remain on the North American Continent. In their view of the world, supernatural powers dwell in natural forces. In the novels of Asturias parochial divinities come alive and dance across the pages, manipulating human actions—Tazol, the god

of dry corn leaves; Cashtoc, the earth devil; Sisimite, the little demon of the fields. Guatemalan doctors trying to promote better standards of health are thwarted by traditional beliefs, such as the view that malnutrition is caused when the spirits of a child's dead ancestors return and kidnap his soul.

Educators express similar frustration. "In this world it's not necessary for everybody to know everything," says an Indian character in Asturias' novel *Mulata de tal*. "A few know and the rest are satisfied with listening to them." Such thoughts and images bear little kinship with the European view of man, with its belief that "ye shall know the truth, and the truth shall make you free."

Demetrio Cojtí, a Kaqchikel Indian from Chichicastenango, spent seven years at the University of Louvain, sponsored by Belgium. Now he teaches courses in communications at San Carlos University. He speaks in a softly modulated voice, as Indians do; but he talks with his hands like a Belgian.

"In practice, the government wants the Indian to become Westernized and abandon his traditions," he says. "This is contrary to what we want to do. In Europe they did not require me to give up or hide my ethnic identity."

His aim is acceptance of a multilingual, multinational Guatemala. "The need to know Spanish should not be an excuse to make our languages disappear. In March of 1987 we had a congressional hearing to advocate a Mayan Academy of Languages, to adapt scientific and economic terms into the Mayan tongues."

HOW DOES A COUNTRY with such separate cultures function as a nation? I posed that question to Jorge Skinner-Klée, former foreign minister and an important figure in politics for more than 30 years, a man whose ancestors were prominent Guatemalan merchants when J. L. Stephens came through a century and a half ago. His answer was succinct: "It doesn't, does it?"

President Cerezo has appealed more than once for his countrymen to think of themselves as a nation, to change their values and attitudes "so that a few years from now, any Guatemalan can say: I am part of this country."

It is a tall order. When I asked him how democracy could succeed in a country without a common culture, or even a common language; without widespread education, ownership, and a stake in society, he answered, "Because we do have one thing in common—even if you are illiterate, you know what you need: freedom and economic development."

A burden of faith brings Julian Rivas Martínez on an annual pilgrimage with his mother, Silvestra, to a Catholic festival in Chajul. For 13 years he has brought her here to pray for her health. Only a miracle could cure her; but Guatemala is a land that believes in miracles.

I hoped he was right, but the willingness to unite together as a nation may come harder. After a time I began to think Guatemala's deepest problem is that its people trust one another so little, that in the every-man-for-himself attitude of its society, no one gives an even break because no one expects it.

The West Indian writer V. S. Naipaul wrote that "the politics of a country can only be an extension of its idea of human relationships." If that is true, building a sense of nationhood may be the toughest challenge of all for Guatemala's fledgling democracy.

THESE THOUGHTS were on my mind one night in Sayaxché, an isolated, end-of-the-line town deep in the Petén. Linked by a ferry and a rutted dirt road to Flores, two hours' drive away, it clusters along the far bank of the Río de la Pasión, on whose green waters 80-foot handmade canoes still ply trade routes that were old in Maya times. Sayaxché is the sort of place where the electricity comes on at dusk and shuts down at ten, a place where a two-dollar room is the best in town. At sunset, when the ferry quits and the arrow-straight dusty road to Flores dissolves into twilight across the way, you feel that the endless Petén, which swallowed the Maya, has also swallowed you.

The town at night is crickets, music, voices: the jukebox at El Oasis, the parishioners at the church, the hum of insects whirring in the dark. As I lay on my cot, disentangling the ragged hymns from the wails of country rock, the music itself seemed to fade away; and what came back to me, dreamlike, sharp as a thorn, was little Julio, playing his newfound harmonica in the wastes of Guatemala City.

Ex nihilo, I thought, out of nothing, hope. Like his country. When everyone thought Guatemala was bound for more pain and sorrow, Guatemalans had surprised the world. Perhaps they can also surprise themselves. □

At the climax of the American Revolution, Lord Charles Cornwallis —facing combined United States and French forces—scuttled ships in the York River to prevent a naval assault on Yorktown, Virginia. Now archaeologists unlock the secrets of a

Yorktown

By JOHN D. BROADWATER

Photographs by BATES LITTLEHALES
NATIONAL GEOGRAPHIC PHOTOGRAPHER

Shipwreck

PAINTING BY ROY ANDERSEN

The desperate act of Cornwallis made possible a rare look at an 18th-century transport, the most complete of nine wrecks located by the author and his team.

CORNWALLIS, 1783. THE MARINERS' MUSEUM, NEWPORT NEWS

THE SAILOR stumbled backward, trying to avoid the cold water spewing from the hole he had just cut through the ship's side. She was an ordinary transport and supply vessel chartered by the British Navy, but to him she was his home, his job. He swept a last look around the hold, then joined his mates in a small boat waiting alongside. As the ship settled slowly into the soft sand, the sailors pulled toward the nearby shore.

Along the beachfront of Yorktown, Virginia, the scene was being repeated. Already many ships had slipped beneath the surface, their masts and yards jutting above the choppy water like the remnants of some great drowned forest. The sailor glanced over his shoulder. Far down the York River lay French men-of-war—the enemy.

The date was September 16, 1781. Within a month at least 50 British ships would lie at the bottom of the river off Yorktown, some sunk by cannon fire, others intentionally sacrificed to block a French landing or to keep them out of enemy hands. The loss of that fleet was to help change the world and secure a new nation—the United States of America. American strategy and French naval power had combined to defeat the powerful British Army in the South under Lt. Gen. Lord Charles Cornwallis in the last major battle of the American Revolution.

Two centuries later the drama of that historic event came home to me as I dove 20 feet down to the bottom of the York River. For five years I had directed a small team in an archaeological study of one of those sunken ships, and now I was using a suction device to remove mud and silt from her hull. Remains of the lower deck had just been dismantled, and I was working below that, inside the hull on the starboard side.

In one spot I noticed a heavy collection of oyster shells. That drew my attention; the clay under the lower deck was usually a uniform gray, and I wondered how the shells had gotten inside. I dug deeper and was startled to find that a rectangular hole had been cut through an inner plank just below the deck. The opening, one foot long by six inches wide, had been neatly cut with a chisel. *(Continued on page 811)*

PRESERVED under five feet of silt, a damaged gun carriage came to light during excavation of the vessel, a 75-foot, 170-ton collier built in England and hired for service in the Revolutionary War. Most working guns from scuttled ships had been transported to land fortifications.

The Siege of Yorktown—1781

SEA POWER was crucial to the British; the rebels controlled the hinterland. After six years of winning battles but not the war, London sent an army to the South, believing that Loyalists there would come to its aid. But the Carolinas would not be subdued, and Cornwallis retreated to Virginia. In August 1781, with 8,300 regulars and as many as 2,000 escaped slaves who believed British victory would mean freedom, he began defensive earthworks around Yorktown and Gloucester Point (below).

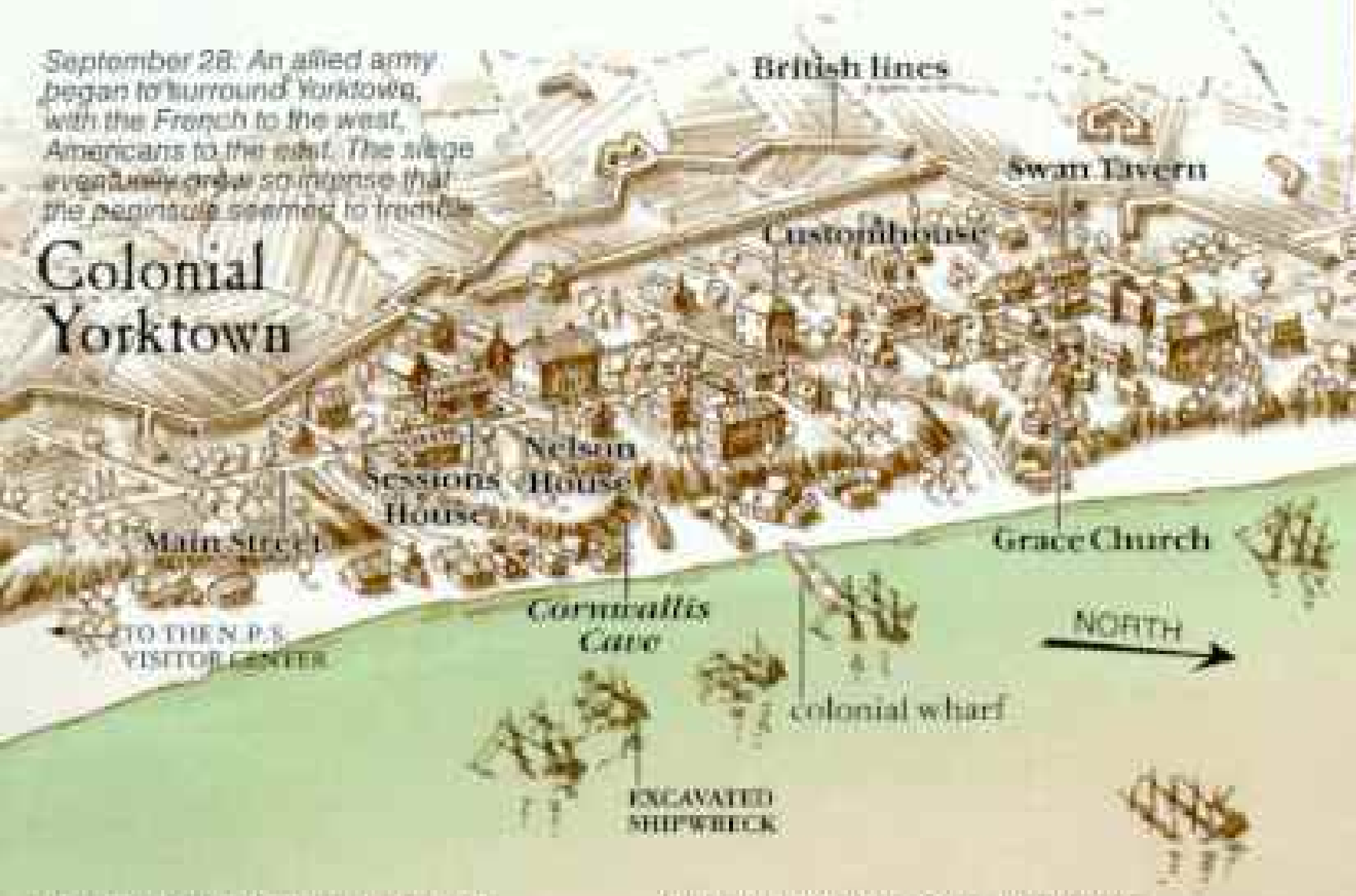
France—England's longtime foe—had dispatched warships toward Virginia. Gen. George Washington and the French commander, Comte de Rochambeau, were marching south from the Hudson Valley. The vise was tightening. Alerted, a British fleet sailed from New York with reinforcements.

This French battle plan (right) maps the French blockade across the mouth of the Chesapeake and the Battle of the Capes. When the British fleet arrived off the Virginia Capes on September 5, it found 26 French warships anchored "promiscuously" in three straggling lines. Instead of attacking immediately, Rear Adm. Thomas Graves—true to the rules of 18th-century warfare—waited while the French formed their battle line. The fleets cannonaded each other for two hours until sunset without a decisive outcome. After five days Graves—outgunned and unnerved—withdrew to New York.

The more than 60 British vessels at Yorktown now took defensive positions. American and French regiments numbering 17,600 men surrounded Cornwallis's army, and the siege began. On October 19 the British surrendered. The Revolution was won.

Colonial Yorktown

September 28: An allied army began to surround Yorktown, with the French to the west, Americans to the east. The siege eventually grew so intense that the peninsula seemed to tremble.

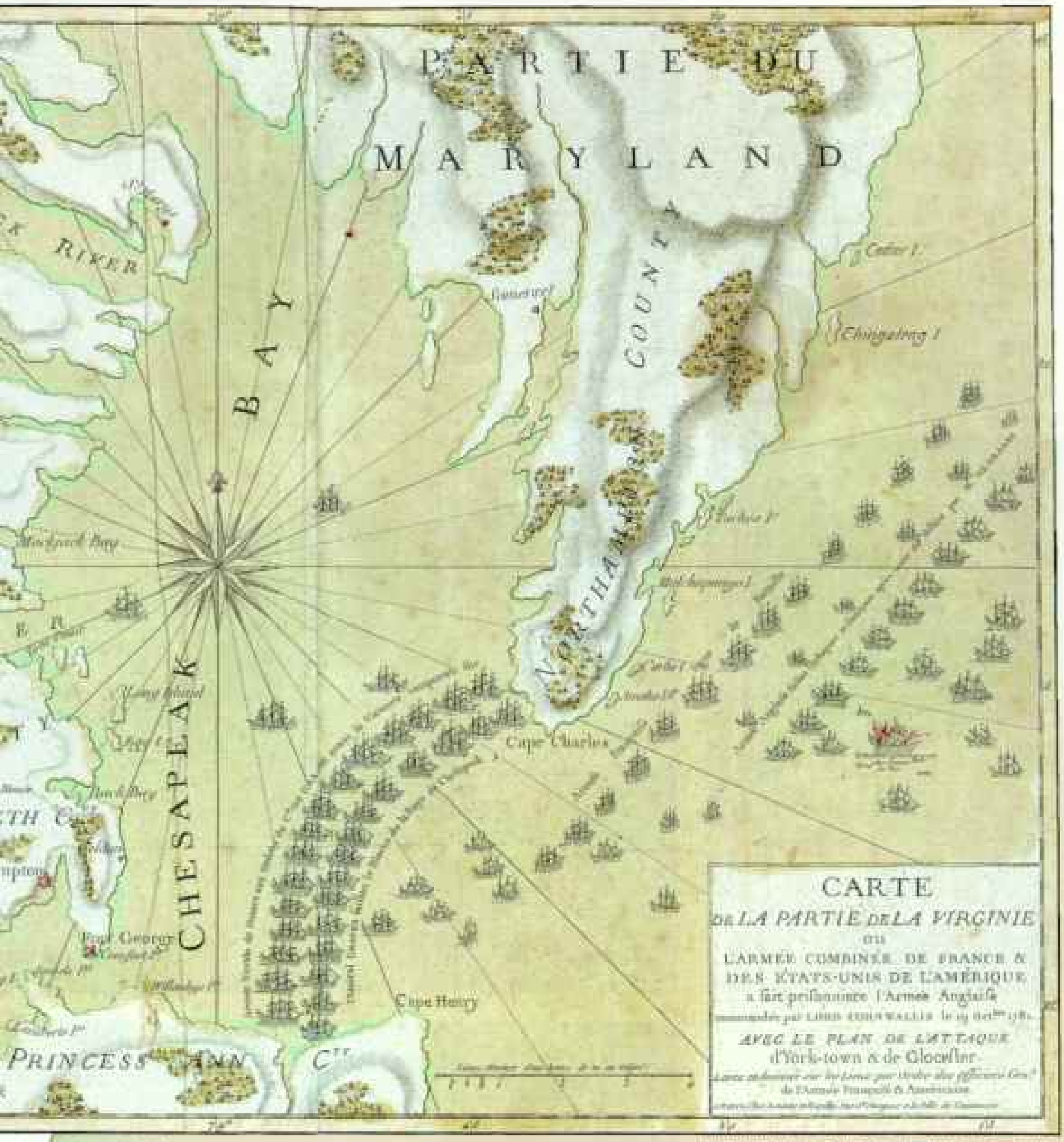


Illustrated ships indicate position of the nine vessels located by author.

NGS CARTOGRAPHIC DIVISION
PAINTING BY CHRISTOPHER A. KLEIN

At the height of the siege Cornwallis and his officers reputedly took shelter under high bluffs in what is today known as Cornwallis Cave.

September 16: "Ten or twelve large merchant ships have been sunk before York, and piles have been driven in front of these vessels, to prevent our ships from approaching the Town sufficiently to debark Troops," a spy reported to Washington.



Virginia plans to display artifacts from the recent excavation at the Yorktown Victory Center.

October 16: British soldiers attempted an escape to Gloucester, but a violent squall drove all boats downriver. The next morning Cornwallis sent a drummer boy to signal his readiness to parley.

Nearly a mile long, a double-span highway bridge built in 1952 links Yorktown to Gloucester Point.

Gloucester Point

October 10: Largest warship at Yorktown, the 44-gun Charon was set ablaze by red-hot shot from the French battery. She drifted to the Gloucester side and sank. Artifacts from Charon are displayed at the National Park Service's Yorktown Visitor Center.

Excavating an instant in time

THE SCUTTLE HOLE in the inner starboard planking of the collier (right) emerged as author John Broadwater brushed away gunpowder-fine silt. A deck support that roofed the hole had rotted away. A foot beyond, he exposed an opening in the hull. Because the holes were carefully cut, he believes a crew member skilled in carpentry executed the task, punching out the chiseled hole in the hull (above) before going topside to flee the slowly sinking ship.

An empty tool box lay upside down in the hold (right). Scattered carpentry tools included a gimlet handle initialed "BR," a clue to the identity of the owner.

PAINTING BY ROY ANDERSEN

This, clearly, was how the ship had been sunk. I suctioned more silt from between the frames. Sure enough, a foot away, a second hole similar to the first penetrated the hull planking.

I was certain that a crewman who was skilled in carpentry had cut these holes, first in the inner planking, then reaching through that to the hull. Even in the final act of sinking his ship, he had been true to professional standards. As if he knew we would someday inspect his work, he had cut the openings so neatly that they might have been for a gunport or window—except that they were below the waterline. How hard it must have been, I thought, for a man whose job it was to keep the ship in good repair to use his skills to end her life.

LONG BEFORE I DISCOVERED the holes, this sailor and his work had intrigued me. I had been admiring his skill throughout my years of studying this relic of the Battle of Yorktown.

During five years of surveying before our excavation, we had located the remains of nine British vessels, including H.M.S. *Charon*, the Royal Navy's largest warship at Yorktown. The best preserved of the nine was intact almost to the waterline, with compartments, decking, and stumps of masts still in place. The ship was small, little more than 75 feet long by 24 feet wide. We did not know her name, but because she was so well preserved, we decided to devote all our efforts to her complete excavation.

As Virginia's first state underwater archaeologist, I was in charge of the project. Previously I had spent several years surveying World War II wrecks in the Marshall Islands, worked on the sunken Civil War ironclad *Monitor* off North Carolina, and joined Dr. George F. Bass of the Institute of Nautical Archaeology in his study of ancient shipwrecks off the coast of Turkey.*

We knew that our small ship held valuable clues to 18th-century merchant-ship life and construction, if only we could get at those clues. But the York River is an archaeologist's nightmare, beset by strong and unpredictable tidal currents, near-zero visibility, and persistent stinging jellyfish.

Early in the project we came up with a solution: We would build a steel enclosure, or cofferdam, around the ship that would contain water to preserve the hull but allow the water to be filtered for greater visibility (pages 814-15). The dam would also protect us from jellyfish and tidal currents.

Traditional cofferdams are dry; no "wet" cofferdam had ever been used for a shipwreck excavation. It took three years to design and build, with support from the National Geographic Society, the National Endowment for the Humanities, the U. S. Department of the Interior, and the Commonwealth of Virginia. But the resulting water clarity was well worth our efforts.

The cofferdam and filters improved visibility on the site from an average of one or two feet to as much as thirty. Our first dive in clear water was a memorable event. "For the first time it looks like a *whole ship!*" I said to the others.

We soon found we were not the only occupants of the cofferdam. A number of marine creatures had remained in residence while the dam was being built. The flounder were friendly; one we named Freddy would swim up to our face masks and let us rub his stomach. Foot-long eels were more aggressive; each time we dug a pit, they would claim territorial rights, clustering around the new hole and almost pushing us aside to see what delicacies we had uncovered.

We concentrated on the ship's stern, where the captain's quarters had been. Almost at once we began to find furnishings as well as military and personal items.

One morning two of our volunteers were cleaning a pair of wood planks fastened together by a tongue-and-groove joint. The planks were plain on one side, but when volunteer Bob Byrd turned them over, he found a rectangular pattern of stains and remnants of the raised molding that caused them.

"That's pretty fancy paneling," Byrd said. "I thought 18th-century merchantmen were supposed to be austere."

"Not necessarily," I replied. "I certainly expected this ship to be plain, since it's so small, but we know from historical sources that some cabins were really ornate."

Soon more clues began to surface. Near the paneling we found parts of a mahogany table, several brass hooks (page 820), and the

JOHN D. BROADWATER is a nautical archaeologist with the Virginia Department of Conservation and Historic Resources.

*See "Splendors of the Bronze Age," December 1987.

arm from a fashionable chair—all evidence of a rather elegant cabin. In addition we found more than two dozen unsealed bottles, some of which may have contained wine, or rum purchased from local merchants.

Also in the captain's cabin we found parts of a dome-topped cupboard. The cupboard is of a well-known style but with a practical touch—cutouts on the shelves were designed to hold china in place when the ship was in heavy seas.

WHEN WE EXCAVATED the ship's bow, we came across a giant puzzle—dozens of jumbled logs in a compartment forward of the foremast. The logs were still covered with bark, and many were notched at both ends. What were they used for? I sought out John Sands at Colonial Williamsburg, the recognized expert on the Yorktown fleet.

"Maybe this was a fire ship," he said. "We know the British sacrificed five other ships by setting them afire and sailing them into the French fleet that was blockading the mouth of the York River. British documents from the time indicate that they were prepared to try again."

But why the notches? One of our team suggested that the logs were meant to be joined together to form beach obstructions.

It was a good guess and close to the mark. Further excavation and extensive research revealed the probable function of the logs and of the vessel herself: She was a floating workshop for Cornwallis's forces. We found scores of partly trimmed logs, beams, and planks, most showing no signs of use or wear. We also found large quantities of wood chips. All these were indications that a variety of items were being fabricated for other ships or for land fortifications.

I found support for this theory when I asked David Syrett, professor of history at City University of New York, if ships were used as workshops at that time.

"Of course," Syrett replied. "The British prefabricated materials for land fortifications aboard ships at Havana and Charleston. Then they simply carried them ashore for assembly when needed."

A dispatch also hints at this activity. "The Seamen work with the greatest spirits and exertion in cutting down wood for redoubts," wrote Capt. Thomas Symonds, commander of the Yorktown fleet, to Rear Adm. Thomas Graves, commander of the Royal Navy in America.

The British controlled the York for 30 miles upriver from Yorktown. With little timber available in Yorktown itself, our vessel could have hauled material to bolster land defenses.

SOON WE BEGAN to accumulate personal impressions of the men who had lived and worked on our ship. A team member excavating the bosun's locker saw a golden glow from the dark silt. It proved to be a scrap of yellow silk ribbon from a popular hat decoration called a cockade. How appropriate that it was found in the bosun's storeroom, I thought. I had just read a description of a bosun by English writer John Masefield; it said he usually wore "a low top-hat with a cockade on one side."

Beneath the logs in the forward compartment we found maintenance equipment, including a winch used for making spun yarn, small line used liberally in a ship's rigging. Nineteenth-century seaman and author Richard Henry Dana, Jr., reported that the spun yarn winch "may be heard constantly going on deck in pleasant weather."

In the ship's stern we found the ceramic figure of a monkey, two and a half inches high with a multicolored glaze (page 819).

"Why would someone have this on a ship?" I asked Marcie Renner, our assistant director for conservation.

"I think it was a seaman's keepsake," she answered. "Something to remind him of home. Look at this: It was a whistle, but the mouthpiece has broken off. The ceramic style is strictly English, and monkeys were a common motif in the late 18th century."

The ribbon, the monkey, uniform buttons, small wooden squares that appear to be gaming pieces, a fragment from a glass tumbler inscribed "hard cider"—all these began to paint a picture of life on our little ship.

She probably carried a small crew—just the captain, the first mate, and a handful of seamen. The most experienced sailors would handle the tasks of carpenter and bosun.

The uniform buttons tell us that she sometimes carried troops, but there are no signs of bunks to indicate a lengthy troop-transport mission. More *(Continued on page 818)*

Some stray buttons bore regimental numbers of foot soldiers who may have been transported by the ship. Both the 22nd and the 43rd served in campaigns in Rhode Island, New York, and New Jersey. But only the 43rd fought at Yorktown.

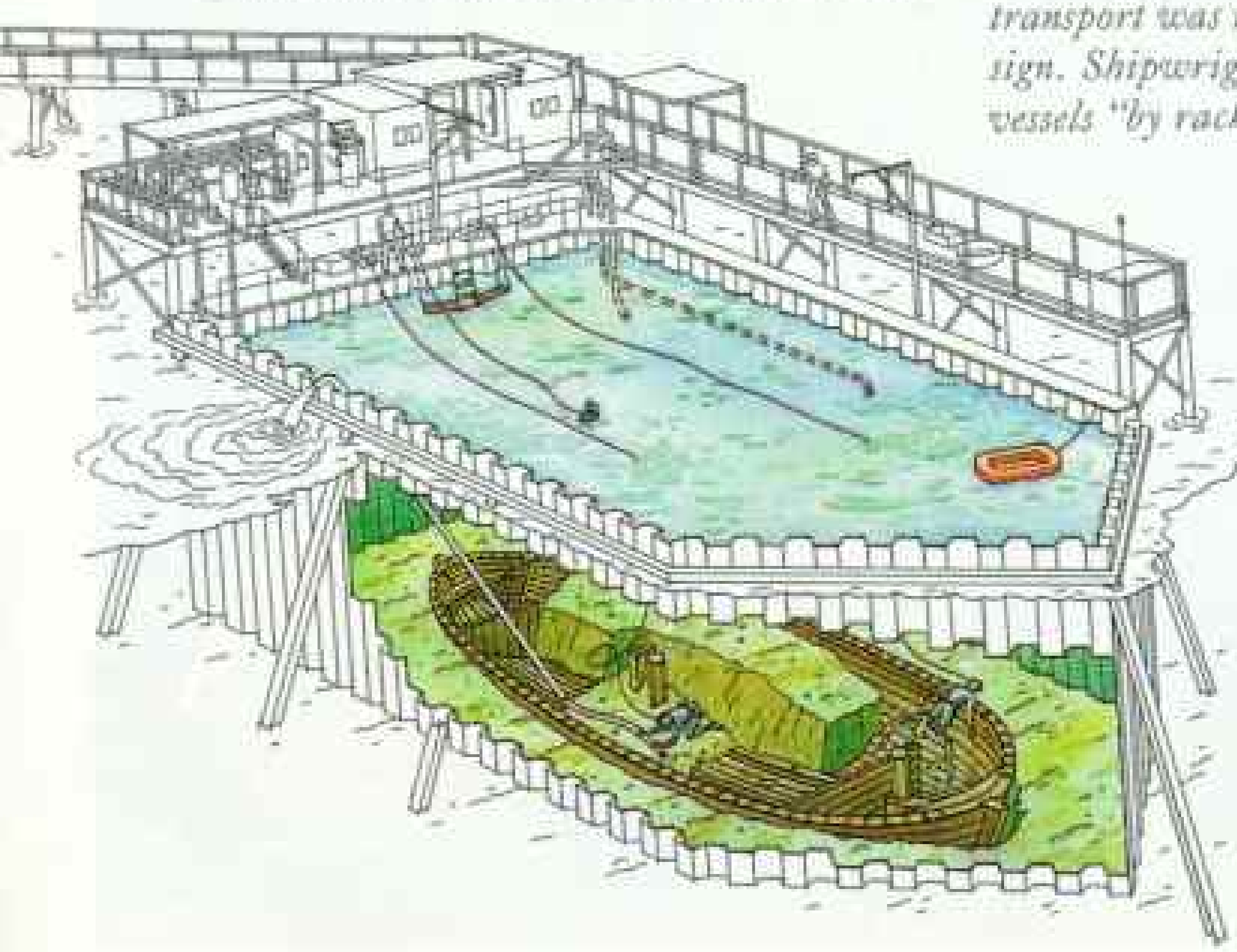
Thirty shoes were discovered in the wreck, along with rims of brass shoe buckles (right) and a chape (above), the back of the buckle that holds the leather strap in place. Glass-and-brass sleeve buttons (right, middle) were common in the period.

IN THE STRONG silty current of the tidal York River, excavation was impossible until an ingenious cofferdam (facing page) was devised. It protects the wreck with 26-foot-high steel walls, creating a calm pool. A pier links the cofferdam to shore. Visibility improved with the installation of a filter system, and excavators—breathing through lines to air tanks on the surface (diagram below)—set to work.

Suction dredges vacuumed blanketing silt, which was strained for small items

before being expelled over the side. The muck that hindered excavation had preserved organic materials, from corncobs to ten-foot logs. Hundreds of feet of rope in various sizes were found, along with this deadeye (above), which was used to tighten the shrouds that supported the masts.

Looking like new, a trestletree assembly that held the upper sections of the masts in place is brought up by the author (above). Comparing ship parts with architectural drawings from the period proved that the transport was not built to any standard design. Shipwrights usually constructed such vessels "by rack of eye."



To produce detailed drawings of the wreck, the team employed SHARPS (sonic high-accuracy ranging and positioning system) to trace underwater points electronically. A computer then created both two- and three-dimensional images. Everything was removed from the site except the hull, which is to be covered with sand.

DIAGRAM BY PIERRE MION

A clutter of casks

THE WRECK held the most complete collection of barrels surviving from 18th-century America—more than three dozen in five sizes. Dubbed "Cornwallis's hot tubs" by the team, two three-foot-wide barrels (above) had burst their hoops. The remains of weevil-infested grain lay in one. Waterproof labels were stapled to each stave before removal.

Buried in sand ballast, three barrels packed with 10,000 lead balls (left) never reached the muskets of besieged British soldiers. Some barrels had held liquids—wine, rum, water. A spigot, here attached to a modern barrel (above), was stuck open.

Demonstrating how the casks from the wreck were made, Kerry Shackelford, a cooper at Colonial Williamsburg (top), dampens an oak cask before placing it over a flame. High heat sets the staves in their permanent form.

A BOUNTY OF BOTTLES—more than two dozen found intact—bore the iridescent patina caused by the chemical deterioration of glass but no identifying marks to reveal their contents or origin. A whistle once stemmed from a Whieldon-ware-style monkey (opposite), possibly a memento from home.

(Continued from page 812) likely she took troops on short hauls, perhaps from Portsmouth, on the peninsula to the south, to Yorktown, where Cornwallis had established winter headquarters.

DEEP IN THE HOLD we encountered sand mixed with stone—the ship's ballast. Cargo would have been packed directly on the sand, which extended several feet up from the bottom of the hold. Small branches and wedges were used to secure items such as casks.

We found few artifacts buried in the sand. However, just to starboard of the mainmast three small wooden casks were uncovered by Billy Ray Morris, assistant director for excavation, and archaeologist Dave Cooper. On his next dive Cooper resurfaced almost immediately. "These casks aren't empty," he shouted over the noise of our compressors. "They're filled with musket balls!"

Carefully we brought the musket balls to the surface and counted them. There were nearly 10,000, and not a clue as to why they were there. Here was a ship with 10,000 rounds aboard, and there on land—some 500 feet away—were British soldiers preparing for a siege. It didn't make sense.

"Maybe they overlooked the casks in the darkness and clutter of the hold," archaeologist Bruce Terrell suggested. Certainly it was not an oversight they would regret. The British held ample ammunition when they surrendered; it was the lack of food that hastened their downfall as superior American and French artillery fire battered their fortifications.

THE CARPENTER was becoming more alive to me each time we found an item that testified to his daily routine and resourcefulness. There was an empty overturned toolbox, then a bevel—a tool used for measuring angles. The bevel had a split arm, which had been so neatly mended with small nails that we didn't notice the break at first. There was a broken oar, cut down for use as a paddle, and also, of course, the tidy openings cut to sink the ship.

In the stern we found the handle from a small drilling tool called a gimlet, stamped with the initials "BR". Were they the carpenter's? I like to think so. If we can locate the name of the ship in British naval records, we may also be able to determine her last roster, and learn BR's full name.

One day I encountered a wooden tool handle in the sand ballast. It was standing upright, with the encrusted remains of the head of the tool lying underneath. Although the head was badly deteriorated, I could see it was an adz, used for shaping timbers. As I worked my way aft, I began uncovering wood chips, shiny orange against the dull sand. About two feet from the adz I uncovered a short log, cut square on one end but with bark still intact on the other.

I swam back a few feet, then took in the whole scene. I could envision the carpenter bent over the log, smoothing its upper surface with practiced strokes. He had partially buried the log in the sand to hold it steady. Chips flew. Then something called him away. Was it the order to scuttle the ship? He set his adz down, and his shoes pressed some of the chips into the sand. Now, two centuries later, they were still there.

I paused a moment, imagining how life had led him to this place. He was probably an experienced seaman and obviously took a serious-minded approach to his work. Perhaps he hailed from Whitby in northeast England, where—like the famous explorer Capt. James Cook—he learned seamanship aboard the sturdy ships that strove to satisfy London's ravenous appetite for coal. We know our ship once carried coal; we found hundreds of pounds of it loose in her bilges.

My daydream ended abruptly as a diver swam past me on his way to excavate a barrel. Scattered about the hull, primarily in the bow, were dozens of wooden containers ranging in size from small tar buckets to a pair of barrels so large we called them "Cornwallis's hot tubs."

"Historical sources give us clues to how barrels were *supposed* to be made in the 18th century," Kerry Shackelford, a Colonial Williamsburg cooper, told me. "But we've never known how tradesmen *really* did it because we never had many barrels we could date. Now we do."

Kerry pointed to some of our staves. "Look at these," he continued. "Staves were usually made from split wood and rounded with a drawknife. But this stave has some saw marks on it. I've never seen this before. Whoever did it was probably making a barrel for some goods that didn't need to be tightly sealed.

"We know from British records that the government was complaining about the barrels supplied to the army. Barrels of peas, for example, were bursting open while being unloaded. So there was obviously some shoddy work going on."

Coopers of the time provided containers for a wide range of commodities, from wine to grain to gunpowder. On both sides during the American Revolution, casks were in short supply and had to be reused whenever possible. Almost all the casks we recovered bore signs of reuse as well as repair; on several barrelheads new markings were branded over old ones, offering clues to contents and origins.

Our carpenter probably left his mark here too; aboard such a small ship the task of maintaining the casks would have fallen to

back draperies in the captain's cabin. The brass handle of a Sheffield pocketknife (below) contained a steel blade that rusted away. Likewise, the blade was missing from the ornate handguard (bottom) of an officer's sword, which escaped the shame of surrender on October 19, 1781.

FEW BELONGINGS *were left aboard the scuttled ship, and of them brass objects best survived the centuries. A rococo hook (above) may have held*

him. Several were repaired with cork plugs that were covered by lead patches nailed onto the staves. A cooper might have fashioned new staves, but the carpenter probably felt that his repairs were just as effective, and faster.

It fell to researcher Linda Brown to make a somewhat grisly yet humorous discovery: Buried in grain at the bottom of one barrel was a rat skull.

"That's the third rat skull we've found," I said. "So much for the old wives' tale about rats always deserting a sinking ship."

SECTION BY SECTION the ship's remarkably intact structure began to take form, as if we were rebuilding her from the top down. In the beginning we encountered badly deteriorated timbers from the upper works, collapsed inside the hull in disarray.

Along part of the starboard side we came upon recognizable features: remains of the lower deck—beams, knees, and planking—still in place.

We also found a strange wooden object, like a giant ticktacktoe board, propped against a partition next to the foremast.

"What on earth is that?" one of our volunteers asked when we surfaced.

"It's a complete trestletree assembly," I said. "Two pairs of crossed arms that support the upper sections of a ship's mast."

Since trestletrees were used in the upper rigging of ships, they are rarely found intact on wrecks. But this one was stowed below and preserved, and because the cross timbers are longer than we expected, we can assume that this ship's upper masts were longer than normal, giving it extra driving power for its heavy cargoes.

The bow, we found, was built almost as a mirror image of the stern, an unusual mixture of standard frames and horizontal timbers that are called transom pieces in the stern and apron pieces in the bow. The technique is so rare that our drawings surprised J. Richard Steffy of the Institute of Nautical Archaeology at Texas A&M University, an authority on ship construction.

"John," he said, "forgive me, but are you *sure* your ship is really built this way? I went through a number of plans for 18th-century British and American ships, and I couldn't find a single example like this."

When the bow and stern were excavated, the ceiling planking was removed so that we could study internal construction and hull shape. Using a variety of computer-aided techniques, we recorded the location of hull features in three dimensions with excellent precision and speed, then began to create site plans and line drawings.

Preliminary hull lines graphically depict what we have known for some time: Though she was small, this vessel was built for maximum cargo capacity. Her heavy construction, boxy shape, sealed inner planking, and the coal in her bilges suggest she was built as a collier, probably on England's east coast.

Colliers are a special, distinctive breed of ship. "Their bows," wrote naval historian Basil Lubbock, "were as round as an apple and their stempiece often a square baulk of timber." Our ship, which fits this description perfectly, seems to be an example of the collier brig—a smaller, two-masted version of what normally in the 18th century was a three-master.

These lowly bulk carriers had their moments of glory. Cook made his historic voyages in colliers, and Capt. William Bligh's *Bounty* also was a converted collier.

Colliers were sometimes preferred over other vessels because of their cargo capacity and shallow draft; they could sit on the bottom of the Thames at low tide with a full hold of coal, waiting to be unloaded in London. Colliers were slow, but they were strong, and these factors probably came into play when our ship was hired by the British Navy as a transport.

We estimate she was 170 tons—below the Navy Board's 200-ton minimum size—but Britain was desperate for ships to maintain its war effort.

Eminent British historian David MacGregor has studied 18th-century merchant ships extensively. Billy Ray Morris asked him: "Our vessel has some unique construction characteristics; what do they tell us about her origins?"

"I'm afraid you'll find that each shipwreck you study from this period is 'unique,' " MacGregor replied, "because there may never have been such a thing as a 'normal' merchant ship. They were all built without plans, using information passed from one shipwright to the next, and even the details of national or local variation are

obscure. You archaeologists will have to tell the rest of us what a typical merchant ship was like."

AS WE NEARED THE END of our excavation, we took stock of what we had accomplished. We have proved that the wet cofferdam can be an extremely effective tool for excavation in murky water. More important, we have learned a great deal about merchant-ship construction and shipboard life, and a vivid picture of our ship has begun to emerge.

We know little of her type because she was an ordinary bulk carrier—the Mack truck of her day—built "by rack of eye" with no plans or models. When merchant ships were required in the 1770s for war with the American Colonies, our ship was chartered by the Navy Board as a transport. Shipowners who leased their vessels—and who had to continue to pay their crews—complained that the rent barely covered expenses.

We have found only part of our ship's cargo and equipment; much of it probably was removed before she was scuttled. On the other hand, Cornwallis's camp had very limited space, and it seems likely to me that only essential items such as weapons, food, and the ship's instruments would have been unloaded.

Perhaps salvage was a factor. With the blessing of George Washington, the French conducted limited salvage operations at Yorktown after the British surrender. And the three-year-old oyster shells attached to the buried timbers of our ship tell us that she was not completely silted over for at least that long after her sinking, so other items may have been removed by local residents during that time.

Our vessel undoubtedly carried food and other supplies and transported troops when needed. Once at Yorktown, she most likely served as a workshop. I like to think that the ship's carpenter was also called upon to serve the fleet and even the army ashore.

The excavation is finished, but our research has only begun. This ship was just a minor participant in a major global event, but now she will be remembered. Now we must move from the water to the laboratory and archives and complete the task of bringing the ship and her versatile crewmen, especially her carpenter, back to life. □

SEVEN OAK STEPS led to the officers' area on the lower deck. The author, gripping a reference grid, found them in the hold (opposite). Still upright, half of a double door with an iron lock likely opened into the captain's cabin, probable site of a fashionable chair, china cabinet, and windows found in the jumbled wreckage. Conservator Marcie Renner measures a window with two panes held in place by brass points. Research may one day identify the names of the ship and her crewmen, who played a role in the last major battle of the Revolution.

Coelacanths

The Fish That Time Forgot

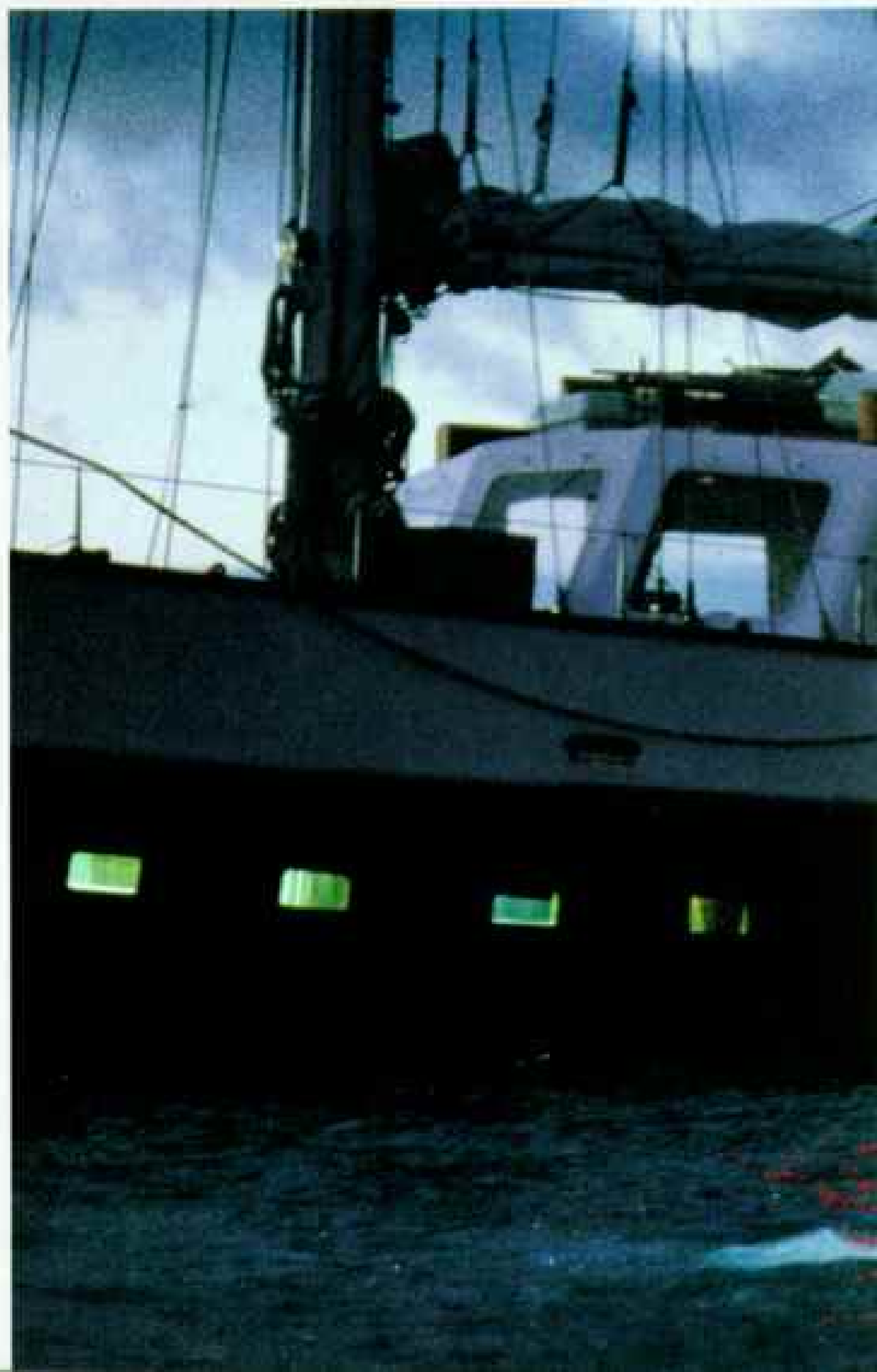
Article and photographs by
HANS FRICKE

A "LIVING FOSSIL," a six-foot-long coelacanth drifts across the floor of the Indian Ocean off the Comoro Islands at a depth of 168 meters (550 feet).

Frozen in stone, fossil remains of coelacanth fish have been identified in deposits dating back nearly 400 million years. No specimen had ever been found less than 60 million years old, leading scientists to believe that coelacanths had become extinct around that time. Then in 1938 a South African fishing trawler brought a specimen up in its nets, and the hunt for another live coelacanth was on.

Last year, using a two-man submersible, my team and I became the first to find and photograph these bizarre and intriguing creatures in their natural habitat—a goal of scientists for half a century.


AFRICA
Grande Comore
COMOROS
MADAGASCAR
INDIAN OCEAN
SOUTH AFRICA
Cape Town
East London
Grahamstown
1000 km
600 mi
10 km
10 mi
Mitsamiouli
Grande Comore
Moroni
Iconi
Dembeni
Site where fishermen have off-loaded coelacanths
Soundings in meters



THE EERIE GLOW of the submersible's interior lights (below) bathes the pilot, Jürgen Schauer, before a night dive alongside our support ship *Metoka*. Our crew made 22 dives in the Comoros before we saw our first coelacanth. We might never have succeeded without the help of island fishermen (left), who told us where they had caught coelacanths on their long lines in the past. Since coelacanths are too oily to be good eating, the hundred or more specimens known to have been brought up since 1938 were caught accidentally in the search for valued food fish. No coelacanth has survived capture for more than 20 hours.

We noted that most coelacanth catches had occurred off the west coast of Grande Comore (maps, facing page). Concentrating on those areas, we measured water temperatures at various depths, searching for levels of 15° to 17°C (59° to 63°F)—the ideal range, according to earlier studies of coelacanth blood. We measured the salinity and oxygen content of the water at all points. In addition we examined the structure of the rugged, lava-encrusted ocean floor, because the shelter it provides could influence the distribution of fish that might be coelacanth prey.

Our painstaking research at last paid off. At 9 p.m. on January 17, 1987, we found our first coelacanth at a depth of 198 meters, 180 meters off Grande Comore's west coast.

The moment capped 17 years of my own research and half a century of study by others, including an expedition in 1972 partially supported by the National Geographic Society. Forty-eight years after that first specimen was caught in South Africa, we had tracked the fish to its native depths and made the first live observations there.

HANS FRICKE is a documentary filmmaker and a marine biologist with the Max Planck Institute for Animal Behavior in West Germany.

EXPLORING A CREVICE in an ancient lava flow, a coelacanth appears to "stand" on its unusual, stalklike fins. Framed in the sub's viewing port under a pair of powerful floodlights, the bulky blue fish seemed oblivious of our presence. Comoro Islanders once used the fish's rough scales as sandpaper.


PREMIO
£100
RECOMPENSE
REWARD

LEGENDARY NATURALIST Marjorie Courtenay-Latimer spotted the first coelacanth in a trawler's catch at the South African port of East London in December 1938. The fish, later mounted, is displayed behind her in the East London Museum (left).

Realizing that she had seen no ordinary fish, the young museum curator sent a sketch to Professor J. L. B. Smith, a noted chemist and ichthyologist at Rhodes University in Grahamstown, South Africa. Smith identified it as a coelacanth, but of an entirely new genus and species from any recorded as fossils. He named it *Latimeria chalumnae* for its discoverer and the mouth of the Chalumna River, where it was captured.

By the time Smith reached East London, the coelacanth's soft parts had been discarded. He launched a campaign to find a second coelacanth, distributing thousands of handbills in English, Portuguese, and French along the eastern African coast and neighboring islands showing a picture of the fish and offering a reward.

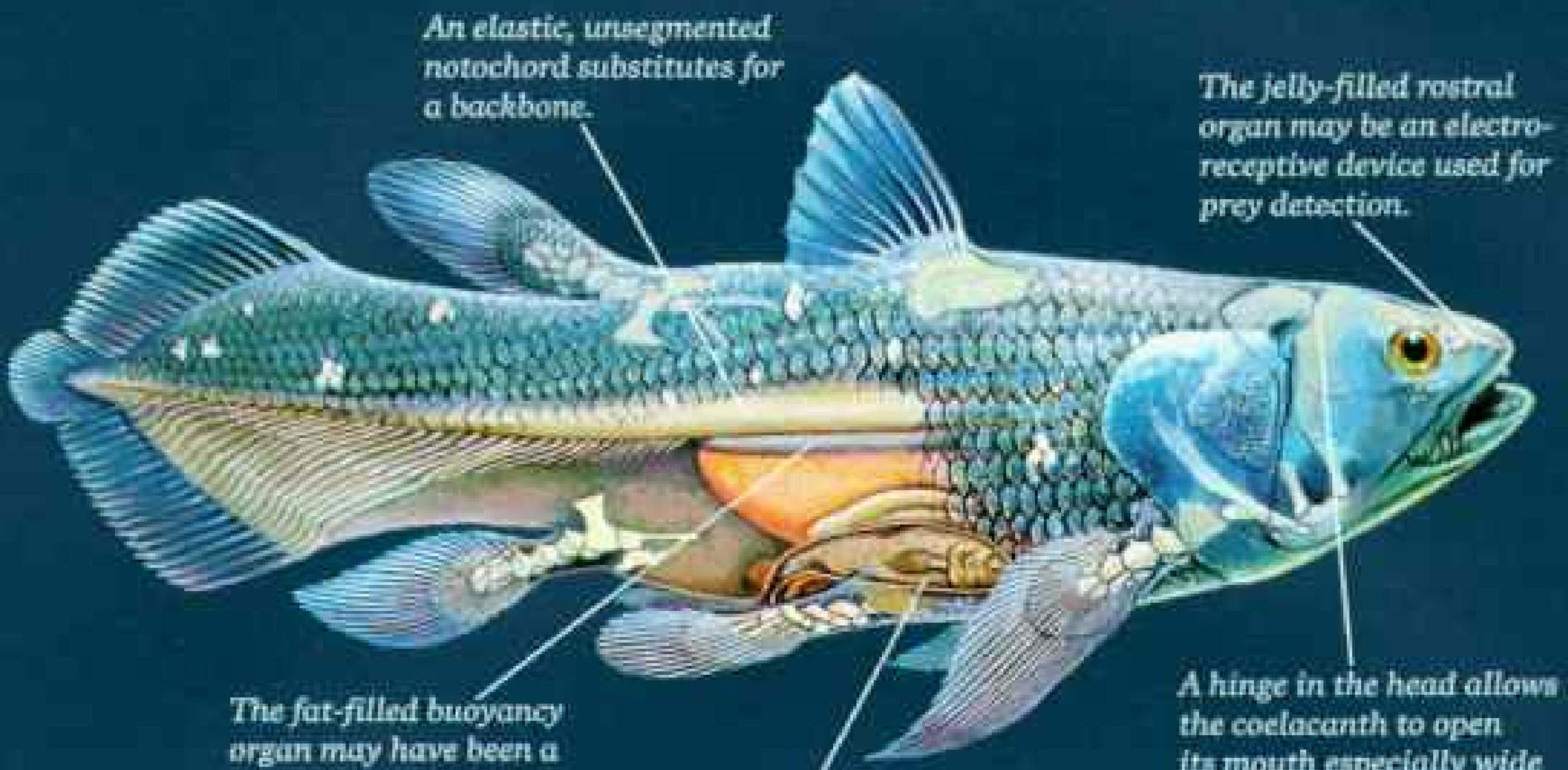
Finally in 1952 Smith heard from the captain of a trading schooner, Eric Hunt (below left, with one of the handbills). Hunt had obtained a coelacanth from a fisherman in the Comoro Islands and was keeping it, salted and injected with preservative, for Smith. Would the professor come as quickly as possible?

It was the chance of a lifetime, but Smith had a problem. He was more than 2,500 kilometers (1,550 miles) from the Comoros, and there were no commercial flights. In desperation he turned to South Africa's prime minister, Daniel F. Malan. Retrieving the coelacanth, Smith explained, was a matter of national interest. Could the government spare an army aircraft for a few days? Within 32 hours he was on his way.

The aerial odyssey of Smith and the coelacanth was front-page news around the world. On the return flight from the Comoros, Smith refused to be separated from his prize. During stops for rest and refueling he slept beside the crate (below center). On the triumphal return to Cape Town, Smith unpacked the treasure (below) before his wife, Margaret, and an appreciative prime minister.

Last June I showed some of our film footage to Margaret Smith, then a widow and a cancer patient in a South African hospital. She told me she had always wanted to see the fish in action. "Now the circle of my life has closed," she said happily. Three months later she died.

J. L. B. SMITH INSTITUTE OF ICHTHYOLOGY (LEFT); CENTER, ABOVE



JÜRGEN SCHAUER

LIKE CARBON COPIES, the tail of a live coelacanth (left) and a 140-million-year-old fossil (far left) virtually match. The fin at the tip of the tail, called an epicaudal lobe, waves like a metronome as the fish drifts along the ocean floor. I speculate it may produce weak electric charges that help the fish maneuver through the darkness of the steep, rough slopes.

Survivor of the ages

FEW CREATURES have endured such an immense span of time with so little change as coelacanths. The cutaway drawing of a present-day specimen (left) seems almost identical with the 140-million-year-old fossil (left, bottom) found in a quarry in southern West Germany. It is that extraordinary lack of change that enabled Professor J.L.B. Smith in Grahamstown to identify the coelacanth caught in South Africa in 1938 from a rough sketch, although he had never seen a live specimen.

Coelacanths first appeared on earth about 400 million years ago. Most of the prehistoric lifeforms shown on the chart at right, like dinosaurs, arrived later and survived for a shorter period of time. Studying the biology of coelacanths and their closest living relatives, lungfish, may eventually shed light on a vital stage of evolution—namely, the time when some creature first emerged from the water and walked or crawled, however unsteadily, upon the land.

Among the oldest known fossils of vertebrates are fish, and among these is a group characterized by fins that had their own muscular and skeletal systems, such as the fins of the coelacanth. These are the so-called lobed-finned fish; only lungfish and coelacanths survive. They are the closest living relatives of that earliest, though still unknown, amphibian.

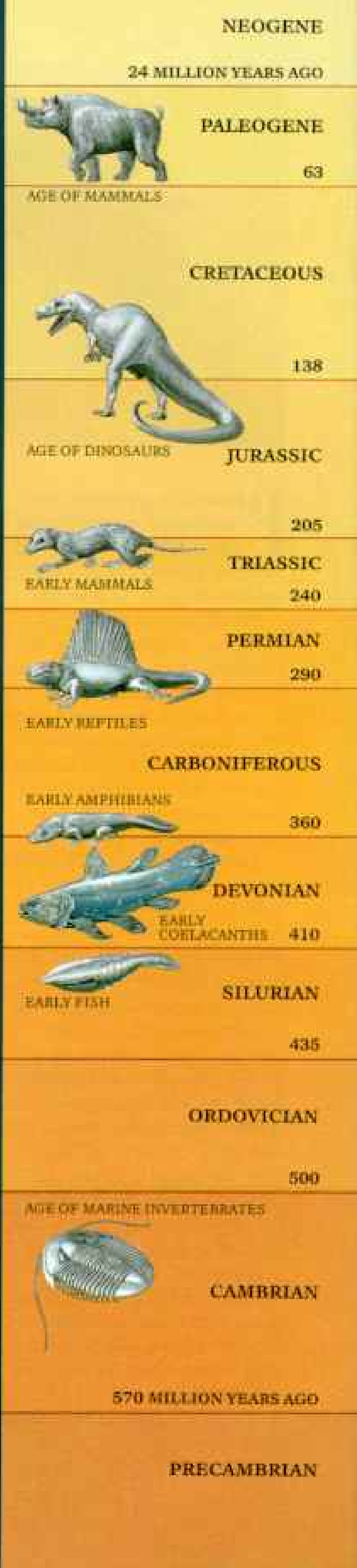
There is a great deal more to learn. Why have coelacanths remained virtually unchanged for eons? What environmental conditions enabled these passive, almost sluggish creatures to survive for what Professor Smith calculated were 30 million generations?

Coelacanth fossils have been found in both freshwater and saltwater deposits. *Latimeria chalumnae*, the living species, is known only in the Indian Ocean. What is its total world population? Is there a living cousin, as yet undiscovered, in some other part of the world? A 19th-century silver religious artifact, found in Spain in 1965, seems to be a representation of a coelacanth. But how did its creator know in such detail what a coelacanth looked like? At that time the fish was known, if at all, only from a handful of fossils.

The waters where we encountered coelacanths are almost devoid of prey. Although we never saw the animal feed, remains of squid and fish have been found in dissected specimens. I believe the key to the coelacanth's survival lies in its very difference from fast-swimming, "high tech" fishes. Since it could not compete for prey with those species, it probably retreated to depths where the others could not survive for lack of food.

We found coelacanths only at night and usually at depths between 170 and 200 meters, though we followed one fish from 192 meters up to 117 meters and then back again. But the fish apparently lives in even deeper and cooler water during the day. Does it survive there between feedings by slowing its metabolism to conserve energy? That is only one of many mysteries still surrounding this incredible fish.

PAINTING BY NATIONAL GEOGRAPHIC ARTIST WILLIAM H. BOND (FACING PAGE, TOP); TIME LINE BY SALLY J. BENSUSEN



PROBING A MYSTERY, we conducted an experiment using a weak electric field underwater to produce a curious reaction from the coelacanth.

At one time or another all six fish we encountered on our expedition were observed performing headstands on the ocean floor (facing page, bottom left). Each drifted nose down with the current across the bottom and held the stance for as long as two minutes (facing page, bottom right).

The first time I saw this odd maneuver, I could scarcely believe my eyes. Some species of fish stand on their heads briefly while feeding or while threatening or fighting an opponent, but none maintain the pose for so long or in such a solitary fashion. I could see no reason for the behavior—no outside threat, no sudden change in the speed or direction of the current, no logical explanation. Yet every coelacanth we encountered put on exactly the same demonstration for us, as if they were all auditioning for a job in the circus!

We know from dissected specimens that coelacanths have what is called a rostral organ in their skulls, a feature similar to one that sharks use to detect the weak electric fields given off by their prey.

The more I witnessed this strange coelacanth behavior, the more I became convinced that they may also be able to locate prey by detecting changes in the electric field around them, and that the headstands are somehow connected with that function.

To test the hypothesis, we performed an experiment with a pair of platinum electrodes assembled by one of my assistants, pilot Jürgen Schauer (above). We attached the electrodes to the manipulator arm of our submersible and dived in search of a coelacanth. When we found one, we extended the arm with the electrodes to within an inch or two of the fish (right, top) and slightly increased the electric field around it. Sure enough, the coelacanth instantly began to tilt, and soon it performed a perfect headstand.

Though interesting, the experiment was not conclusive. We conducted the electric test on only two of the six coelacanths we saw during our dives, and it merely suggests that headstands are in some way related to electric fields. Both of the fish tested turned their heads away from the electrodes. Perhaps the electric field was too strong and, never experienced before, caused artificial postures. In any case it is intriguing that this fish may home in on prey by detecting changes in the weak electric field the prey produces.

Coelacanths swim strangely anyway—sometimes backward, sometimes belly up. During our expedition we spent eight and a half hours in all observing coelacanths underwater, six hours with a single individual. We found all of them in one two-kilometer stretch off the west coast of Grande Comore, but we don't know if there are other deep-water areas equally rich in specimens.

FLURRY OF FINS propels a coelacanth along the bottom in this view from the rear (left).

At first glance the ungainly movements of the coelacanth suggest total discord, with all fins flailing helter-skelter. But careful analysis of our motion-picture films of coelacanths persuades me that in fact the fish is well coordinated.

The fish's forward, or pectoral, fins and rear pelvic fins are synchronized. The front right fin works in tandem with the left rear and vice versa—the same gait as that of a trotting horse. In addition the coelacanth can rotate its flexible forward fins nearly 180 degrees, enabling the fish to "scull" as it swims and thus stabilize its sluggish body as it drifts with the current along the bottom.

Our films settled another question that has intrigued scientists: whether the coelacanth can walk on its lobed fins. Though we observed several individuals resting with their fins braced against the sea bottom, we never saw any of them walk, and it appears the fish is unable to do so.

As thrilling as it was to encounter one coelacanth, it was infinitely more exciting to observe two of them together (above). During one of our later dives we were following a coelacanth when it came to a lava overhang where another coelacanth was already in residence. Curiously, the second fish failed to react in any way to the intruder.

Over the years I have observed countless fish underwater, and when an individual approaches another of the same species, there is normally a reaction—a recognition or at least a sense of awareness. Here there was nothing visible on the part of either fish. The only hypothesis I can offer is that in their natural habitat the coelacanths recognize one another by their electric fields. If that is so, our two coelacanths were aware of each other long before contact was made, and the actual meeting was an anticlimax.

OLD AND NEW WORLDS converge as our submersible—christened *Geo* for the West German magazine that helped support our work—rises with lights ablaze beneath a Comoran dugout, a craft unchanged for centuries.

Geo proved ideal for our research. With a depth range of 700 feet and the ability to stay below for as long as a week at a time, the sub enabled Jürgen Schauer, Olaf Reinicke, Raphael Plante, and me to survey wide areas on each dive.

For all their excellent work in the past, the scientists who preceded us in the study of coelacanths were severely hampered by the lack of a submersible. They could only examine dead or dying specimens brought up by Comoran fishermen.

In fact, our own 1986-87 expedition was little more than an initial social call, enabling us and the coelacanth to make one another's acquaintance. We learned to identify individuals by the distinctive patterns of white spots on their skin. They are probably camouflage that helps the fish blend in with similarly colored sponges on the seafloor.

We also managed to dispel the notion of a coelacanth season in the Comoros between January and March. Since we encountered coelacanths as late as May, it's obvious that what was thought to be a season is simply the period in which Comorans go after coastal food fish and bring up coelacanths by chance. When the fishermen move elsewhere in April, coelacanths are no longer caught.

I confess I'm sorry we never saw a coelacanth walk on its fins. Professor Smith himself nicknamed the coelacanth Old Fourlegs in the belief that the creature actually did walk upon the seafloor like a seal on its flippers. Alas, that does not seem to be the case. For every myth we dispelled, however, I'm certain there are a dozen fascinating discoveries still to be made. In short, we have just begun to know the coelacanth. □

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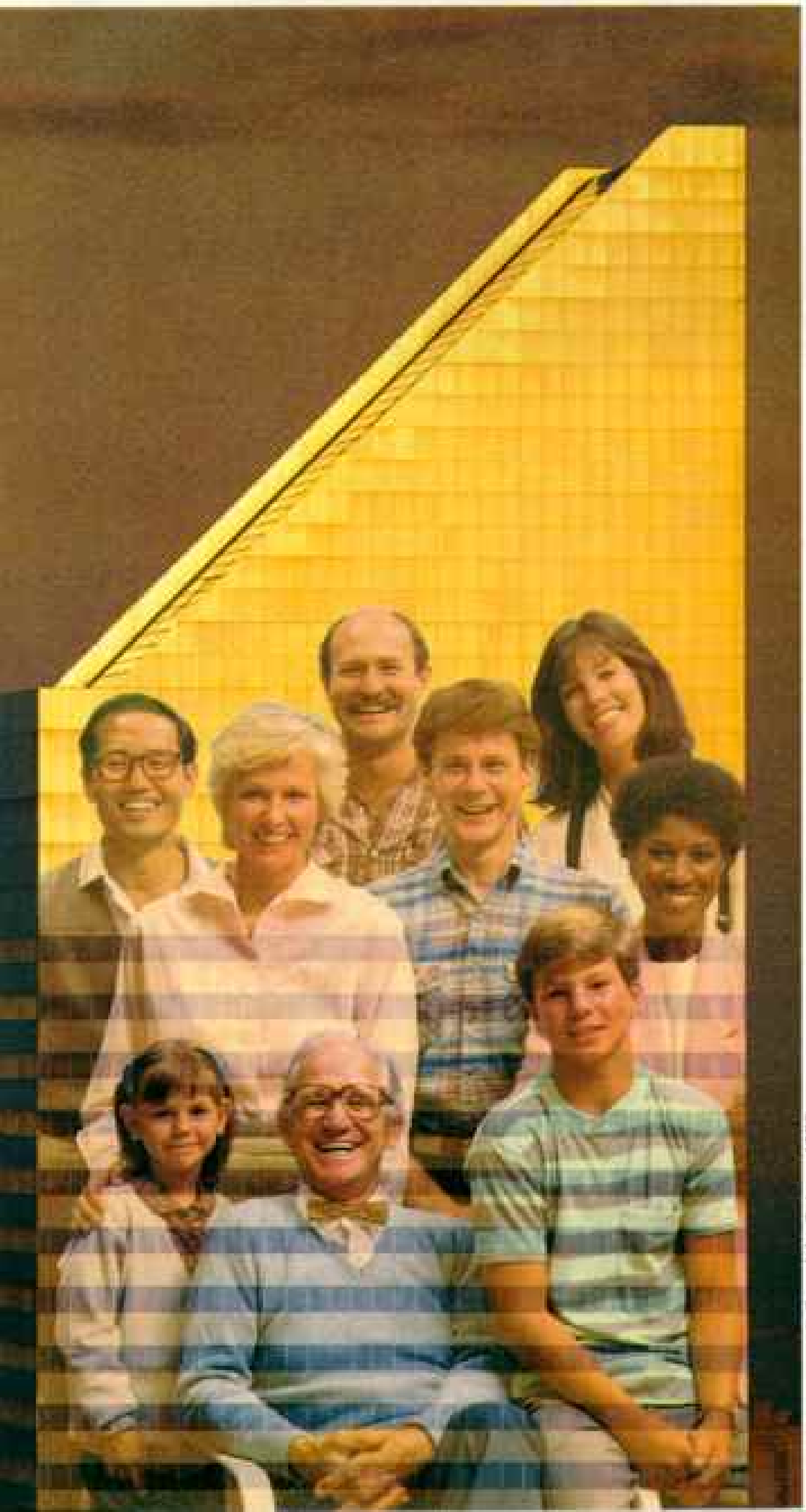

The drive to succeed is deeply ingrained in the American character.

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As Citicorp and Citibank, we understand this determination to succeed. For over 175 years we've helped people across the U.S. and around the world see their ideas of success become reality.

Today, we are already helping one in every five American families to build a better life. We make more home-mortgage loans and more student loans, and provide more MasterCard® and Visa cards than any other company. Facts that have made us America's largest financial services corporation.

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Next time you or your company have a financial need—any size, any place, any time—let us put our energy, our resources, and above all our people to work on it.

We'd like you to get to know us better.

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Members and staff: a tradition of loyalty

I'D LIKE TO SHARE with you two letters that show how personal the relationship can be between those of you who have supported the Society for so many years and those of us who have worked on your behalf. We may not always know each other by name, but we touch each other's lives, making us feel we are members not of a society but of a family.

"I was only six when photographs in a GEOGRAPHIC article about gliders greatly intrigued and inspired me," writes Ronald K. Meyer, Jr., of Sacramento, California (right). "It moved me to set a goal that, over the years, often seemed impossible. Two years ago I became an Air Force instructor pilot. For me flying is the ultimate freedom—a dream come true. The NATIONAL GEOGRAPHIC inspired that dream."

Heady stuff, these dreams. They may come full-grown or blossom quietly in the heart. Consider the story of Dawn Marie Hatten of Eureka, California.

"One of my first memories is sitting on my grandfather's lap while he read to me from NATIONAL GEOGRAPHIC," she writes. "I had the honor of removing the wrapper. Then we read from the front of the magazine straight through to the back. I am dyslexic and found learning to read very difficult. Grandpa used the GEOGRAPHIC to prove to me that learning to read is worth any effort. The day I read NATIONAL GEOGRAPHIC to him for the first time was a triumph for both of us.

"Three years ago Grandpa died. He was my best friend, and I miss him so very much. Now we look forward to reading NATIONAL GEOGRAPHIC from the front straight to the back to our seven-year-old son. I know Grandpa would approve."

AIR FORCE CAPT. RONALD MEYER LETS BOY SCOUTS EXAMINE HIS T-37 JET TRAINER AT MATHER AIR FORCE BASE, CALIFORNIA. PHOTOGRAPH BY JAMES A. SUGAR, BLACK STAR

And so it continues, this relationship we have, from one generation to the next. Rooted in curiosity about the world, it has intertwined our interests for 100 years. My grandfather dedicated 67 years to the Society, my father 52 years, and so it is gratifying to me that a tradition of loyalty also endures among our members. More than 29,000 of you have been with us for 50 years or more, nearly 350,000 for 30 years or more.

We recently honored seven members of the staff who together have given 287 years of distinguished service to the Society. You've seen some of their names in Society publications for decades: Luis Marden has written and photographed for the magazine since 1934; photographer Joseph Baylor Roberts contributed to 72 articles from 1936 to 1967.

Others made their mark behind the scenes: Joe Barlett (36 years on the staff) by insisting upon perfection in printing quality; Catherine Trueblood (42 years) by deftly keeping millions of membership records intact; Ray Rankin (46 years) by maintaining our Membership Center Building in top form; Joanne Hess (32 years) by guiding the development of our Audiovisual Services; and Catherine Hart by lending her grace and expertise to the Cartographic Division for 46 years.

It's my pleasure to recognize their contributions here, for it is dedication like theirs that inspires the extraordinary loyalty of our members and helps keep alive the dreams we share as a Society.

Gilbert M. Grosvenor

PRESIDENT, NATIONAL GEOGRAPHIC SOCIETY

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Without nuclear energy American dollars spent for foreign oil could be our biggest export

There's an incredible amount of American money going overseas to buy foreign oil. How much?

In 1987, the U.S. paid foreign countries nearly $40 billion for oil; that's 23% of our record-high trade deficit. Iran alone received over $700 million. That's enough money to buy over 20 new fighter planes for the Iranian Air Force. A very unpleasant thought.

To stop this money drain and reduce our trade deficit, we *must* further reduce our need for foreign oil. We've already made significant progress. The 109 plants in America making electricity with nuclear energy replace oil. Every year, they reduce our trade deficit by $5 billion. But if we want our economy to continue to grow, then we must do even more.

Trouble ahead

Electricity use has increased in all but 2 of the last 50 years. But while demand is definitely growing, our ability to meet that demand, without using even more oil, is not growing. By 1992, all nuclear energy plant construction in this country will be completed. To meet the electricity demand of the next decade will require either using more foreign oil to produce electricity or building power plants that use energy grown here at home, like nuclear energy.

Nuclear energy can keep our money home

Even though most Americans believe that nuclear energy will continue to play an important role in our nation's energy future, no new nuclear power plants are currently being planned. At present, too many financial, political, licensing and regulatory uncertainties stand in the way of America's further developing its nuclear energy resources.

Nuclear energy has proved it can help curb our costly dependence on foreign oil. Nuclear electric plants have already saved America over 3 billion barrels of oil and $105 billion in foreign oil payments.

If nuclear energy is going to *continue* to help fuel America's future, we must plan for it now.

If you'd like more information on making America more energy independent, write to the U.S. Council for Energy Awareness, P.O. Box 66103, Dept. FD04, Washington, D.C. 20035.

Information about energy
America can count on

U.S. COUNCIL FOR ENERGY AWARENESS

Buffy-headed Marmoset **Genus:** *Callithrix* **Species:** *flaviceps* **Adult size:** Length of head and body, average 220mm; tail, 307mm **Adult weight:** 280—350g
Habitat: Mountainous forests in southeastern Brazil **Surviving number:** Unknown
Photographed by Luiz Claudio Marigo

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 that elusive moment when the rarely seen buffy-headed marmoset pauses briefly to eat its newly caught prey.

With its diminutive size, restricted range and limited number, the buffy-headed marmoset is extremely difficult to sight as it scampers through the lower forest canopy and understory. Very little is known about this tiny primate, which is Brazil's most endangered marmoset, but it is presumed to live in small groups and to feed on insects and fruits. Threatened by the destruction of its forest habitat, the buffy-headed marmoset requires the continued protection of the reserves where it still remains. Like most endangered species, its future depends on mankind's ability to live in harmony with the natural world.

An invaluable research tool, photography can contribute to a greater awareness and understanding of the buffy-headed marmoset and how it lives within its natural environment.

And understanding is perhaps the single most important factor in saving the buffy-headed marmoset and all of wildlife.

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An American classic magnificently crafted as an exactingly engineered die-cast metal replica.

Shown smaller than actual length of 5.5 inches.

The Duesenberg SSJ...the most legendary of all classic cars...the fastest, best-handling and most opulent of all Duesenbergs. Only two were ever built, and both are virtually priceless.

Remarkable attention to detail.

All the important components of this large 1:24 scale model — the body, chassis, drivetrain and engine block — are crafted of metal. The seats are glove leather and the tires are genuine rubber.

Both the engine and the undercarriage are authentically recreated and, of course, the doors and both sides of the hood open.

Each component of this model is individually inspected, then hand-assembled. Note the gleam of the model's finish. It is achieved by polishing each piece of metal, then hand-spraying the paint finish. Finally, and perhaps most remarkably, each car is actually hand-waxed.

Surprisingly modest price.

This Duesenberg SSJ replica is $88.50, payable in three monthly installments of just $29.50 each. It is available only by direct subscription from the Danbury Mint; it is not being sold in stores.

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To reserve a Duesenberg SSJ in your name, you need send no money now. You will be billed in three convenient monthly installments, your first in advance of shipment. If you prefer, you may charge each monthly installment with VISA or MasterCard.

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F201

Members Forum

Centennial

The NATIONAL GEOGRAPHIC first caught my attention as a young boy some 40 years ago. It opened up a world of adventure, environmental concerns, and a tolerance for the variety of cultures that people of the earth create. Eventually it inspired me to acquire an A.B. and M.A. in geography. Your staff should feel proud of the achievements you have shared with others.

JOHN B. PASSERELLO
Sacramento, California

When I first opened your glossy pages many years ago in distant Malaya, I knew I had a friend to drive away boredom and worry, to give counsel and instruction. Some friends fall out over trifles, others part for their own good reasons; we have been forcibly separated by the war and its aftermath. What a pleasure to see you again after many years. Time has not drained your vigor nor daunted your spirit. Congratulations on your centennial jubilee.

PETER TKÁČ
Bratislava, Czechoslovakia

Australia

Thank you for the all-Australia issue (February 1988). Such a large diverse country deserves as much in its bicentennial year. My fascination with Australia sprang 30 years ago from an unlikely source: the mystery novels of Arthur Upfield, each set in a different part of the country. Against minutely observed and described landscapes, Upfield's half-Aboriginal detective, Napoleon Bonaparte, revealed his own and his countrymen's complex personalities as he went about his police work.

NANCY S. SHEDD
Petersburg, Pennsylvania

I compliment the staff involved in the February issue. The articles were a well-balanced combination of history, geography, sociology, and scenery. The photo essays were unusual. Here is one reader who supports the evolution of the magazine into one that takes a realistic look at societies, including the warts. You cannot properly present a picture of the world if you pretend nothing is wrong anywhere.

GEORGE M. STERN
Valley Cottage, New York

As a naturalist and regular visitor to Australia, I was disappointed in not seeing such significant scenic areas as the tropical and subtropical rain forests of Queensland, the dramatic Blue Mountains National Park (the "Grand Canyon of Australia"), or the stately temperate forests of the Perth and Melbourne regions.

THOMAS C. SOUTHERLAND, JR.
Princeton, New Jersey

The single-focus format results in either pleasing or displeasing entirely most members. Normally I find at least one article of interest. Having not the slightest interest in Australia, this issue was, for me, a waste of one-twelfth of my membership for the year.

DAVID A. MONTGOMERY
Pleasant Dale, Nebraska

When our 11-year-old son Bryan started reading about Australia, I didn't see or hear him for a couple of hours. I peeked in his room and saw he was transfixed, reading the text and studying the photographs. He looked up and said, "I want to go to Australia!" No travel guide could have brought the same gleam to his eyes. Thank you for the inspiration.

ESTHER STEIN
Brookville, New York

The principle of entropy, the tendency of systems to lose complexity and energy, is well known in physics. Your map supplement on Australia shows it applies to cartography as well. The map lacks a reference grid of latitude and longitude, the Tropic of Capricorn, and the outer limit of the continental shelf. In your Australia map of February 1979, I find those details, plus a more generous scale and roughly six times as many place-names. I find your March 1948 map is of even larger scale with proportionately more place-names and an index. You have produced a pretty poster but no map.

ANTHONY F. WILLIAMS
Seattle, Washington

As a geology student, I appreciated the satellite image on the Traveler's map. Congratulations.

ROBERTO FIORE
Lucolena, Italy

Like many Aussies, you have a Sydney bias. Melbourne is classier, more livable, and blessedly non-Californian! Your map should include Karratha, a planned city that has quickly grown out of a cattle station on the west coast.

JOHN AND PEG UNDERWOOD
Buskirk, New York

Page 188 states that literacy in Australia is virtually 100 percent. I checked with the Australian

High Commission in Ottawa, which said statistics for 1986 give the functional literacy level as 90 percent, including the Aborigines.

C. H. WHITELEY
Ottawa, Ontario

Our figure came from the Australian Bureau of Statistics. Clearly, agencies differ.

Mr. Terrill overlooked 33 percent of the Australian population, the Irish Australians. They, along with his English working class, occupied many an "innocent" convict ship. One gets the view that it was Mother England's children who did it all single-handedly. Bunk.

RONALD D. KUHN
Harrisburg, Pennsylvania

To update: Sir Joh Bjelke-Petersen is now the ex-premier of Queensland, forced out of office by his own National Party in November 1987. What precipitated his removal was his willingness to give Japanese investment interests the right to develop choice publicly owned land on Queensland's shores. Public outrage was so great that the deal was stopped.

BERYL B. WOMACK
Laguna Vista, Texas

The photograph on pages 234-5 shows Camps Bay, Cape Town, with Lion's Head in the background [not Cape Horn]. South Africa was initially favored as the destination of the convict ships—until residents of Cape Town protested. How different history might have been.

ANTHONY BRADLOW
Henley on Thames, England

I have lived in Queensland for 30 years and have never seen rain forest clear-felled by loggers (page 204). This may be privately owned blocks being prepared for agricultural purposes where loggers are called in to salvage timber. The Queensland State Forestry uses only selective logging management and so successfully that in 10 to 40 years the logged areas regenerate and are virtually indistinguishable from virgin rain forest.

MICHAEL LOCKYER
Ravenshoe, Queensland

Correct. And the area shown near Innisfail is not included, as stated, in the forest proposed for world heritage protection.

"Child of Gondwana" by Joseph Judge is the most descriptive article I have read about the breakup of Gondwana. The excellent diagrams explain the concept to the lay person, yet are also interesting to those familiar with plate tectonics.

FRED DOWNEY
St. John's, Newfoundland

The only farmers who have kangaroo problems (page 202) are those who have mismanaged and overstocked their land. We are country property owners and know that kangaroos eat mainly weeds, do *not* damage fences unless they are starving, and curb their breeding to the food supply.

R. E. Shackleford
Emerald, Victoria

Mary Ellen Mark's photo essay about Sydney has captured the soul—the agony and joy—of all large cities' immigrant groups.

Genevieve T. Grayson
Seattle, Washington

I am accustomed to seeing the spontaneous photographs of people for which the magazine is renowned. O'Brien's good but obviously posed portraits lack the impact of such images as that on the June 1985 cover that your readers expect.

Tim Biser
Fort Worth, Texas

I grew up with National Geographic. When I was a kid, I learned the difference between boys and girls by looking at your pictures of natives. I am 68 years old (102 in the morning). I live in central Jersey, been a country boy all my life. Boy—would I like to go to Australia! That's country. A hundred miles of nobody. That's for me. Thank

you for getting me there—to Australia—almost.

WILLIAM O. TERRILL
Warren, New Jersey

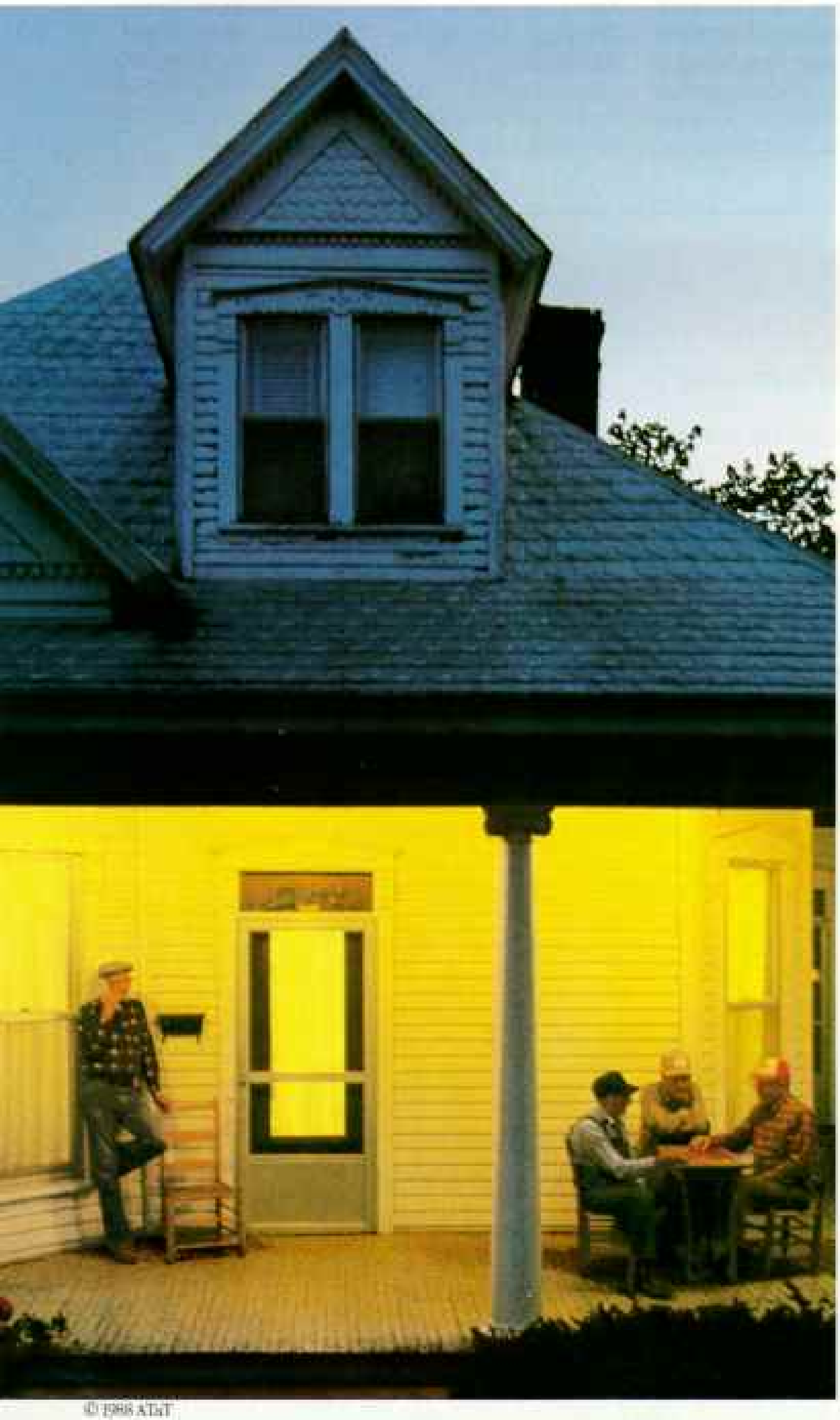
Galápagos

As a licensed guide and a consultant in the Galápagos, we do not share the author's optimistic view about the future of these islands (January 1988). The carrying capacity for man is not only a question of tourist infrastructure like transport and hotels, but is also determined by the number of immigrants attracted by the jobs that increasing tourism provides. Controlled tourism means controlled immigration. Yet nobody in Ecuador seems willing to restrict tourism. Nature conservancy must focus on this problem. Also, one cannot speak of introduced organisms as being "still a problem"; in fact, their effects are already disastrous, such as the damage caused by feral goats and pigs on Santiago Island.

ELLEN PEDERSEN
WOLFGANG PITTROFF
Idar-Oberstein, West Germany

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

We still think there's a lot to be said for small talk.



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NATIONAL GEOGRAPHIC MAGAZINE

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From its gracious old world buildings and elegant tree-lined boulevards, to the prim dress of young school girls, Melbourne retains the charming reminders of our Victorian heritage.

Melbourne

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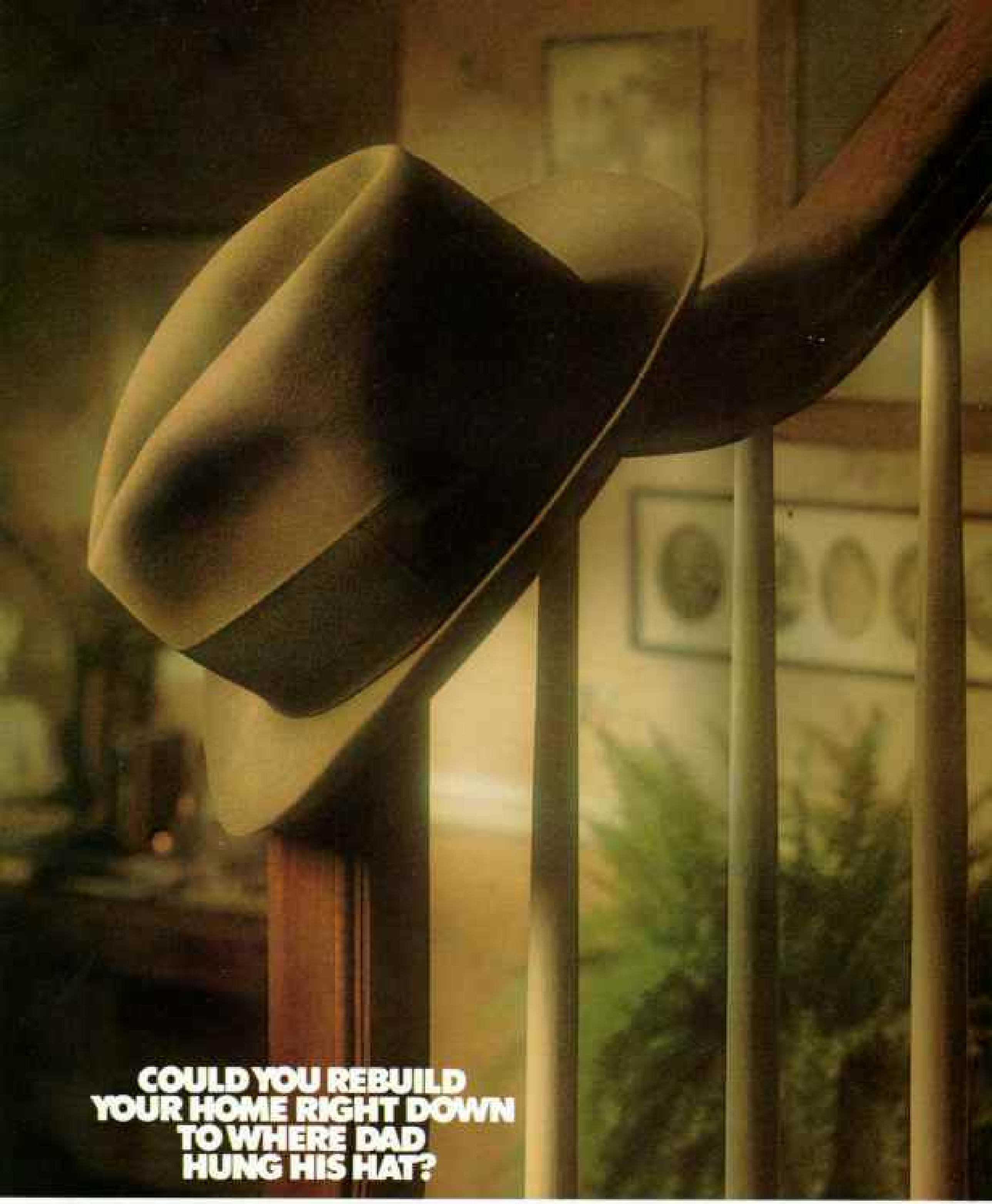

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Test drive Chevy S-10 Blazer, now with new available fuel-injected Vortec V6 power. It'll make your palms itch and your heart beat faster.

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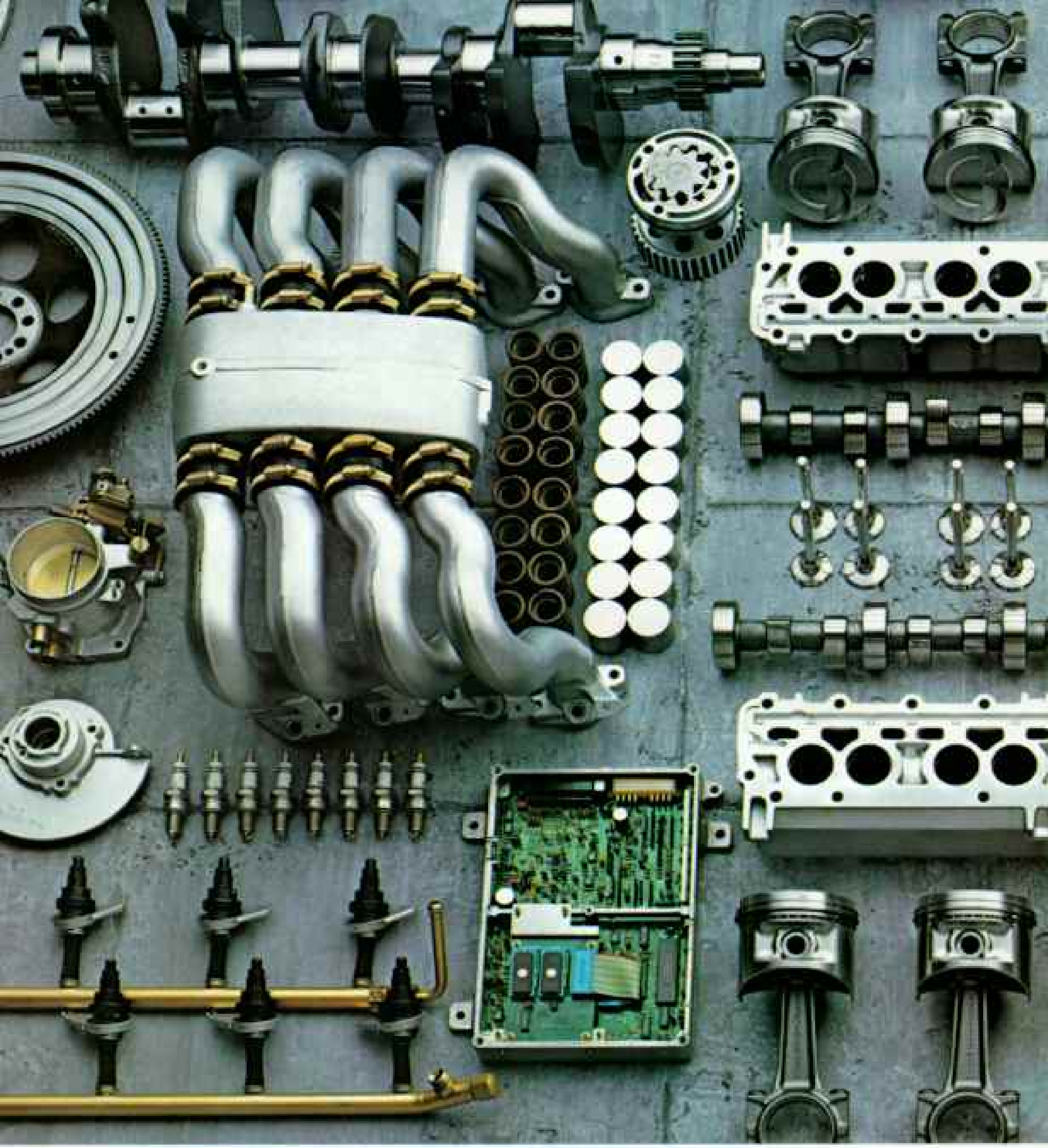

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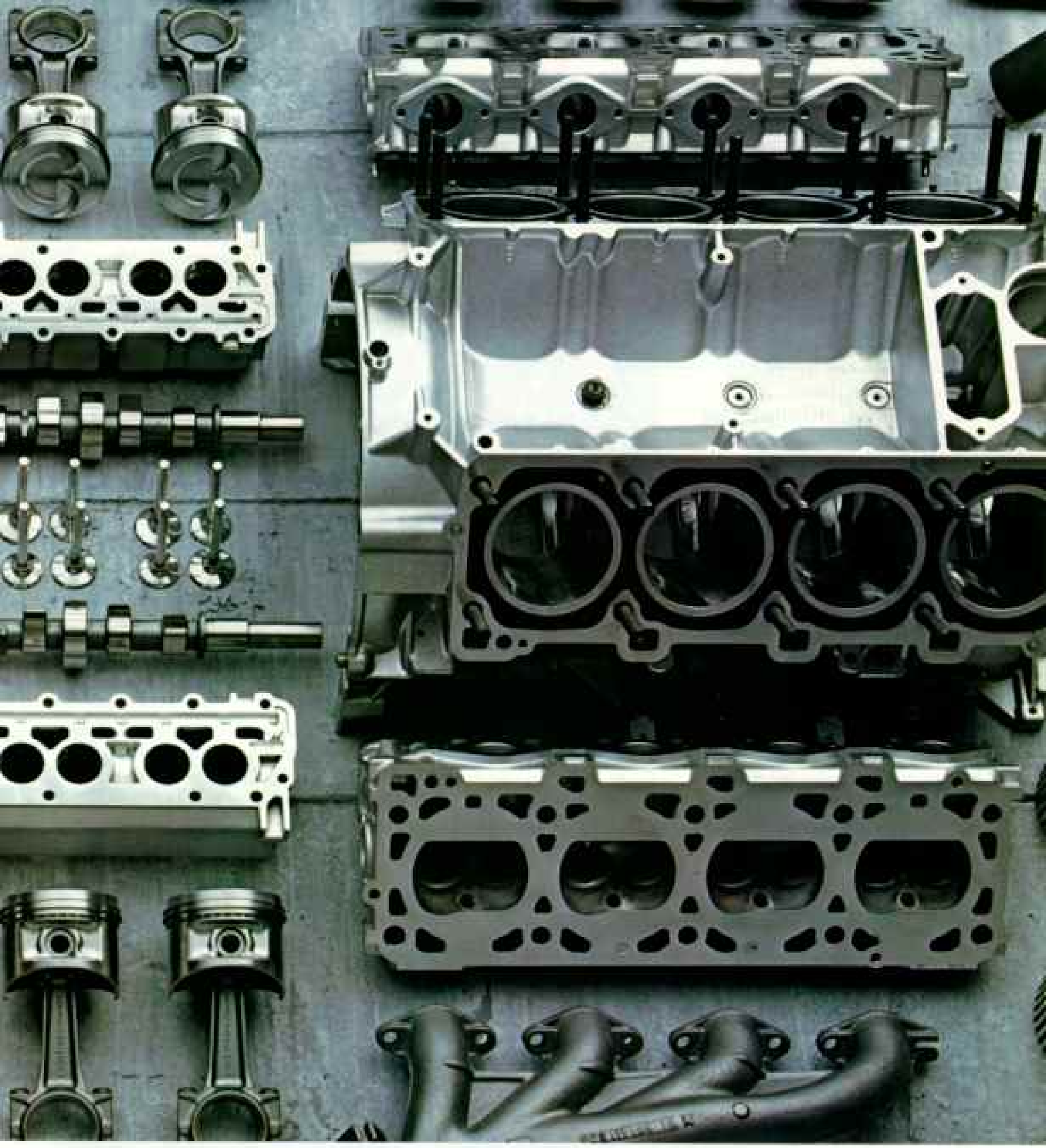

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Just turn the key.

EXXON 93 SUPREME.

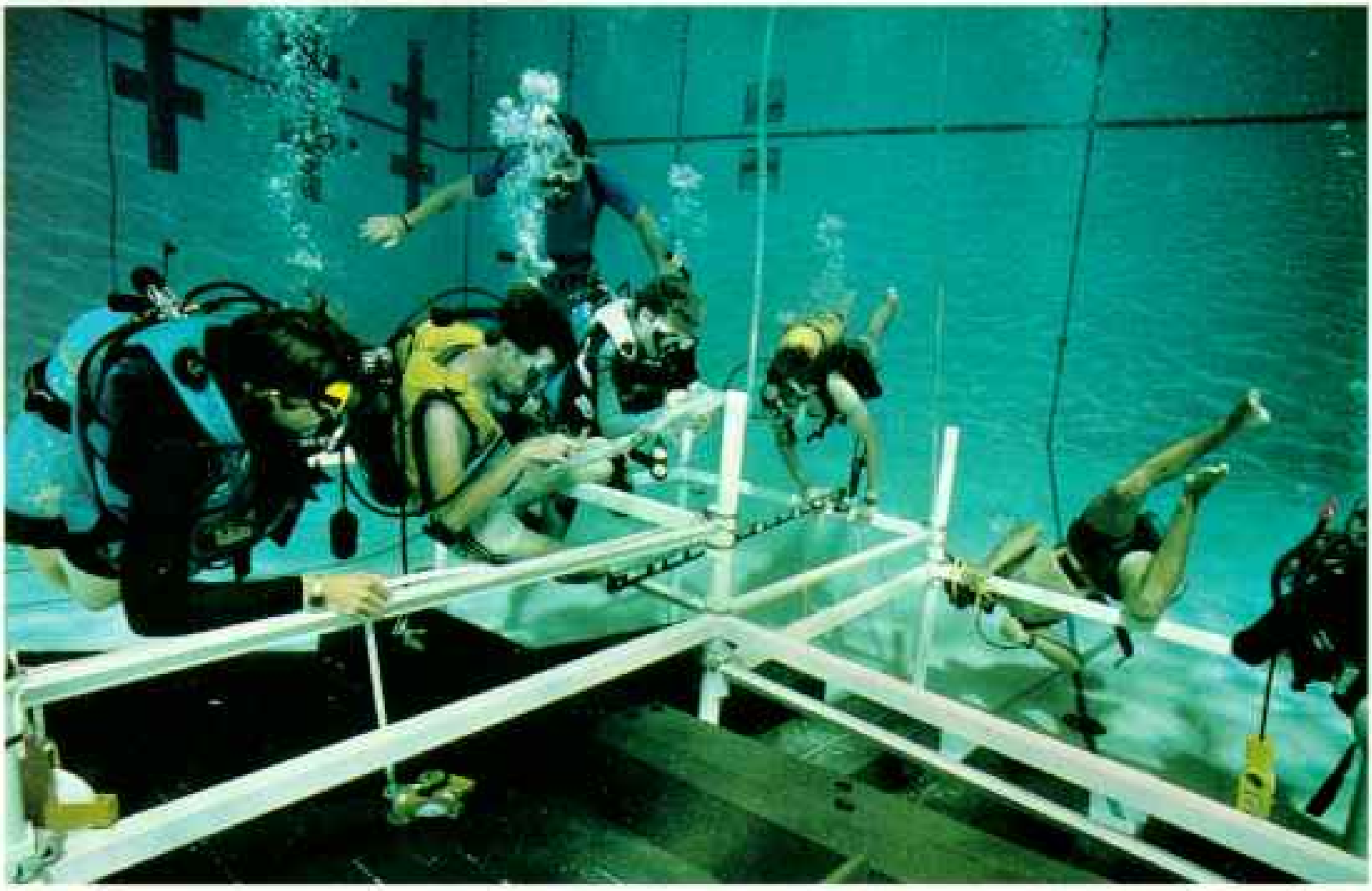
Precision equipment for precision engines.

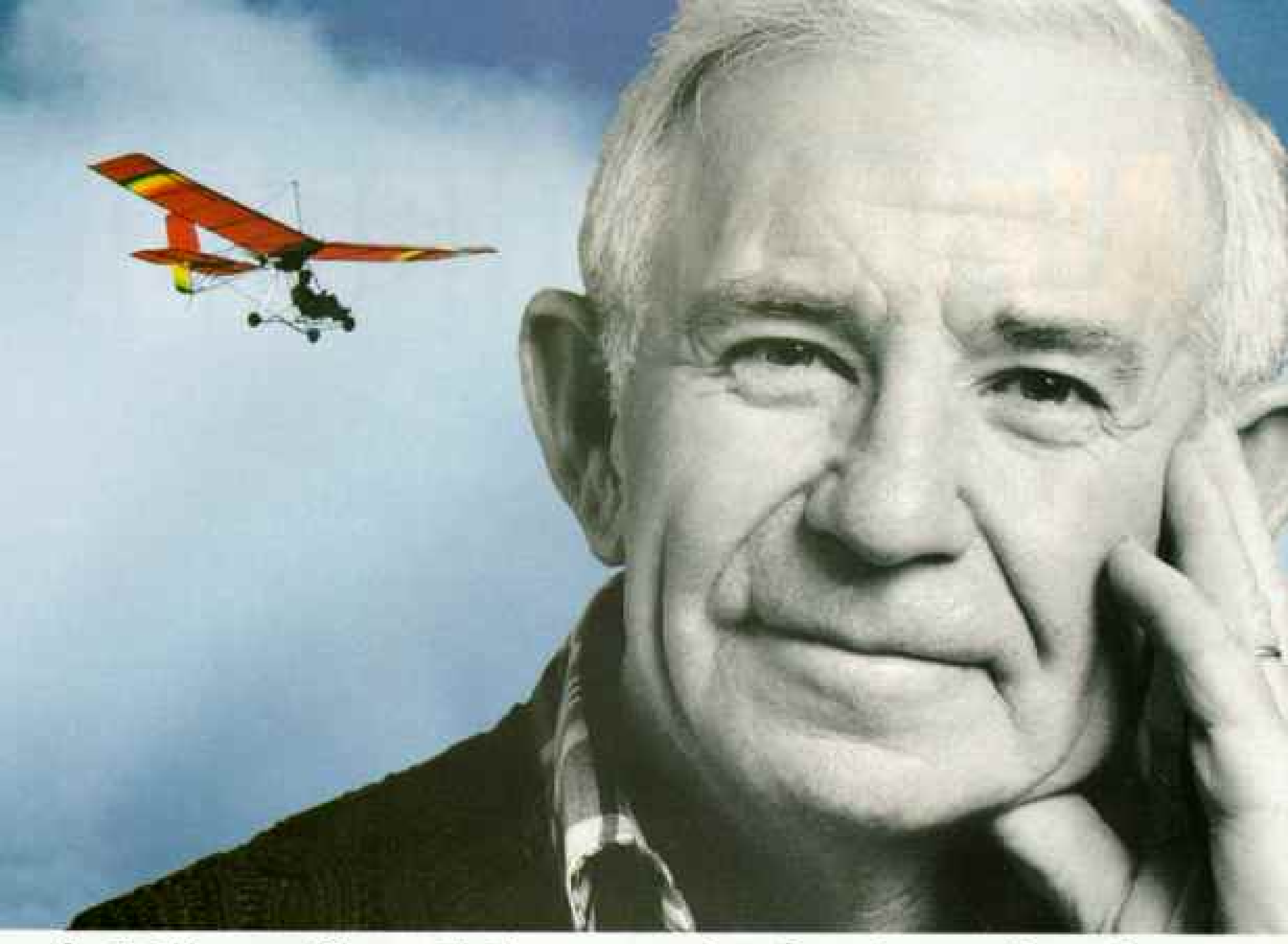
On Assignment

SELF-TAUGHT photographer JAMES NACHTWEY (right) has concentrated since 1981 on the world's hot spots from Northern Ireland to Afghanistan, Lebanon, Israel, Sri Lanka, and, for us, Nicaragua and in this issue Guatemala. He realized that even at those far-flung locations he was shooting one story, and the nature of war became his main concern. "The same dynamics—the fear, grief, and injustice—are at work in every conflict," he believes. "Readers should see the hard images and be shaken out of their equilibrium. No one should be let off the hook."

DIEGO MOLINA (ABOVE); NATIONAL GEOGRAPHIC PHOTOGRAPHER BATES LITTLEHALES

A WATERY CLASSROOM at East Carolina University taught students how to map and excavate shipwrecks before they worked at Yorktown. Assistant Professor Gordon P. Watts designed a fiberglass wreck, dubbed the *Sinkentine*, duplicating such details of wooden sailing ships as spikes and tool marks, for the Maritime History and Underwater Research Program at the Greenville, North Carolina, campus. Says photographer BATES LITTLEHALES, himself a veteran diver, "This pool had everything but the silt."





At 57, Roger Cornell discovers the freedom of owning an ultralight, and a mutual fund from The Prudential.

"I'm young... I intend to fly. That's the way to go. I mean, when you've got control, you can do what you want. Here I was, I had leased out the farm, I had some money. So I checked around to different companies. But The Prudential rep asked all the right questions. Like what I had, what I needed, what I wanted to do. Then, he came up with a mutual fund to do the job. With Prudential, I feel like I can take care of myself."

Roger Cornell

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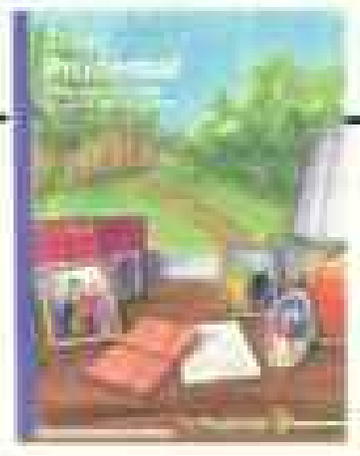

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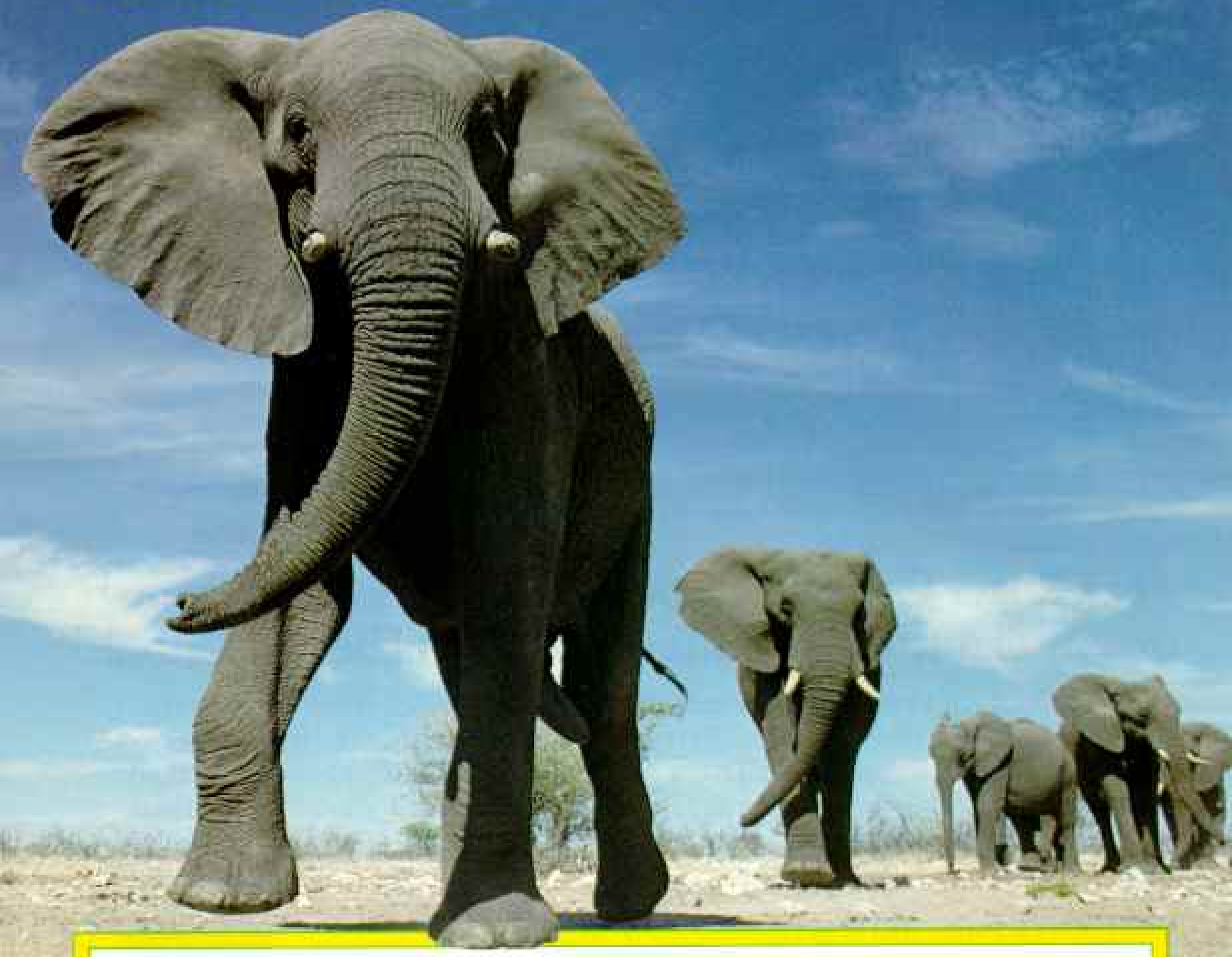

Tune in Sunday, June 5...

for a surprising look at the largest of all living land animals, the African elephant. Find out what keeps these 6-ton giants with huge flapping ears, 300-pound trunks, and 5½-inch-wide toes on the move.

And on other Sundays . . . On **June 12,** soar over Panama with migrating hawks as EXPLORER observes their enormous flying power from a specially built motorized glider. Then on **June 19,** encounter a tribe with a history of head-hunting in New Guinea's "Valley of the Cannibals." And **June 26,** journey to Australia during its bicentennial year and meet some of the world's most improbable animals.

Every Sunday
9p.m. ET* on
SuperStation TBS.

NATIONAL GEOGRAPHIC EXPLORER

*Also Mondays at midnight ET/9 p.m. PT and Saturdays 9 a.m. ET

"Honey, next time you make chili, use a pot, OK?"

"My husband makes chili good enough to bring tears to your eyes. I guess it has something to do with the *way* he cooks. There's usually more chili on the cooktop than there is in the pot. Sometimes I wonder if he uses one at all. But with our Whirlpool® appliances, I don't worry about it.

You cook, I'll clean up. My husband and I have a deal. If he cooks I'll clean up. And vice versa. With this smooth ceramic cooktop, I think cleaning is the easier job. Even on chili night. Spills can't run underneath the burners. And the edges around the cooktop keep messes from dripping over onto the sides or the floor. I just wipe the top clean.

Like father, like son. My 12-year-old spends more time in the kitchen than I do. Seems like every time he turns on the tube, he puts another TV dinner in our Whirlpool oven. Yesterday he forgot to take it out. By the time I found it, all the splatters and spills were baked on. My Whirlpool self-cleaning oven took care of it though, so I didn't have to.

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