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SEE "THIS BRITAIN" TUESDAY, DECEMBER 9, ON PBS TV

NOW THE SKY of northern latitudes presents the glorious panoply of winter—Orion striding the night, the triangle of Taurus, the Great Square in Pegasus—as though the heavens were adorned for Christmas. Indeed, the Christian feast has an undeniable link with the winter sky; the New Testament is silent about the date of the Nativity, but the Roman festival of Saturnalia long celebrated that time in late December when the sun halted its journey to the south and began to climb higher and higher in the north each day, heralding the turn toward spring and renewed life.

Seeing the early Christians caught up in the spirit of the festival, Church fathers urged them to celebrate not the return of the sun but the birth of the Son, the Saviour. By the fourth century, December 25 had become firmly fixed as Christmas.

Almost every civilization has looked to the stars to pace off the seasons, the times to plant and harvest. Early religions developed rituals to fend off the death of winter and ensure the resurrection of spring, and their priesthoods were often based on astronomy.

Perhaps no other people, however, developed the calendar—the awareness of the steady, inexorable passage of time—to such a point as the ancient Maya of Middle America. We are presenting in this **GEOGRAPHIC** an extraordinarily detailed account of Maya civilization. We knew, even before we began the project two years ago, that there was much to be reported, and much contrary scholarly opinion about what was known. We have faced the situation before, as during our treatments of the Phoenicians and the Incas, and they are problems we love to have—problems of abundance and interpretation, of stunningly rich visuals and fascinating text.

We decided upon a popular, generalized treatment of the ancient Maya civilization, and what remains of it among the modern Maya-speaking peoples of Guatemala and Mexico. We also wanted to report on advances in deciphering the complex Maya hieroglyphs. And how could we turn down an opportunity to show you Tikal in all its classic glory? One of the leaders of this largest of all archeological excavations describes that 14-year effort, and an artist restores life to the ruins.

From the tower at the Palace in Palenque, Maya priests could watch as the sun reached its southernmost point at the moment of solstice; to their eyes, as it set that day, it appeared to vanish into a nearby pyramid tomb. It was the same event celebrated by the Romans, and by countless other sky-watchers throughout history—and, in a way, by you and me today. Think about that when you stand under the Yuletide sky.

Silvestro Brosuono

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December 1975

THE MAYA

I—Children of Time 729

Staggering accomplishments in art, architecture, astronomy, and mathematics marked the ancient civilization of the Maya. The glory is gone, but ways of the past still guide their descendants' lives. By Howard La Fay, with photographs by David Alan Harvey.

II—Riddle of the Glyphs 768

Deciphering Maya writing can mean a deadly race between scholars and art thieves. National Geographic archeologist George E. Stuart and photographer Otis Imboden report on progress in unlocking the mystery of Maya hieroglyphs.

III—Resurrecting the Grandeur of Tikal 792

William R. Coe recounts the 14-year struggle of archeologists to lay bare a crumbled, jungle-shrouded metropolis in Guatemala.

IV—A Traveler's Tale of Ancient Tikal 799

Artist Peter Spier re-creates the daily life of that long-abandoned Maya city, which in its day rivaled the splendor of Rome. Text by Alice J. Hall.

Can We Harness the Wind? 812

In today's crucial search for more energy, engineers look again at power our forefathers used. By Roger Hamilton and Emory Kristof.

Rafting Down the Yukon 830

Four young adventurers relive the Klondike gold rush in the course of a two-year, 1,850-mile river odyssey. Keith Tryck and Robert Clark tell the tale.

Iowa's Enduring Amana Colonies 863

Descendants of a German religious sect succeed in clinging to the past while living comfortably in the present. By Laura Longley Babb, with photographs by Steve Raymer.

COVER: *Calendar symbols carved in limestone date an unknown event that occurred in Yaxchilán, Mexico, nearly 1,000 years before Columbus reached the New World. Photograph by Otis Imboden.*



The Maya, Children of Time

By HOWARD LA FAY

FOREIGN EDITORIAL STAFF

Photographs by
DAVID ALAN HARVEY

FROM THE DEEPS OF MYSTERY they came, and in mystery their unique culture fell. Scholars call them Maya, but they knew themselves by other names, and many are now lost. For some fifteen centuries they flourished in the grimly inhospitable reaches of Middle America, and between A.D. 250 and 900 they shaped a magnificent civilization of soaring pyramids and splendid palaces. This Classic Period ended in a sudden collapse. Cities were abandoned; the population declined drastically; jungle soon shrouded the mighty monuments.

During Europe's Dark Ages, the Maya practiced an astronomy so precise that their ancient calendar was as accurate as the one we employ today; they plotted the courses of celestial bodies and, to the awe of the faithful, their priests predicted both solar and lunar eclipses. They calculated the path of Venus—an elusive planet that is by turns morning and evening star—with an error of only 14 seconds a year. The Maya originated a complex system of writing and pioneered the mathematical concept of zero.

Still following ancient ways, a modern Maya harvests "sunbeams of the gods," the corn that provided the foundation for the brilliant civilization his forefathers built in Middle America. Come spring, he will plant anew with a digging stick, just as did the hooked-nosed deity (right) from the Madrid Codex (pages 777-780), one of four Maya books that survived the Spanish conquest.







Mute captives in stone (above) keep secret the mysteries they witnessed when religion and rule were one and the Palace of Palenque (**left**) towered above a dazzling city. Flourishing in the late seventh century under a ruler named Pacal, Palenque epitomizes the grandeur of Maya culture. In the first thousand years A.D. these Indians of Middle America developed a calendar as precise as our own, the most advanced writing system in the New World, and some of its greatest art and architecture.

In the Palace's eastern courtyard, nine-foot-tall figures (**above**) place hand to shoulder in submission. The man at right

has arms bound behind his back and scars that suggest self-mutilation, a rite believed pleasing to the gods. Nearby towns may have brought in the sculptures as tribute.

Above the courtyard, the Palace tower surveys the dense forest. From the tower at winter solstice, the setting sun appears to plunge into Pacal's nearby pyramid tomb (page 760) as if through the gateway to the underworld—a tribute to the king's divinity. Palenque became sacred as the westernmost city of the Maya, the place where the sun died. Nobles built hillside mausoleums, calling to mind Egypt's Valley of the Kings.

Yet, until recently, the brilliance of these achievements shone but fitfully through an encompassing gloom. Even the era of the Maya's greatest glory remained dim. Inscribed dates in their complex calendar loomed and disappeared . . . 7 Imix 14 Zec . . . 8 Ahau 13 Pop. So did the names of a few great personages: Bird Jaguar, who ruled in might at Yaxchilán; Pacal, whose pyramid tomb at Palenque rivals that of a pharaoh.

Now, however, the light of scholarship has begun to pierce the ancient shadows. City-states, dynasties, long-ago wars creep into clearer focus. Gone forever is the image of the Maya as peaceful, rather primitive farmers practicing esoteric religious rites in the quiet of their jungle fastness. What emerges is a portrait of a vivid, warlike race, numerous beyond any previous estimate, employing sophisticated agricultural techniques. And, like the Vikings half a world away, they traded and raided with zest.

JOURNEYING through the mountains and tropical forests and parched plains of Central America, I shared—at a long, pale remove—the sense of wonder experienced by 19th-century explorers when they first discovered the great Maya monuments. To fly down the steamy, green valley of the Río Usumacinta and suddenly descry the majestic white ruin of Yaxchilán off the left wing . . . to coast eastern Yucatán and find the temples of Tulum, timeless as dreams, towering above the savage surf . . . to round a bend in a road and confront the grandeur of Uxmal. Even now, after the discoveries have been made and registered, such experiences re-sound in the soul like an organ chord. And always with a haunting sense of tragedy. For the rise and fall of the Maya illuminate not only man's capacity for greatness, but also his terrible affinity for doom.

At the noontide of their power, Maya city-states stretched from Mexico into Belize and Honduras (map, pages 736-7). Copán, Tikal, Chichén Itzá, Palenque dominated busy trade routes where jade, salt, cacao, and pottery passed from center to center. Maya temples rose in the high, cool mountains of the south, in the torrid lowlands of Guatemala's Petén, and throughout the Yucatán Peninsula's sere plain. For almost seven centuries, Middle America knew the splendor of Maya culture.*

Scholars employ several complementary

tools to re-create the Maya past. Archeology, with its unearthed buildings, stelae, and inscriptions, provides the bulk of practical information. Chronicles such as the Popol Vuh and the books of Chilam Balam present a post-conquest Maya version of history. Accounts of Spanish conquistadors and friars—unwitting anthropologists—record Maya practices in the last, lost days of the conquest that nearly obliterated them.

Finally there remain the Maya themselves. Their blood diluted, their past forgotten, they manage to survive in scattered villages. Some still observe the customs—speaking the old languages, serving the old gods, following the ancient calendar, living in the slow, soothing rhythm of their distant forebears.

THE IDENTITY of the earliest such forebears poses a vexing question. Many scholars believe that Maya culture commenced in the lowlands of Guatemala's Petén region. Others speculate that the Maya had some significant relationship with the shadowy Olmec, who flourished to the west more than a millennium before Christ, and that they ultimately migrated into the lowland regions where their civilization reached its peak.

For clarification, I sought out an archeologist who has spent his career on the far frontiers of the Maya past. The 5,000-foot-high colonial city of Antigua, onetime capital of the captains general of Guatemala, floats among volcanoes and clouds. There Edwin Shook received me in a laboratory crammed with ancient artifacts.

He said: "We keep probing for the beginning of Maya civilization—that moment, easily identified archeologically, when a society settles down and develops agriculture and a modest architecture. So far we haven't found it. Do you know Kaminaljuyú?"

I did. I had visited this ancient site, now encompassed by the urban sprawl of Guatemala City. The spare, somber lines of its early

*The lost greatness of Middle American peoples has commanded major attention from National Geographic-sponsored research expeditions for more than half a century, and the resulting discoveries have done much to dispel the mystery that once shrouded Maya glory. Since 1924 the Society has backed 68 projects ranging from excavating key ruins to deciphering the once-baffling glyphs. GEOGRAPHIC readers have followed the emerging story in more than three dozen articles, such as Sylvanus Griswold Morley's "Yucatán, Home of the Gifted Maya," in November 1936, and Eusebio Dávalos Hurtado's "Into the Well of Sacrifice," in October 1961.

structures had impressed me profoundly.

"I was with the Carnegie Institution when we began excavating it in 1936. It was the biggest Preclassic site ever tackled. Most archeologists thought we'd find traces of a simple, rather primitive culture. Instead, we found monumental architecture and glyphic writing. Incidentally, I'm almost certain that Maya hieroglyphs originated either in Kaminaljuyú or on the nearby Pacific coast.

"In 1948 workmen accidentally penetrated a Kaminaljuyú tomb dating from 300 B.C. It's probably the most important Preclassic burial ever found. There were some 450 pottery vessels, many imported from as far as Honduras and El Salvador. To me, this proves that 500 years before the Classic Period, Kaminaljuyú was both advanced and cosmopolitan. Of the earliest days, we know only this: By 800 B.C. a sophisticated culture was established here."

A few days later, in the Mexican state of Chiapas, I visited Dr. Gareth Lowe of the New World Archeological Foundation. Husky and soft-spoken, Dr. Lowe has spent almost twenty years studying Preclassic origins.

"We theorize that the Maya migrated into the lowlands of Petén and Yucatán about 900 B.C. Who they were, we simply don't know, but their pottery and language relate to this southern highland area. Here in Chiapas," he said, "we found the earliest dated monument, from 36 B.C. The first inscribed date at Tikal is 300 years later."

Before I left, Dr. Lowe showed me some pottery he had unearthed on the Pacific coast near Tapachula. Elegant in design and beautifully decorated, it dates from a daunting 1700 B.C.—almost a thousand years before the founding of Rome.

ONE OF THE EARLY MAYA ruins I visited was Becan, a recently excavated site clasped in the green embrace of the fecund forest of southern Yucatán. Dr. Joseph W. Ball of San Diego State University, a ceramist who had dug there, briefed me.

"A dry moat dating from the second or third century A.D. surrounds Becan. It reveals that the Maya—so long portrayed as a peaceful, devout people—were involved in warfare from very early times. Deposits of charred debris and bone material suggest that the population was attacked about A.D. 450."

For a long afternoon I explored Becan's moat—some 1.2 miles in circumference—beneath the dense canopy of tropical forest.

Few sunbeams penetrate the sweltering shade, and at ground level no breeze stirs. Sweat runs from your scalp to your heels in enervating rivulets; within minutes your clothes cling like clammy cerements. My notebook became a soggy clot, the sweat from my hand blurring words even as I wrote them.

Everywhere you inhale the rank smell of decay as fallen limbs and dead trees rot moistly underfoot. Snakes lurk in the shadows, ticks infest the vegetation, and drooping branches produce avalanches of stinging ants. Grasp a friendly tree for support and—should it be the innocuous-appearing *escoba* palm—surgically sharp thorns pincushion your hand. Dusk brings hordes of mosquitoes and, after a scorching, airless night, the prudent man checks his shoes for scorpions before putting them on.

The tropical forest struck me as a totally hostile environment. One of the many paradoxes of Maya history springs from the fact that in just such surroundings their civilization reached its zenith.

Until recently many scholars believed that the Maya were few in numbers and wholly dependent upon primitive slash-and-burn agriculture. Dig after dig, however, revealed evidence of densely settled centers and a large rural population as well. Dzibilchaltún in northern Yucatán, excavated by Dr. E. Wyllys Andrews IV of Tulane between 1956 and 1961, is unique in that the Maya occupied the site continuously from at least 500 B.C. to the time of the Spanish conquest—a period of 2,000 years. Professor Edward Kurjack of Western Illinois University has made an intensive study of aerial photographs and actual sites of the region. His conclusion: At its peak, Dzibilchaltún's population numbered some 40,000.

Meanwhile, proof appeared that the Maya, far from being the primitive farmers of theory, used sophisticated agricultural techniques. In southern Yucatán, Professor B. L. Turner II of the University of Oklahoma and others investigated the remains of large-scale terracing on hillsides. Dr. Turner also made a study of "raised fields"—artificial platforms of soil that enabled the Maya to grow crops in seasonally flooded lowlands.

"These features," he told me, "indicate that the Maya practiced permanent and intensive agriculture capable of supporting a large population. If you could have flown over the Petén at the height of the Classic Period, you





would have found something akin to central Ohio today.”

An older generation spoke of a “Maya Empire,” but today scholars doubt that such an entity ever existed. The Maya language early fragmented into numerous variants. Architecture and art followed diverse paths. Warfare raged, alliances shifted, dynasties rose and toppled.

Yet communication was swift and precise. When the astronomers of Copán standardized the lunar calendar toward the end of the seventh century A.D., it was quickly adopted throughout the Maya world.

At an elevation of 2,000 feet, Copán in Honduras was a center of Maya astronomy. It also possesses elegance of architecture, and, rare among the Maya, Copán’s artists approached sculpture in the round. Yet Copán struck me as a disturbing place. On the famed stelae you find visages that are vaguely Chinese (page 759), poses that are vaguely Egyptian. Many stone faces exhibit no obvious Indian characteristics; many more seem like caricatures. Stone demons posture everywhere; an evil jaguar leers from a wall; simian heads surmount sculpted human bodies. Copán is sinister. Even the gods depicted here resemble devils.

RECURRING STRIFE characterized the Classic Age, and artists memorialized it in striking murals at Bonampak. To Mayanists, that name rings down the ages like a clash of arms. The remains of the ceremonial center lie innocently enough on a series of limestone terraces in the hot lowlands near the Río Usumacinta. Discovered in 1946, a three-chambered temple revealed walls covered with frescoes unrivaled in the Maya world. In rich reds, yellows, and blues, artists portrayed life among the Maya elite of the late eighth century A.D. One series of paintings depicts a raid against another Maya community, from the battle to the final ritual sacrifice of prisoners.

A later battle account, preserved in a monastery, captures the excitement of Maya warfare. One must picture the warriors of both sides, vivid in spotted pelts and blazing feathers, the hooked-nosed war chiefs directing tactics.

Declares the chronicle: “They came over the hill with the first rays of the rising sun, filling the air with their shouts and war cries, displaying their banners. . . . It was terrible, this descent of the Quiché. They advanced rapidly in columns down the hill to the edge of the river. The clash was horrible, the screams and shouts. A din of flutes, drums, and

Purification by fire: Men of Chamula in Mexico’s southern highlands race across a flaming plaza in Carnival rites that mix Christian and Maya beliefs. During the five-day festival, villagers called Passions impersonate the Christ, who is also Lord Sun. Others, in conical, beribboned hats of fur, are evil Monkeys—Christ’s persecutors and the Sun’s enemies—who harass feasting townspeople with obscene and sacrilegious jokes. On the fourth day, the Monkeys and the Passions purge themselves in the flames, as did the 16th-century Maya. Those earlier people esteemed fire walking as a “remedy for their calamities . . . very pleasing to their gods.”



THE MAYA



- ▲ Archeological site or ruin
 - Populated place of archeological importance
 - Other site or place of interest
 - ✈ Place with scheduled air service
 - P.A.H. denotes Pan American Highway System
- Elevations in feet

MAP PAINTED BY PETER E. SPIER
 COMPILED BY GUS PLATIS
 NATIONAL GEOGRAPHIC ART DIVISION

LOWLAND MAYA CIVILIZATION reached its height during the Classic Period on a vast stage extending from the Yucatán Peninsula to the base of the Guatemalan mountains. Individual centers developed distinctive personalities, but all shared a complex calendar, hieroglyphic writing, astronomical concepts, and sophisticated artistic styles.

MAYA TODAY, some two million strong, live throughout the area and speak one of the two dozen distinct languages of the Maya family.

Gulf of Mexico



Archeologists use three terms in dating Middle American sites and artifacts.
PRECLASSIC: 2000 B.C. to A.D. 250.
CLASSIC: A.D. 250 to 900, the peak period of Maya civilization.
POSTCLASSIC: A.D. 900 until the Spanish conquest.

Caribbean



Sea

PRONUNCIATION GUIDE
 Vowels in Maya place names usually take the sounds ah, ay, ee, oh, and oo, while x corresponds to English "sh." Words are generally accented on the final syllable.

- Uxmal = oosh MAHL
- Kaminaljuyú = kah mee nahl hoo YOO
- Dzibilchaltún = tseeb eel chahl TOON
- Xcobenhaltun = shkoh ben hahl TOON
- Yaxchilán = yahsh chee LAHN

HIGHLAND CULTURES flourished in southern Guatemala and Chiapas in Mexico during the late Pre-classic, when peoples here used an elaborate calendar as well as writing system that was later more fully developed by the Classic Maya civilization in the lowlands. Early in the Classic Period, however, the highlands came under strong influences from Central Mexico.

Pacific Ocean

CHIAPAS
 Villahermosa
 Palenque
 Palenque, THE PALACE
 Mt. Zontehuitz 9,376
 Bohom (Chamula)
 Tuxtla Gutiérrez
 San Cristóbal de las Casas
 Venustiano Carranza
 Comitán

PETEN
 El Mirador
 La Muralla
 Tikal
 Tikal Temples, LAND II
 Uaxactun, STRUCTURE E-VI, SUB
 Xulbun
 Uaxactun
 Holmul
 Tikal National Park
 Xunantunich
 Barton Ramée
 Altun Ha, STRUCTURE B-4
 Belmopan
 Xunantunich
 Flores (Tayasal)
 Melchor de Mencos
 La Naya
 Lake Peten Itzá
 Yaxchilán
 Yaxchilán, STRUCTURE 33
 Banampak
 Usumacinta
 Pasión
 Seibal
 Seibal, STELA 10
 Machaquila
 Lubaantun, MASKED FIGURINE
 Púsilha
 Victoria Peak 3,680

BELIZE
 San Pedro
 Altun Ha
 Belize City
 Turneffe Islands
 Stann Creek

GUATEMALA
 San Juan Atitán
 Nebaj
 Cobán
 Lake Izabal
 Quirigua
 Quirigua, STELA D
 Copán
 Copán, BALL COURT
 Lake Atitlán
 Acateñango Volcano 13,045
 Mazatenango
 Champerico
 Monte Alto
 Escuintla
 Puerto de San José
 Santa Ana
 El Salvador
 Sonsonate
 Nueva San Salvador (Santa Tecla)
 Cojutepeque

HONDURAS
 Puerto Cortés
 Puerto Barrios
 San Pedro Sula
 Tela
 La Ceiba
 Yoro
 Victoria
 Tegucigalpa



conch-shell trumpets resounded as the Quiché chiefs vainly sought to save themselves by divine magic. Soon they were hurled back, and many died. . . . A great number were taken prisoner, together with their chiefs. . . .”

When I flew into Bonampak on a charter aircraft—there is no other practicable means of reaching this remote site—I found that mineral deposits now shroud virtually all the frescoes. Mercifully, however, experts copied them soon after their discovery, and the National Museum of Anthropology in Mexico City displays the reproductions.

Descending the broad stone stairway at the base of the Bonampak temple, I reflected that the fate of these murals typifies a tragic theme of Maya archeology—discovery and loss. Consider the glyphs that have long baffled scholars, and today baffle computers. Some Spanish friars understood the glyphs, but the knowledge has disappeared. In the 18th century Avendaño, who had lived among the Yucatec, wrote dictionaries and a grammar of the language. Now, no known copies exist. Time has blotted the murals of Bonampak; at Tanchah, near Tulum, yet another painting showing a procession of gods was discovered and almost immediately defaced by looters (page 787). Every increase in Maya knowledge seems matched by a commensurate loss.

AT LEAST ONE ELEMENT during the Classic Age lent unity to the Maya world—religion. From earliest times the Maya displayed a preoccupation with divine forces. Their great ceremonial centers such as Tikal and Palenque were—for a people who had to cut every stone without the benefit of metal tools—monumental acts of faith.

Maya religion fathered Maya science. The late Sir Eric Thompson, greatest of Mayanists, told me, “Their skill with numbers developed because accurate calculations were important to divination. They developed astronomical observation to support astrology—a basic element in their religious beliefs.”

Above all, time obsessed the Maya. They envisioned it in terms we can never understand. To them, past and future were indistinguishable. In the Maya language one word, *kin*, serves for sun, day, and time.

The Maya pantheon included innumerable gods, in varied manifestations. Possibly the greatest was Itzamná, the Lord of Life, generally portrayed as an elderly sage. Ah Kin,

the Sun God, presided over the day, and Ah Puch reigned in the Land of the Dead. Chac, God of Rain, rose to pre-eminence each springtime; if the rains came late, crops failed and famine stalked the land. Later, Kukulcan—the Maya manifestation of the central Mexican deity, Quetzalcóatl—gained a kind of primacy in the form of a feathered serpent.

To function benevolently, the gods required human blood. The Maya sacrificed accordingly. Prisoners of war, perhaps individuals levied from the peasantry, or even some devout volunteers sated the divine appetites. Climaxing an elaborate ceremony, a priest ripped open the victim’s breast with an obsidian knife and tore out the still-beating heart.

In addition, priests and pious individuals cut holes in their tongues and drew rope festooned with thorns through the wound to collect blood offerings. Priests pierced their earlobes with stingray spines for the same purpose, and drew blood from their genitals.

Bernal Díaz del Castillo, historian of the Spanish conquest of Mexico, recorded his disgust at the pagan priests “clad in long white cotton cloaks, reaching to their feet, and with their long hair reeking with blood, and so matted together, that it could never be parted or even combed out again. . . .”

Human sacrifice outraged the Spaniards, and they smashed idols, burned sacred books, tore down pyramids, and used the stones to erect churches. Caught between torch and sword, the Indians converted. But after four centuries of imposed Christianity, the Maya have not forsaken the ancient deities.

IN THE SPRING of this year the rains did not arrive on schedule. While corn withered, villagers grew apprehensive. Finally, they turned—as they often do—to the long-nosed God of Rain, Chac. Everywhere, secret ceremonies invoked his aid.

With the aid of Pedro Gullotti of Mérida, I was permitted to attend such a ritual in the village of Xcobenhaltun (Shkoh-ben-hahl-TOON). Numbering perhaps a hundred souls, the village lies beside a dirt track that winds through the Puuc hills of central Yucatán.

When we arrived early on Sunday morning, Yum Kin, Lord of the Sun, awaited us before his altar. Yum Kin, of course, bore an earthly name—Susano Santos. He is a Maya priest, or *h-men*, who serves the old gods. One of the villagers, Heraclio Uuc—who farms 22 acres—had commissioned the ceremony.

The forty or so men in attendance were his guests, and he was bearing the considerable expense.

The Yum Kin was a small, frail man with coal-black hair and remote eyes. He did not know his age, and regarded the question with indifference. The villagers knew that he was at least 80. When he spoke, he looked directly at you, but his eyes seemed to focus on something far away. He is an *ah-pulyaah*, a practitioner of black magic, as well as a priest, and the villagers treated him with gingerly respect.

"I was called by the gods before I was born," he told me. "While my mother was carrying me, my father did an evil thing to her, and from the womb I struck him dead."

SUSANO'S ALTAR was a plain wooden table with a cross mounted on the rear edge. Before the cross were 13 bowls—one for each Lord of the Day—filled with *zacá*, cornmeal stirred into water and sweetened with honey.

As Susano made his final preparations before the altar, the men in attendance killed a dozen or so chickens, plucked them, cleaned them, and plunged them into buckets of water to simmer over fires. Nearby they had previously dug a huge ditch, covered the top with logs, and piled stones atop the logs.

At a given moment, Susano passed the bowls of *zacá* among the congregation. He favored me with one, and I sipped the sweet, watery liquid. Meanwhile, women—who are barred from the ceremony—were in their huts making thousands of tortillas. These were piled 13 high—each pile representing a cloud—cemented with dough, and wrapped in broad green leaves of the *bob* tree. Called *tutiwah*, they would eventually be baked in the pit.

In the manner of the ancient priests, Susano had fasted for two days and would eat nothing until the ceremony ended. He did, however, drink copious draughts of *balché*—a liquor made of fermented honey and the bark of a certain tree—that has long and ancient religious associations for the Maya.

I asked him about his priestly activities. "I go where I am needed," he said. "In another village there was dissension, strife, and murder. They summoned me to bring them peace, and when I arrived I called down a thunderstorm. I told them to shelter in their huts because the final lightning bolt would bring fire to the village. It did; several bushes began

to burn. The people were so awed that they have lived harmoniously ever since."

Heraclio Uuc, wearing a baseball cap, lit the logs above the pit. As they burned through and crumbled, the intensely hot stones above cascaded down. Then the men placed the leaf-wrapped *tutiwah* upon the stones and filled in the pit with earth. The village still speaks with wonder of the h-men who, several years before, had downed a long draught of liquor, removed his shoes, and calmly walked across the fiery stones without injury—a practice of the ancient Maya. "He was," declared one villager decisively, "the devil."

The *tutiwah* baked for slightly more than an hour. Then the men excavated the loaves—done to a crisp—and Susano piled almost half of them on the altar. He topped them with the chickens that had been boiled earlier. From a purse he took a clear glass ball and dipped it in a bowl of *balché*. Such a ball, called a *zastún*, meaning clear stone, possesses high ceremonial significance.

The Yum Kin now addressed the altar—always staring through the *zastún*—from the four points of the compass. "O Clouds," he chanted, "I implore you to come now and bring life to Xcobenhaltun . . . I give to you now, O Lord, this bread and this meat . . . What I ask of you is life for these farmers. Let the rain fall where they have worked and life will begin for them again . . . Therefore, Clouds, when I tell you to give rain, follow my order. Because I have the power, as a priest, a Lord of the Sun, to command the rain . . . With my power, O Clouds, I ask you to bring only good to humanity."

After the ceremony, the congregation wolfed down the food—the gods had already consumed the all-important spirit of the sacrifice. Susano lay exhausted, his remote eyes staring at nothing—or at everything.

Within less than a week the sky darkened. Lightning bolts—the spears of Chac—flashed and crackled through the leaden air. Finally the heavens opened to pour life-giving rain on the parched fields of Yucatán.

MY STAY IN XCOBENHALTUN introduced me to the rhythm of life in an isolated Maya village. Given the innate conservatism of farming societies—and of the Maya, above all—there is little reason to believe that rural life today differs radically from that of the distant past.

The families of Xcobenhaltun live in houses





NATIONAL GEOGRAPHIC PHOTOGRAPHER OTIS IMBODEN (ABOVE)

“City of dawn” to the ancient Maya, Tulum glows as the sun’s first rays strike the east coast of Yucatán. In the 15th century Tulum overlooked a vivid parade of commerce. Traders glided past in huge canoes laden with jade and feathers from Honduras, honey, wax, cotton, and salt from other parts of Yucatán. After the Spanish landed in 1517, they marveled at this and other great cities with their plazas, markets, temples, orchards, and maize plantations. But the invaders proved so destructive that in fifty years Tulum was all but abandoned.

Even so, echoes of glory yet sound at the site. The sculptures and murals of the limestone temples sing praises to deities repeatedly reborn out of the sea—the moon and the planet Venus. Another patron of renewal, the Corn God (above) carries the Maya glyph, or sign, for corn atop his head. Dr. Arthur G. Miller discovered the wall painting at nearby Tanchah.



similar to those of their ancestors. The sides, sticks lashed together, permit air to circulate; the high, thatched roofs provide insulation against the oppressive heat. Furnishings are sparse—usually a large drum for water, a grinding mill for corn, a small, low table, and a few low benches. Hammocks slung from the beams furnish sleeping accommodations. Having spent a few nights in Maya hammocks, I can attest that they are cooler and more comfortable than any bed.

The Maya begin work early and eat frequently. At ten in the morning, I joined Santos Teodoro Uuc Chi—one of the few

villagers who spoke Spanish—for a repast. We crouched on benches six inches high while his wife Feliciano presided at the fire. She shaped tortillas by hand from cornmeal dough and cooked them on a steel sheet above the flame. We dipped the hot, delicious tortillas in a bowl of thick bean soup.

Pigs, chickens, and turkeys roam among the huts. In the center of the village stands a rack of beehives. The Maya here make these in the ancient manner by hollowing a section of log, sealing the ends with mud, and punching a hole in the side to permit bees to fly in and out.



Mirror image of a sister in clay created some 1,200 years ago (below), a hardworking Yucatec wife is up before dawn to grind corn and cook tortillas. Maya women of old sought solace from the Maya moon goddess, Ixchel, patroness of fertility, weaving, and medicine. Wife of the sun, she consorted with other gods, just as the moon crosses paths with stars and planets. In this 4¾-inch figurine from Jaina Island, off Yucatán, the moon goddess takes a grinning rabbit for her partner.

OTIS IMBODEN (BELOW)



A SENSE OF COMMUNITY, of mutual interdependence, suffuses every aspect of life in Xcobenhaltun. I detected a feeling of kinship, perhaps even of love, among the members of the village. When I arrived, a group of men were trying to saw planks from a thick log. Someone needed a new door for his hut. They took turns with a handsaw, and there was much advice, many jokes, and easy laughter.

Because corn is soaked in water and lime, making it easier to grind into meal, that mineral ranks as a staple of Maya life. Together the villagers heat chunks of limestone

to pulverize them. At the edge of Xcobenhaltun—like a blinding snowdrift in the parched forest—a great mound of lime stands available to all comers.

Still, most modern Maya exist on the ragged edge of want. In the Guatemalan town of Huehuetenango, I met a U. S. Maryknoll missionary, Brother Felix Fournier, who recounted a poignant story. Brother Felix works in isolated villages of the Maya highlands—villages much like Xcobenhaltun. He told me: “These people lack medical attention, and the average annual cash income of a family is less than \$300. Of course, they grow



MERCHANT GOD MAKING FIRE, MADRID CODEX

Forefathers' know-how guides a farmer near Lake Atitlán in highland Guatemala as he waters his bean field from an irrigation ditch. Long ago, Maya agriculturists perfected sophisticated techniques with only hand labor and stone tools. They built raised fields above swampland, constructed terraces, and dammed waterways.

On a dry April day in Yucatán's lowlands, Mario Antonio Raigosa has set a match to brush near Maní to clear land by the ancient slash-and-burn method. Ancestors laboriously created fire with a wooden drill (left).

Religion still coincides with wise agronomy; if weeds are allowed to grow, Maya believe, the souls of the corn plants will move to cleaner fields.



much of their own food, but protein is always scarce. Maybe once a week a family will buy a few ounces of meat and cook it in a soup so that everyone can obtain some benefit."

A few days earlier, Brother Felix had been in a village, and an Indian asked, "Why is it that you Americans are so much bigger and stronger than we, and you never get sick?"

"But we do get sick," said Brother Felix. "Look at me now. I have a brutal cold."

"What is a cold? No American ever gets seriously ill. No American ever dies."

"Of course we do!"

"I've seen many Americans. Some live here. But not one has ever died."

"I will die. My father is dead already."

The Indian smiled with a sad wisdom. "No," he said, shaking his head, "it is well known that Americans do not die."

IN THE GREAT EPOCH of Maya civilization, tillers of the soil—the peasant population—supported the entire superstructure of society. To gain some insight into the Maya social order, I called upon Professor Alfredo Barrera Vásquez of the Yucatán Institute of Anthropology and History.

A white-haired man with a swift smile, Professor Barrera received me at a desk in the Biblioteca Central—a huge, high-ceilinged room lined with old books. The library opened, through great double doors, directly onto the street in downtown Mérida.

"Among the ancient Maya," Professor Barrera said, "there was a profound cultural dichotomy. On the one hand, you found the elite—a small group of priests and chiefs charged with preserving knowledge. They understood astronomy, architecture, engineering, art. They alone knew how to plan the building of the great monuments. They alone knew the meaning of everything in the temples. They could predict eclipses and cast horoscopes. They could decipher the history carved on the stelae and add to it. In return, they led splendid lives.

"Luxury items like jade, feathers, and jaguar pelts were reserved for their exclusive use. It was the function of the rest of the population to provide these luxuries for the lords, as well as to meet all their everyday needs. So the commoners farmed, cut wood, hunted, and then bore the fruits of their labors to the ceremonial centers. When the elite traveled, it was even the duty of the people to carry them in litters on their shoulders.



Doing battle with pain, folk healer Juventino Pérez of Maní, Yucatán, treats a victim of rheumatism with massage and secret chants. Among the ancient Maya, healers belonged to a hierarchy of priests and astrologers. Of the old elite, only the healer remains, still respected, still sought after. This woman came 85 miles from Campeche to see Pérez, whose son, standing, is an apprentice. Other patients wait. His *zastún*, a glass sphere, assists the healer in diagnosing a young woman's problems (right). Has she offended the gods? A relative? Violated a taboo? He will prescribe herbs or exorcise evil spirits.





“When a baby was born, the parents took the child to a priest who, with the aid of star charts and books, would predict its future. Each day, each moment was governed by a different god; depending upon the exact time of birth, a child would owe a lifetime of devotion to the ascendant deity.

“In his lifetime a Maya bore three names. Say he was born on the date 7 Ahau of the Maya calendar: His name until puberty would be simply Seven Ahau. When he was initiated into manhood, he would assume a new name that reflected some personal feature. Say he was short. Then he would be known as Tzap, or Short One. Not until he married did he assume his formal name. Supposing his mother came of the Poot family and his father was an Uuc, his adult name would be Na Poot Uuc, literally an Uuc born of a mother [Na] named Poot.

“An ultimate refinement was also possible. The name of a man’s profession, or some noteworthy characteristic, might replace his mother’s name. If our hypothetical child had proved very courageous in battle, he might have been known as Ah Dziik Uuc, or the Uuc Brave One.”

Professor Barrera now directs a staff of 12 in preparing a definitive dictionary of the Maya language. This work, which includes collating all entries from all previously published dictionaries plus adding modern vocabulary, will consume almost two years.

“I myself,” the professor said, “have been bilingual since early childhood. I had a Maya nurse, you see.”

“If you could go back to a Maya city of the Classic Period,” I asked, “would you understand them and could they understand you?”

“All languages change,” he said. “I think present-day Maya relates clearly to the language spoken at the time of the conquest. If you study the modern language scientifically, you can deduce the older forms. But I repeat, languages change. In our new Maya dictionary you will even find words like ‘strike’ and ‘ball.’ Baseball is a passion in Yucatán, and the American vocabulary of the game has passed into Maya.”

THE YUCATEC OBSESSION with baseball merely echoes an ancient enthusiasm. Virtually every Middle American ruin contains at least one court where teams played a ball game that is still not perfectly understood. In the Mexican



PRINCETON ART MUSEUM; 6 1/4 INCHES HIGH

Man disguised as a god? Perhaps. Priests often portrayed deities they revered. Here large round ears, snaggle-toothed smile, and shield suggest the aged jaguar god, a lord of the night and god of the underworld.

Noble ballplayer, wearing hip padding for safety (**facing page**), takes an everlasting time-out from the fast-moving Middle American game (pages 810-11). Prominent nose represents the Maya ideal of beauty in the eighth century, when thousands of these charming painted pottery figures were placed in graves on Jaina Island, off Yucatán. Vividly portraying costumes, customs, and even personalities, they rank among the finest works of New World art.

MUNSON-WILLIAMS-PROCTOR INSTITUTE, UTICA, NEW YORK; 5 5/8 INCHES. BOTH PHOTOGRAPHS BY OTIS IMBODEN

version, two stone rings protrude from opposite walls and, apparently, the teams scored by putting a rubber ball through one of the rings. This must have been a fiendish enterprise; paintings on vases imply that the players could hit the heavy ball only with hips and buttocks (painting, page 810). Possibly, penalty points also resulted when the ball touched the ground.

In any case, the ball game was a serious matter with deep religious connotations—so deep that losers were often sacrificed. Its antiquity is attested by the fact that archeologists have discovered three ball courts in Chiapas that date from the sixth century B.C.

Human sacrifice, as we know, constituted a vital element of Maya ritual. Through the centuries, a cenote at Chichén Itzá has grown fabled as the site where, presumably, harsh-faced priests cast lovely virgins into the deep waters to appease the gods.

HALF A CENTURY AGO, a journey from Mérida to Chichén Itzá involved a slow train, a tedious ride on mules, and ended with a hammock slung among the ruins. Now you drive there in two hours, and luxury hotels compete for your patronage.

Chichén Itzá is a kind of dual ruin. Maya buildings of great beauty crumble quietly on one side of the highway; on the other stands the gray architecture of the Toltecs—a warlike people from Mexico—who ruled in Chichén Itzá after the Maya collapse.

On a fiercely hot day, I walked the length of a 325-yard causeway leading from the Toltec sector to the most famous of Yucatán's cenotes. These sinkholes in the limestone that underlies the entire peninsula provided the ancient Yucatec Maya with virtually their sole source of water.

By two o'clock in the afternoon the last of the clamorous tour groups has adjourned for lunch. A sunny tranquillity enfolds the Well of Sacrifice. Swallows and butterflies dart and

flutter above the opaque green water. Small blind fish from the underground streams that feed the cenote wriggle just below the surface. A majestic egret suns himself on a clump of floating twigs. Halfway up the side two gorgeous birds—blue-green motmots—do territorial battle for a limestone ledge.

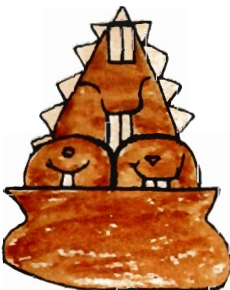
Silence. Serenity. I stand on the ruins of a small temple on the south edge of the cenote and regard, 70 feet below, the murky jade of this well sacred to Chac.

THE ROMANTIC FICTION of sacrificed virgins is just that. People did die here, but—except for children—not necessarily as offerings. Rather, in the early morning they were thrown into the cenote. If one survived until noon, he was rescued. Since he had visited the god, he was expected to prophesy about rainfall in the impending year.

In 1904 Edward H. Thompson, U.S. Consul in Mérida, began to dredge the cenote. Through several years, he brought up thousands of artifacts and a jumble of skeletons.

Later, Dr. Earnest Hooton of Harvard reported on these human remains: "Three of the eight ladies who fell or were pushed into the cenote had received, at some previous time, good bangs on various parts of the head, as evinced by old, healed and depressed circular lesions; and one female had suffered a fracture of the nose. One woman also had platybasia, a condition in which the skull base is pushed up into the cranial cavity. Two of the men had received head wounds which left depressed lesions. Altogether, it is suggested that the adult denizens of the Sacred Cenote may not have been generally beloved in their presacrificial careers."

Once, at this cenote, a bystander rose to kingship. A Maya chronicle testifies that in a certain year all those thrown into the cenote drowned. But a nobody named Hunac Ceel Cauch dived into the well and emerged "to declare the
(Continued on page 755)



Giving thanks in the old-time way, women dedicate a part of the corn harvest to the Christian God, as they once did to Maya deities. But times have changed, as in this Protestant service in Mexico's southern highlands. Women attend, though seated apart from men; in pre-Columbian days they were generally banned from religious rites. These Protestant converts reject the old gods and the drinking that still accompanies Maya festivals.

During colonial times, there were brutal confrontations between Christian and Maya beliefs. Spaniards smashed idols, burned sacred books. But after four centuries of Christianity, Indians still cling to ancestral traditions.

BOWL FILLED WITH CORN GLYPHS, MADRID CODEX; DAVID BRILL, FACING PAGE



Lively hub of a trade network preserved since antiquity, the Friday market at Sololá, in Guatemala, draws Indians from remote hamlets of highlands and lowlands. Farmers-become-merchants, they trudge with traditional net bags swinging from tumplines around their foreheads. Many travel at night in order to be open for business at dawn. Within the packs ride products that have gone to market since pre-Columbian times: tomatoes, avocados, sweet potatoes, high-backed sandals, and small turkeys.

Shoppers bargain for goods that may have come fifty miles and have a hundred yet to go. Vendors from other large towns buy in bulk for resale at home.

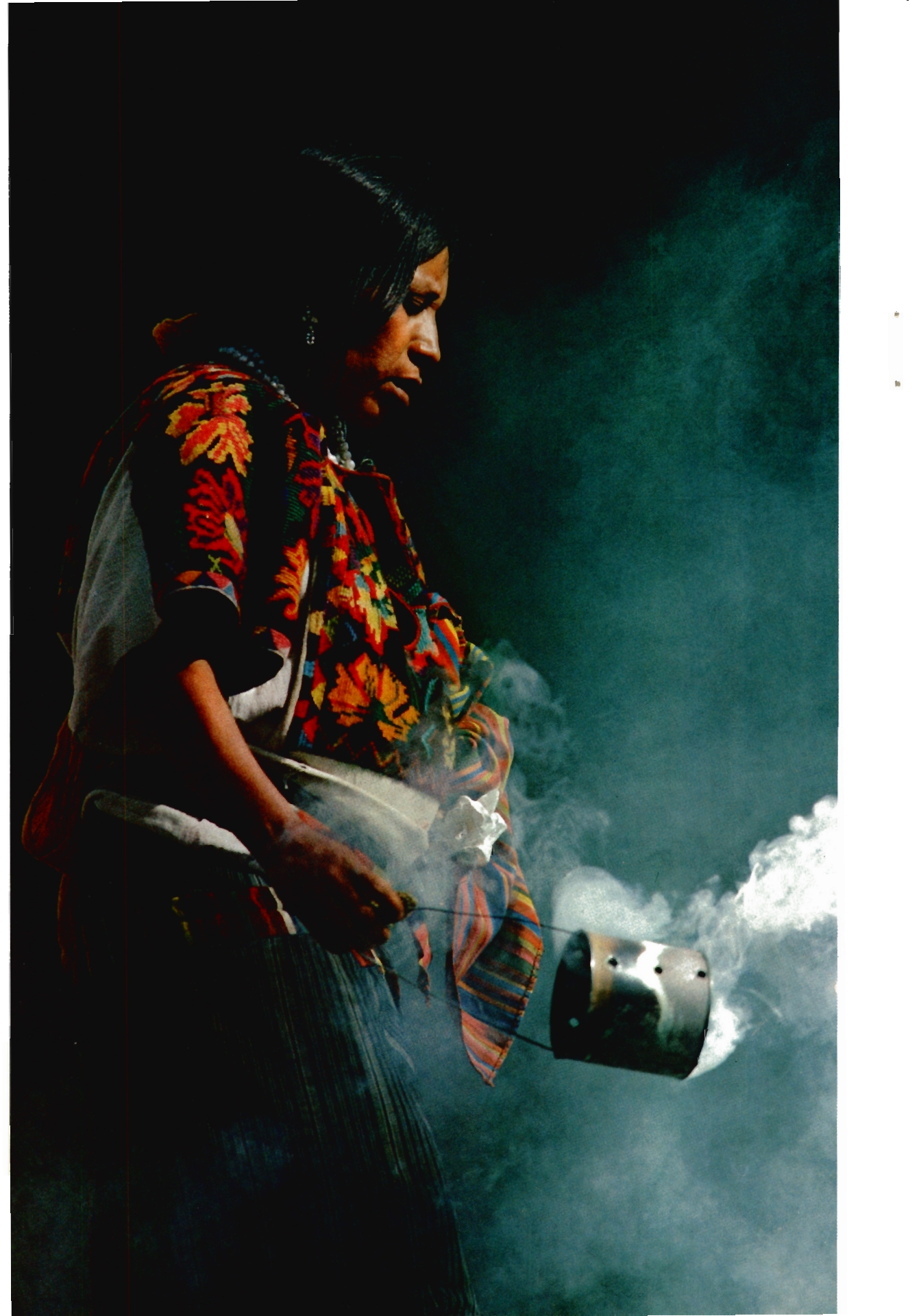
Some farmers have formed cooperatives to purchase trucks and speed produce day and night to different markets along the Pan American Highway, the new trade route of the highland Maya.



OCCELLATED TURKEY, LEFT, AND KING VULTURE MAY REPRESENT TWO TRIBES LOCKED IN COMBAT, MADRID CODEX







(Continued from page 750) prophecy. . . Then he was set in the seat of the rulers.”

This event occurred in the tormented, decadent centuries following the Classic Maya collapse. Hunac Ceel Cauich ruled in Mayapán, a walled, shoddy city built after the fall of Toltec Chichén Itzá. Mayapán survived until about 1450. In this Postclassic age the burgeoning civilizations of central Mexico strongly influenced the remaining Maya—yet their flickering culture persisted. When the Spaniards arrived early in the 16th century, they found Maya cities such as Tulum flourishing on Yucatán’s eastern coast.

IN THE WOODED HILLS of the Mexican state of Chiapas, once the westernmost march of the Maya, brood the haunting ruins of Palenque. Archeologists have freed perhaps two dozen structures from the green grasp of the forest, but this represents a scant beginning (pages 730-31); Palenque’s temples and pyramids stretch for seven miles along a wooded ridge. What secrets do the trees shield, the earth cradle? No one can guess, and archeologists can only dream. But the tiny segment of Palenque excavated to date has already revealed art treasures unequalled in Middle America.

At Palenque I met Merle Greene Robertson. White-haired, incredibly energetic, Mrs. Robertson has spent 13 years copying and recording Maya art. She has made rubbings of 600 monuments at 50 sites for Tulane University. She worked at Tikal, and is now in her third year of recording the stucco images at Palenque. I asked Mrs. Robertson, steeped as she is in Maya art, what she regards as its salient characteristics.

“Well, first, it reflects its environment. The Maya lived in the jungle, and in their art you find an endless variety of plants and animals. Not long ago a herpetologist was looking at some stuccos, and he identified several species of snakes, each accurately portrayed.

“Then the buildings of Palenque—with their large openings—bring the outside in. The Maya were the summation of their environment.

“As far as technique is concerned, they

were fantastic. For example, stucco figures were put on naked, and then clothing was added layer upon layer. Now stucco is simply plaster, and it dries rapidly. But the Maya added a bark extract and other substances to it that kept it malleable for a long period of time, permitting them to fashion incredible detail. But the secret is lost. No modern artist could duplicate these Maya works of art.”

MOST VISITORS who come to Palenque do so to visit the somber, awesome tomb of Pacal, who ruled the city-state from A.D. 615 to 683. On a bright June morning I followed their example and arrived among the ruins at 6:30 a.m. At that hour the air soothes with the accumulated coolness of the night, shadows stretch across the grassy plazas, and the heightening sun warms the buildings as it has for almost a millennium and a half—an old friend, indeed an old god, paying his daily visit.

You clamber up steep steps of the Temple of the Inscriptions—Pacal’s tomb—feeling the flood of sunshine on your back. At the top, high above the plaza, you pause for breath and gaze out across the green countryside; to ancient eyes, that broad vista might have seemed a world. Turning away and entering the temple proper, you pass a glyph-covered wall—no one can fully read its messages.

At this very spot, in 1949, Dr. Alberto Ruz Lhuillier—then in charge of the excavations at Palenque—noticed round holes in a slab set into the floor. Raising it, he found that it led to a secret passage clogged with rubble and earth. Four years were required to clear the passage, which descended into the heart of the pyramid. At the bottom Dr. Ruz found a chamber with five skeletons. Removing a triangular slab from a side wall, the archeologist shone his flashlight into a large vault. Shadowy stucco figures with elaborate feather headdresses stood solemnly along the walls and, almost filling the center, he saw a huge sarcophagus. Dr. Ruz had discovered the most elaborate pyramid tomb in the New World.

With Merle Greene Robertson and Professor David Kelley, an expert on glyphs from Canada’s

(Continued on page 760)

When the world was young, the Maya burned precious incense to nourish the gods of creation. “Food for the gods,” a bittersweet resin called copal is still served to divinity, this time by a Quiché Maya who swings her censer as she enters the Church of Santo Tomás at Chichicastenango in the Guatemala highlands.



Quiriguá's sculptures: sermons in stone

ONE-MAN RULE... marriages of convenience... struggles with usurpers... self-aggrandizement. Faces and inscriptions record the power politics of eighth-century Guatemala. According to recent interpretations of hieroglyphs here, a newcomer from nearby Copán named Two-Armed Sky assumed power, probably married into a local dynasty, and erected huge carved stones to his own glory. His name comes from a literal reading of his personal identification glyph.

The 42-year-old ruler stares serenely from a 20-foot sandstone stela raised in 766 (right). Ann Coe, wife of University of Pennsylvania archeologist William R. Coe, cleans moss from the carved feathers of a towering headdress of god masks.

The successor of Two-Armed Sky immortalized himself with a huge boulder (left). Below the panel of glyphs, an abstract dancer holds writhing serpents in "one of the most complicated sculptures in the Maya world," according to Dr. Coe. He is restoring the site in a five-year program sponsored by the University Museum, the National Geographic Society, and the Guatemalan Government.

Crossed eyes (right) identify a sun-god found by Dr. Coe. Archeologist David Sedat checks giant earplugs and necklace.



EMBLEM GLYPH FOR QUIRIGUÁ



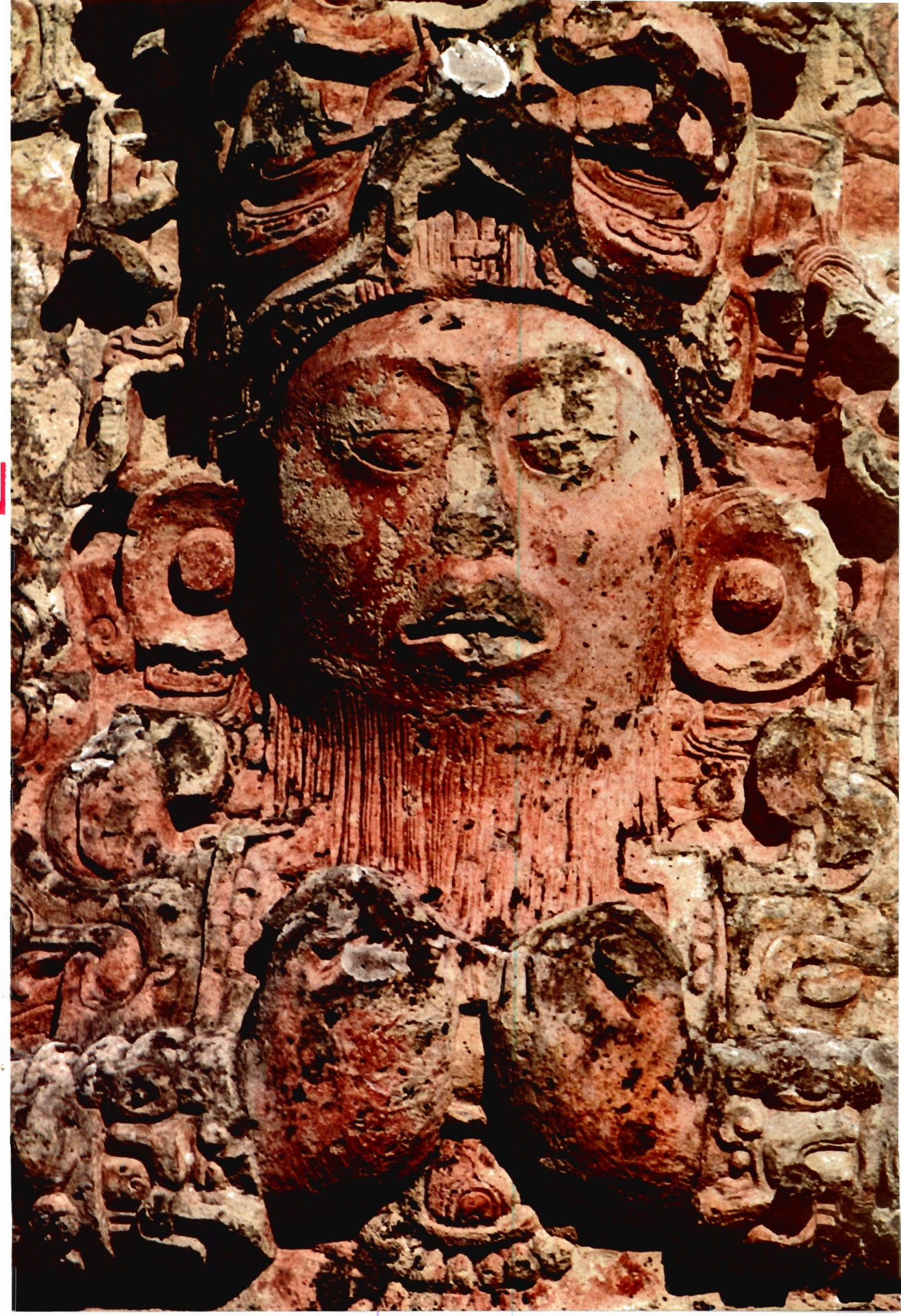
OTIS IMBODEN (ARIZONA)





Living face and countenance of stone share the strength of a common heritage. The Oriental cast of their features bespeaks the Asian forebears of all American Indians. At Copán in Honduras, a bearded ruler (**right**) still flushes red with paint that once covered his stela, erected in 782. Leaders

may have held the allegiance of their people by granting prestigious ceremonial tasks. A system of rotating religious duties prevails today in the highlands, home of this straw-hatted Guatemalan elder of San Juan Atitán (**above**). Men win honor by doing voluntary service.



(Continued from page 755) Calgary University, I descended the stairway found by Ruz. The limestone passage glistened moistly. You go down, steeply and deeply, through a series of brilliantly engineered corbeled vaults. The awesome passage drops away before you like the nave of a cathedral plunging into the depths.

Ordinarily, the tomb of Pacal is barred. But this day I was accompanying Mrs. Robertson and Professor Kelley as they studied the rectangular slab above the sarcophagus (facing page). The complexities of the inscription enthralled them for hours, permitting me to stand quietly and contemplate this wonder of pre-Columbian art.

WHAT IMPRESSES YOU when you enter the tomb of mighty Pacal? The silence. The void that comes when time, too, dies. For 1,300 years Pacal had reposed here in absolute silence, in total darkness. He lies here still. And though the world has found him, the vault—lost to sunlight and starlight, to solstice or equinox—seals this dead king into a bleak eternity.

We crawled under the great slab and Mrs. Robertson loosened stone pegs in the coffin lid. While she shone a flashlight through one hole, I peered through the other. The interior glowed red with cinnabar—color of the east, where the sun is reborn each day, and where man too can hope for rebirth—and I could discern fragments of a dark skeletal foot.

Mrs. Robertson and Dr. Kelley mounted the great carved slab in their stocking feet to examine the glyphs and the various portraits

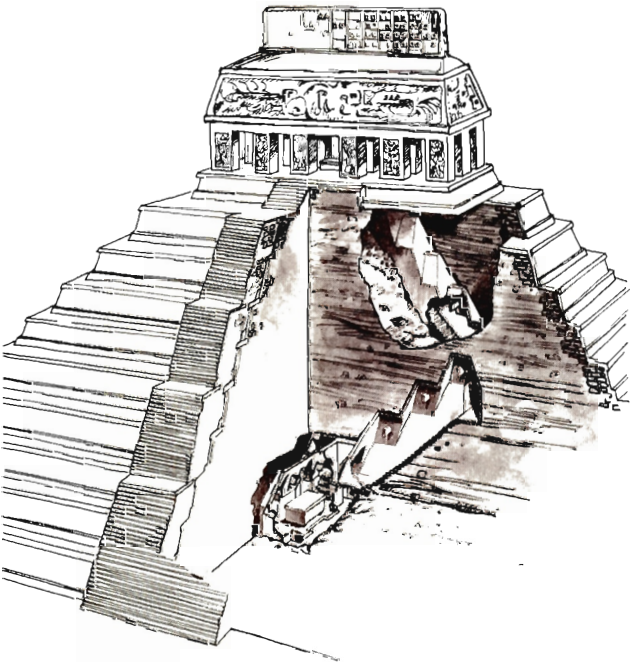
under a strong light. The central figure, of course, is Pacal himself. One interpretation holds that the slab depicts his assumption among the gods after his illustrious earthly career. He lies in a curious posture and his right foot is clubbed. As the two scholars concentrated on his other foot, they noted a slip of the artist's chisel on the big toe. After close study, Dr. Kelley cried, "No, it's not a mistake! That's a split toe, a congenital defect. I have it myself."

He peeled off a sock and, comparing his toe with Pacal's, verified that indeed they suffered from the identical split. The sculptor had not erred—a towering testimony to the verisimilitude of Maya art.

From evidence in the tomb, portraits of other rulers of Palenque, and inscriptions, scholars are fashioning a genealogy of the dynasty that produced Pacal and raised the city to greatness. The period ranges from A.D. 501 to 783, and offers several surprises. Unlike other Middle American peoples, the Maya accorded importance to women. Two queens had ruled in Palenque: the Lady Kan Ik, who reigned from 583 to 604, and the Lady Zac Kuk, probably the mother of Pacal, who occupied the throne from 612 to 615.

Two portraits of Pacal depict him with a club foot. And Merle Robertson's study of the stucco images convinces her that the dynasty suffered from an unusual incidence of deformities. She suspects that this resulted from repeated inbreeding within the royal family. Pacal, at least, seems to have married his sister, Lady Ahpo Hel. Similar practices prevailed among the Mixtecs of southern Mexico

760



Frozen in a perpetual fall, Pacal, the great ruler of Palenque, drops at the instant of death into the jaws of an underworld monster, just as the sun sinks each day in the west. This interpretation holds that, again like the sun, he will ascend into the heavens, thus fulfilling a cosmic cycle. This exquisite bas-relief is carved on a 12-foot sarcophagus lid of limestone. The cross behind the ruler represents the sacred *ceiba* tree with roots in hell, trunk in life, and branches in the heavens, where a celestial bird perches.

Pacal died in A.D. 683. The five-ton lid remained hidden until 1952, when a Mexican archeologist reached the crypt under the Temple of the Inscriptions (left).

DRAWING BY RICHARD SCHLECHT;
PHOTOGRAPH BY MERLE GREENE ROBERTSON AND LEE HOCKER





Striding through a cloud-haunted sky, Lord Sun illuminates Uxmal before dropping into the underworld of night. Ancient planners apparently positioned buildings with the

and also, curiously enough, among the dynasties of Egypt.

Bluntly, in the Temple of the Inscriptions, one cannot avoid an implicit comparison to the crypts of the Egyptian pharaohs. The similarities between the tomb of Pacal and of those who ruled earlier beside the Nile are striking. In each instance pyramids rise above the burial sites and the builders took elaborate precautions to conceal the entries; inside the tombs grave goods accompanied the corpse into the afterlife; the sarcophagus top bore the likeness of the dead king.

Yet, Egyptian pyramid tombs—with their detailed reliefs depicting virtually every phase of daily life—remain exquisitely decorated passageways to eternity. In contrast, the burial vault of Pacal seems at once more austere and more barbarous. Five youthful victims had been slaughtered outside his door to serve him in the hereafter. His pyramid speaks of savage grandeur.

ALL ITS SPLENDOR could not save the city of Palenque. It died abruptly at the outset of the ninth century A.D. The same fate soon overtook the other city-states in the center of the Maya world. The

convulsion began on the frontiers and traveled inward. Within a few generations, Classic Maya civilization lay supine. Peasants were building cooking fires in abandoned temples; once-great ceremonial centers lay empty and desolate.

Most Mayanists advance uncertain theories for the sudden collapse of the Classic culture. A failure of trade, overtaxing of agricultural means, earthquakes, hurricanes, invasion are cited. So is disease, and medical evidence indicates that as the Classic Age waned, the Maya shrank in stature as they fell prey to malnutrition.

Sir Eric Thompson has written that peasant revolt played a key role in the collapse. Professor Alfredo Barrera Vásquez agrees.

"The Maya collapse," he said, "is a clear-cut matter for me. That cultural dichotomy of the Maya—the gap between the elite and the peasantry—grew wider with the passage of time.

"At a certain point the ever-increasing demands of the aristocracy became unbearable. The people rebelled. Their only weapon was their overwhelming numbers. They probably strangled most of the overlords with their bare hands. Some of the rulers, of course,



help of astronomy and heavenly powers. The Pyramid of the Magician, right, and the Nunnery Quadrangle, center, align with the sun's path at setting on the summer solstice.

escaped. These may have returned with new allies, the Toltecs, a few years later to reconquer parts of their former domains."

The Classic Period ended in chaos, but its final years saw a certain sunset glory. Nowhere is it more manifest than at Uxmal, 45 miles southwest of Mérida. The name in Maya means "thrice built," and implies that Uxmal survived more than one catastrophe. A chronicle reports that "during the Katun 2 Ahau [probably A.D. 987 to 1007] Ah Zuytok Tutul Xiu took up residence at Uxmal." The Xiu family, of Mexican origin, soon became completely Mayanized and ruled in the city from approximately A.D. 1000 until the eve of the Spanish conquest.

The architecture of Uxmal, with its facades of golden limestone, represents the full, glowing splendor of Maya artistic achievement (above). One 320-foot-long building, called by the conquering Spaniards the Governor's Palace, has been hailed as the most beautiful edifice in pre-Columbian America. After spending a long afternoon watching the play of light and shadow on its frieze, composed of 20,000 intricately decorated blocks carved with implements of stone, I see no reason to retain the modifier "pre-Columbian."

In February of this year, Elizabeth II, Queen of England, paid a state visit to Yucatán. One event in the royal schedule excited much comment. More than a thousand notables gathered for a gala outdoor reception among the ruins of Uxmal on the night of February 27. The local authorities offered a program of Mexican folkloric songs and dances for the royal delectation. Among the presentations was an ancient invocation to the Maya rain god, Chac. Although rain is all but unknown in Yucatán in the month of February, Chac obliged by dousing the assemblage with a generous downpour.

AT THE QUEEN'S TABLE that evening sat a retired schoolmaster named José Xiu. He is descended from Ah Zuytok Tutul Xiu, and once his ancestors ruled at Uxmal.

José Xiu lives on a street without a name in the town of Oxkutzcab. I found him in his house, an old man with white hair and a face that could have come from a Maya stela. He said, "The last Maya ruler of this area was my ancestor, Tutul Xiu. The priests had foretold that soon white men with beards would arrive from the ocean and become new

Memory has fled for many families in the Mexican highlands, who know no allegiance to Maya life or lore after centuries of buffeting by outside influence. When the handful of conquistadors won the highlands by playing on hatreds among Maya tribes, land and people were divided among the victors. Thereafter, many Indians adopted the Europeans' clothing, religion, and language. Those who moved into towns became Ladinós. Today Indians still remaining on ancestral lands are regaining ownership under a Mexican Government program.

The pet of this rural family speaks to us of the Maya past, when dogs were raised as sacrificial offerings and ceremonial food.



SINGING DOG PLAYS A GOURD DRUM AT A NEW YEAR'S RITE, MADRID CODEX; DAVID BRILL, RIGHT



gods. So when the Spaniards arrived, Tutul Xiu offered no resistance. Because they believed the prophecies of the priests, the Maya of this region willingly accepted the conquest. In fact, when Tutul Xiu was baptized, the conquistador of the Yucatán, Francisco de Montejo, was his godfather."

Does José Xiu visit Uxmal often? "Yes," he nodded gravely, "and the other ruins as well. When I see them, I am very proud to be a Maya. I am continually surprised to see what my people did—achievements that even modern technology cannot match.

"But we Maya do not look only to the past. Education is changing our lives. Today we

are chemists, physicists, artists. We will be as great in the future as we were in the past."

When I left, Señor Xiu returned to his work—a peculiarly Maya undertaking. He was preparing an article for the newspaper, *Diario de Yucatán*, on the names of stars.

AMONG THE MAYA, even the memory of greatness died with the Spanish conquest. Some, like the Xiu, capitulated without a struggle. Others fought doggedly and well. In at least one case, a Spanish renegade guided the Maya to key victories over his former compatriots, and apparently he did it for love of a woman.



Along with a number of other Spaniards, Gonzalo Guerrero and Gerónimo de Aguilar fell into the hands of the Maya in Yucatán in 1511. All but these two died or fell victim to the sacrificial knife. Both men survived as slaves, and they soon managed to attain positions of prominence and trust. In 1519 the conqueror of Mexico, Hernán Cortés, landed at Cozumel Island off the east coast of Yucatán, and sent a message to his two captive countrymen.

Only Aguilar responded. When he reached Cortés, he reported that his erstwhile companion, Guerrero, "was with the cacique of Chetumal and married an important lady of

that land by whom he has children. He is captain for a cacique named Nachancam and on account of having won many victories against the enemies of his lords he is greatly beloved and esteemed. . . . He did not come . . . because he has his nostrils, lips, and ears pierced and his face painted and his hands tattooed according to the custom of that country. . . . Indeed, I believe he failed to come on account of the vice he had committed with the woman and his love for his children."

Chroniclers later reported that Guerrero masterminded many a Maya victory. According to a Spanish official report, he died in action in 1536: "During the combat which



Sky-watchers of antiquity charted the heavens from this observatory at Chichén Itzá. With the data, priests selected auspicious days for planting and harvest, warned of eclipses, and directed sacrifices. During a recent dry spell, a folk healer conducted a rite to the



Chacs, or rain gods, at Chichén Itzá (**facing page**). Domingo Cen Balam, whose last name means “jaguar,” places food offerings on an altar. Wiggled in sisal, a friend blowing on a gourd portrays a rain god. The men share the chicken, bread, and drink after the deities have feasted on the spirit of the sacrifice.

NORTH STAR GOD HOLDS A CORN GLYPH AND ANOTHER THAT TOGETHER INDICATE ABUNDANCE, MADRID CODEX

had taken place... a Christian Spaniard named Gonzalo... had been killed... He is the one who lived among the Indians of the province of Yucatán for 20 years or more, and in addition is the one whom they say brought to ruin the Adelantado Montejo... he came with a fleet of 50 canoes... to destroy those of us who were here... This Spaniard who was killed was nude, his body decorated, and he wore Indian dress...”

But not all the gallantry of Gonzalo and the Maya remnant could stem the tide of history. The banner of Spain rose everywhere in Middle America; friars razed the ancient temples, smashed the idols, burned the books.

NOW, ONLY THE RUINS REMAIN. But they possess a power of their own—an immortality compounded of stone, silence, and solitude. On June 21, the date of the summer solstice, I went to the Caracol at Chichén Itzá, an astronomical observatory (left), just before sunset.

Night comes softly in Yucatán at that time of year. A pastel sunset briefly splashes the western horizon. In the darkening sky appears the evening star, Venus—a votive lamp to the dead sun. So highly did the ancient Maya priest-astronomers regard Venus that they made it a god.

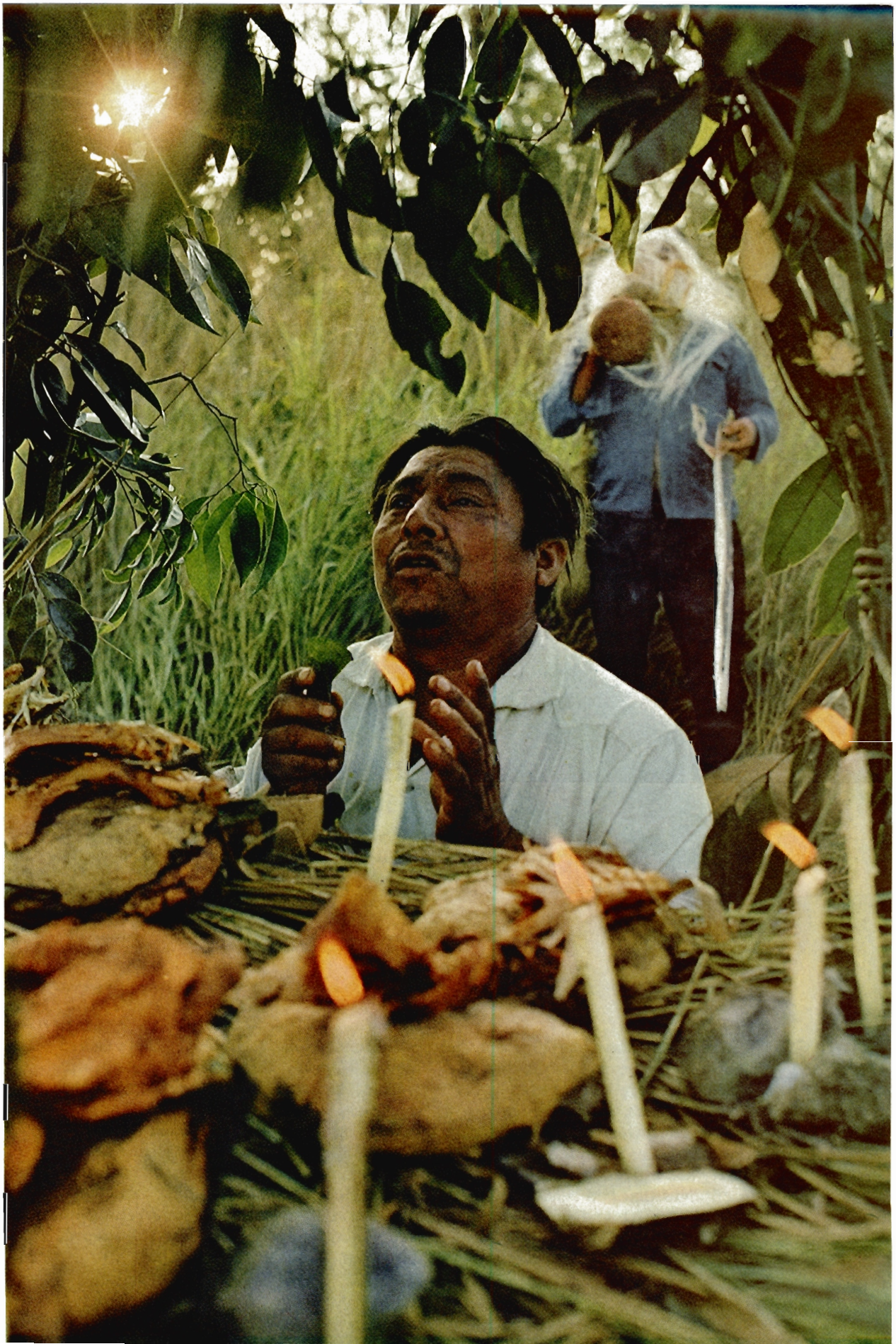
Night brings a merciful quiet to the highway that bisects Chichén Itzá. In the east the moon rises, a round radiance of platinum. Somewhere a hidden bird, the tapacamino, sounds his anguished call. In the lambent moonlight the deserted ruins loom pale and lovely and sad.

How many nights did the priest-astronomers pass here in the high, lonely silence? How many nights illumined only by the heavenly bodies whose passage governed their own fate and that of their people? How many nights observing, recording, computing?

All gone now. Overhead the constellations still wheel in their changeless patterns. But new men in new countries with new instruments now track their progress. Chichén Itzá lies empty in the silver moonlight; the jaguar’s roar resounds through the deserted temples of Tikal and Yaxchilán; the demons of Copán direct their sculptured shrieks at history, but history has discarded them.

The Maya, Children of Time, knew this too would happen. Long ago one of their prophets wrote: “All moons, all years, all days, all winds, take their course and pass away.”







THE MAYA *Riddle of*

By GEORGE E. STUART, Ph.D. STAFF ARCHEOLOGIST

MURDER and Maya hieroglyphs make an unlikely combination, but the two came together one evening several years ago, deep in the rain forest of northern Guatemala. It happened at La Naya, soon after Scotsman Ian Graham and his party had arrived to draw and photograph inscriptions that had been reported at the remote ruin. They found much more than they bargained for.

"I never thought Maya archeology would

be that dangerous," Ian told me when I visited him at Harvard University's Peabody Museum of Archaeology and Ethnology, "but I sometimes feel fortunate to be alive. The looters are quite serious about their business."

At La Naya, Ian and his group had unwittingly interrupted a gang of men engaged in cutting apart an ancient stone monument. Later, as the archeologists were setting up camp, shots rang out and Pedro Arturo Sierra, one of Ian's assistants, fell dying.



Seeking keys to the past, Ian Graham plays lights across eroded details of a stela at Yaxchilán, Mexico (left). The Scottish scholar from Harvard University has undertaken the task of photographing and drawing all known Maya inscriptions. His work will provide an invaluable resource for interpreting the mysterious writing, a complex system of both realistic and abstract pictures. Another aid, a computer, analyzes glyphs for Professor Leonardo Manrique and Cristina Álvarez Lomeli (above) of Mexico's National Institute of Anthropology and History.

the Glyphs

Photographs by OTIS IMBODEN NATIONAL GEOGRAPHIC PHOTOGRAPHER

The shooting was an isolated incident. But looting still occurs frequently enough to deprive us of priceless knowledge of the fascinating ancient Maya civilization.

At Naranjo, a site near the Guatemala-Belize border, half the 40 known monuments have been attacked. Some of the finest examples of ancient American sculpture lie scattered in meaningless fragments over the forest floor. In their efforts to slice beautiful stone carvings into portable, marketable

segments, looters have totally destroyed many precious hieroglyphic inscriptions.

Such depredation—wreaked with tools as crude as sledgehammers—is doubly deplorable now. Researchers need every inscription that men like Ian Graham can record, for in the past two decades Mayanists have made significant progress in deciphering them.

Until recently it was thought that these intricate glyphs dealt only with the calendar and the gods. Now, however, scholars have

unraveled the names of rulers and fragments of history that indicate the ancient Maya sought an immortality of sorts in stone.

The brilliant civilization that rose in the lowland jungle of the Yucatán Peninsula endured at places like Palenque, Tikal, and Copán until about A.D. 900, when a complicated series of circumstances wrecked the delicate equilibrium of what archeologists call the Classic Period. Not the least of Maya achievements was the most complex writing system ever devised in the Western Hemisphere.

Learning to Read Messages in Stone

Maya writing appears strange to us, for we see it across a wide gulf of time and culture. Its elements usually appear in what Maya epigraphers—specialists in the writing—call “glyph blocks.” These are the square or rectangular elements that make up the separate units of an inscription.

Glyph blocks may be arranged in a horizontal row to be read left to right, or in vertical columns to be read from top to bottom. In long inscriptions, such as the exquisite Tablet of the 96 Glyphs from Palenque, two columns are to be read at a time, top to bottom.

Individual glyph blocks hold the actual elements of the writing. In all, 800 or more glyphic elements are known. Authorities do not agree on how many of these have been deciphered accurately; estimates range from 5 to 30 percent.

Usually each glyph contains a dominant “main sign” that occupies most of the block. To this are attached any necessary affixes, or smaller elements. Main signs often have two forms. One is abstract and geometric; the other is the head of a human, animal, or bird that presumably represents a god or mythical being. Even the numbers, most often shown with combinations of bars (representing fives), dots (representing ones), and shells (zeroes), have different head forms. The numbers almost always refer to calendar matters.

To the Maya priest, time and its endless passage of days inspired great awe. Anyone

who has beheld the brilliant night sky from a dugout canoe on the Rio Usumacinta, or from the pinnacle of a ruined pyramid on the plains of northwestern Yucatán, can perhaps approach some understanding of this Maya obsession—the effort to bring the moving universe into harmony with the seasons, and the regular passage of days into coherent unity with the errant moon.

In order to perpetuate their unique affinity with the cadence of time—and to meet the year-to-year needs of the farmers who sustained them—the Maya employed the complicated calendar system developed by unknown Middle American forebears.

Only the priests and rulers possessed complete knowledge of the calendar and hieroglyphic symbols. These were recorded by sculptors—with rarely an error—on stone, or painted by scribes in incredibly delicate rows of glyph blocks we find on pottery, walls, or the pages of surviving Maya books.

Our increasing ability to decipher this writing has come about largely in the past century, and is an epic of both arduous exploration and meticulous scholarship.

Early Bishop Left Keys to the Puzzle

We would have been much the poorer without the account of the Maya written in the 1560's by Diego de Landa, third bishop of Yucatán. Although the original was lost, an indefatigable French antiquary, the Abbé Brasseur de Bourbourg, found an abstract of the famous Landa text in a Madrid library in 1863. It contained, in addition to an amazingly complete account of Maya ways at the beginning of the colonial period, a description of some of the workings of the calendar, accompanied by recognizable pictures of glyphs for *kin*, or day, and the names used for various days and months.

Beginning in 1880, it took Ernst Förstemann, head librarian of the Royal Library at Dresden, 14 years of spare-time study to figure out the fundamental workings of the Maya calendar. He found a wealth of raw

Magnificent obsession of the Maya, time reached its most elaborate expression in glyphs such as these on a limestone lintel from Yaxchilán. Combining head forms and full figures, they portray a single date. Here animals represent blocks of time; the profiles of gods are numbers. The monkey, right, second from top, signals “day”; in his hand a god's head, gazing skyward, means six; the skull below the hand, facing left, is 10. Thus, this glyph stands for 16 days. The sum of the days in all these glyphs is added to a starting point in 3114 B.C. to equal February 11, A.D. 526, in our calendar.

PHOTOGRAPHED WITH PERMISSION OF THE NATIONAL MUSEUM OF ANTHROPOLOGY, MEXICO CITY, 1/4 ACTUAL SIZE





material in Landa's account, as well as in the excellent drawings of monuments that Frederick Catherwood had made during his journeys with John L. Stephens between 1839 and 1842, and the yet-unmatched photographs of Englishman Alfred P. Maudslay that were just beginning to appear in print.

Förstemann possessed one item of prime importance that no one had yet utilized: the Postclassic Dresden Codex, which had reposed since 1740 in his library. The manuscript had been purchased in Vienna; most authorities think it may have been part of the shipment of New World curiosities that Cortés himself sent to his sovereign, Emperor Charles V, who resided in Vienna in 1519.

The Dresden Codex is painted on fig-bark paper sized with a thin layer of white plaster, folded screenlike into 78 pages. It is one of only four major Maya writings to survive, including works in Paris and Madrid, and a book in Mexico City whose authenticity is doubted by some authorities.

Today, "to all intents and purposes, the contents of the Dresden Codex are known," noted the late Sir Eric Thompson, dean of all Maya scholars. His definitive study of the document shows it was a book of divination.

Among its thousands of glyphs, delicately drafted figures, and rows of numerical notation lie sacred almanacs of good- and bad-luck days, tables charting the orbitings of Venus and predicting solar eclipses, and even warnings of divinely bestowed diseases.

Each Day a God to the Maya

Förstemann started from scratch in trying to decipher the Dresden manuscript. It is a tribute to his genius that he not only managed to grasp the repeating sequences that paced Maya eternity, but was also able to calculate backward in time—and in Maya terms—the base date of the calendar used from the Early Classic Period onward.

There were two main cycles; one of 260 days, the other 365. These sequences meshed like gear wheels (graph, page 783). Each day was named in terms of both the 260- and 365-day cycles, and the full name of any single day could repeat only every 18,980 days—once every 52 years.

To the Maya users of this calendar, the very days were gods, as were numbers. These moved in relentless procession through the eternity that priests of Quiriguá, Guatemala, must have glimpsed in A.D. 766, when they



VASE FROM DUMBARTON OAKS COLLECTION, PHOTOGRAPHED BY OTIS IMBODEN AND EMORY KRISTOF

produced the calculation on Stela D that reaches a day 400 million years in the past!

How did the priests handle such stupendous calculations? Simply by a method of positional notation such as we use when we write "1975." In our case, the four positions of numbers represent, from left to right, 1000's, 100's, 10's, and 1's. The Classic Period Maya customarily used *five* positions and a modified "base-20" arithmetical system to record dates.

Archeologists call such inscriptions "Long Count" dates, and can correlate them with our own calendar. Still there remains a tantalizing mystery: Long Count dates record the number of days that had elapsed since the beginning of the Maya calendar, a date that most Mayanists agree corresponds to our own August 11, 3114 B.C. What, one can only wonder, was the high significance of that day, long before Maya history began?

We found just such a Long Count date last year while I was helping to map the site of Cobá in collaboration with Mexico's National Institute of Anthropology and History, and with support from the National Geographic Society.

Domingo Falcón, the custodian of Cobá, and his brother, (Continued on page 785)

You are there, in a Maya throne room of the eighth century, transported by a realistic painting on a tomb vase (above). The seated ruler, right, stares into an obsidian mirror. Does he ponder his past, represented by the virile youth at left? Is he "the mirror in which the people see themselves," as lowland Maya once said, using a word—*nen*—to express the triple meaning of ruler, to contemplate, and mirror? Faded glyphs perhaps record a funeral chant; one may stand for Yaxchilán.

To make this "roll-out" photograph, NATIONAL GEOGRAPHIC technicians built a special strip-camera setup. A rotating turntable holding the pot is synchronized with a motorized 35-millimeter camera. The speed of the moving film and the width of the slit in the shutterless camera determine the exposure.

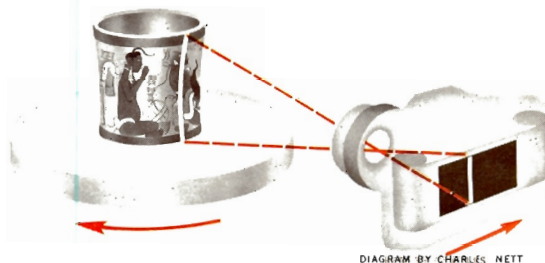


DIAGRAM BY CHARLES NETT



Ceremony of self-sacrifice unfolds on an exquisite Maya vase, buried with a young woman at Altar de Sacrificios, Guatemala. Jade inlays in her teeth identified her as an aristocrat; she evidently died to accompany an older noblewoman, buried below her.

OTIS IMBODEN, COURTESY MUSEUM OF ARCHEOLOGY AND ETHNOLOGY, GUATEMALA CITY

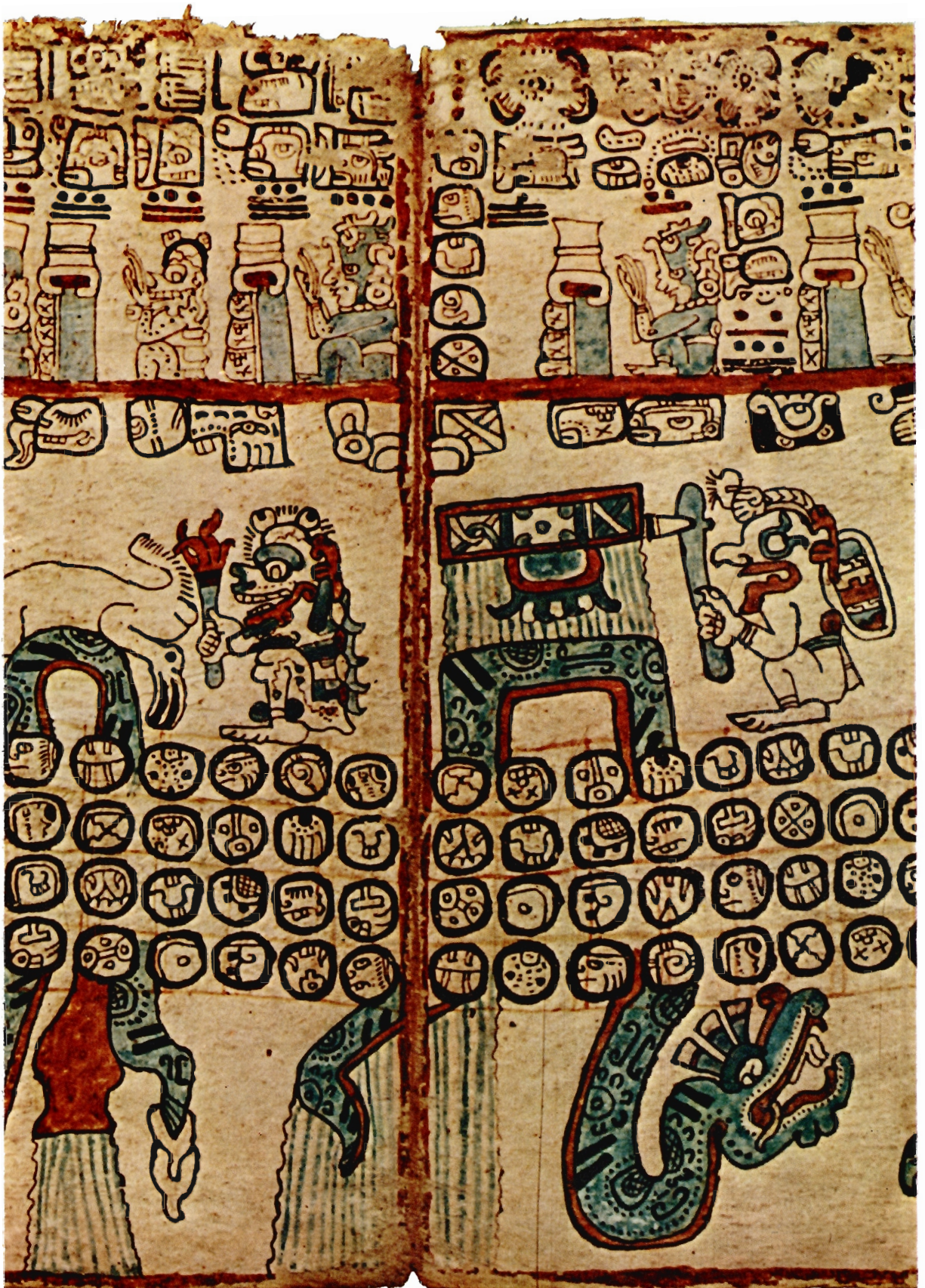
The vase bears glyphs that date the suicide to April 21, 754, and identify the participants. The male dancer, in jaguar-skin headdress, mittens, and trousers to impersonate the god of the underworld, is the renowned ruler of Yaxchilán, Bird Jaguar. The snake



above the dancer at right symbolizes a completed life cycle. At lower left, the white-faced victim takes her life with a leaf-shaped flint, resembling a blade found in her grave. A leader from Tikal, upper left, holds a jar of blood offerings. Red-speckled areas on other costumes pinpoint spots often chosen for ritual bloodletting to win divine favor.

Farmer's almanac of bygone centuries, the Madrid Codex (far right and foldout pages) once guided Maya priests performing divination rites relating to hunting, weaving, planting, bee-keeping, and rainmaking. A scribe painted the codex on a folded 22-foot length of paper made of the fig tree's inner bark that had been pounded

FOLLOWING PAGES FOLD OUT



UNDULATING sky serpents send rain; their voice is the thunder. Two are rattlesnakes. The circles of crosshatching on the serpents' skins are the

same as that in the glyph for the fifth day, Chicchan, which is therefore a proper time for rain ceremonies.

MERCHANT GOD Ek-Chuah grasps a copper ax and carries his pack on a tumpline. Above his head the glyph

with black background names him; its design resembles his own eye.



and coated with fine white lime plaster. It was read left to right on both sides. Here, in Madrid's Museo de América, GEOGRAPHIC photographer Victor Boswell uses a guide to assure accurate color in the four-page reproduction that follows.



OTIS IIMBIZIN



WATCHED OVER by good and evil gods, orderly rows of glyphs name the 20 days of the Maya "month," over and

260-day cycle that was essential for forecasting. To use this calendar, a priest probably counted a random pile of corn kernels while reading

the days from left to right across the pages. The day reached when the grains ran out determined the prediction. For example, the glyph for

Day 1, or Imix — resembling a baseball fielder's glove — was always auspicious, a good time to plant maize, a portent of plenty.



GOD OF DEATH stands upright, adorned with "death eyes," bells jingling on his head, neck, wrists, and ankles. Glyph over his head shows the

closed eye of a dead person, also a sign of the sixth day, Cimi. A divination landing there portends serious illness or death.

MAIZE GOD, with a vertical line through his face, sits on the red line, directly above. Here he holds the Imix glyph of

abundance and the Kan sign for corn, also the fourth day.





NATIONAL GEOGRAPHIC PHOTOGRAPHERS OTIS IMBODEN AND VICTOR P. BOSWELL, JR. MUSEO DE AMÉRICA, MADRID; ACTUAL SIZE

TWO CHACS, or rain gods — one upside down — wield battle axes.

Yucatán Maya today still say of wet weather, "Chac is falling."

IT'S RAINING frogs and turtles! These animals also appear in the Maya zodiac. Swimming turtle with boxlike shell, at top,

shares his hook-nosed profile with four name glyphs nearby.



The past was more than prologue to the Maya

A SON PRESENTS himself as even greater than his father in this magnificent bas-relief from Palenque. With the death of the ruler Pacal, left, his son and successor Chan-Bahlum, right, celebrated his ascension by building three beautiful temples and placing stone tablets in their inner recesses.

In this scene on the so-called Tablet of the Sun, Chan-Bahlum receives from his father his dynastic rights, represented by hand-held idols. Knotted burial clothes and other symbols on Pacal indicate that he is acting after death and is, in fact, deified. Both men have the high, flat forehead formed in infancy when boards were bound around the skull to give this much-admired deformity.

The shield at center, covering crossed spears of war, portrays the Sun God in his aspect as the Jaguar God of the underworld. Two other gods of that domain crouch below.

Once such scenes were believed to show only gods and priests. Then in 1959 an exciting breakthrough occurred when Tatiana Proskouriakoff, now of Harvard's Peabody Museum, correlated such scenes with newly interpreted glyphs to show they recorded historical events.

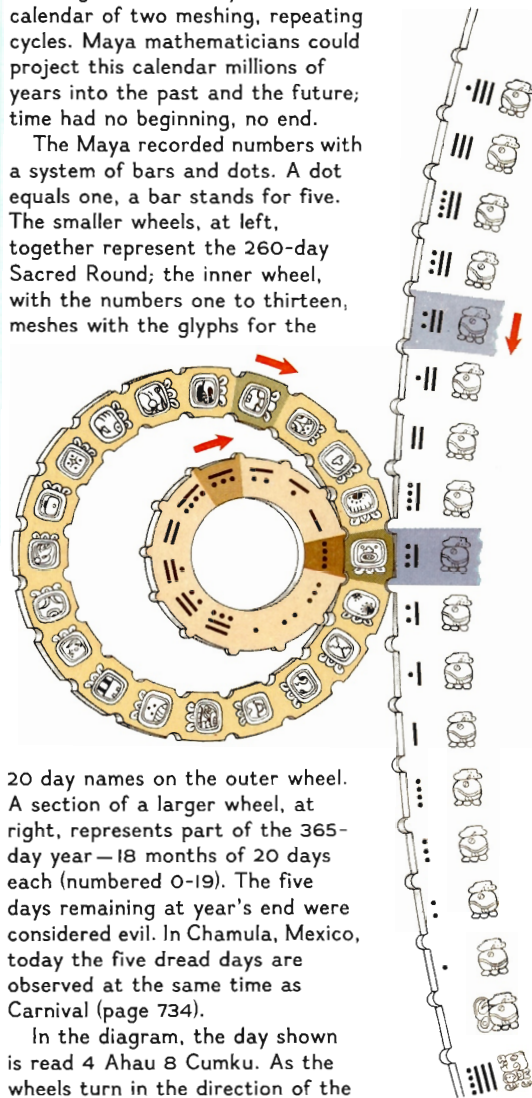
Glyphs above the shield tell of Chan-Bahlum's ascension in 684 and name his father and his mother, Lady Ahpo Hel, who also held power. The inscription includes the fact that Pacal lived into his fifth *katun* (80-100 years) and ends with an emblem glyph referring to Palenque.

Inscriptions around the edges, still not fully understood, refer to a day in 2360 B.C., probably important in Palenque mythology. Others refer to Chan-Bahlum and a distant ancestor when each was 6 years old, perhaps the age an heir apparent was designated. Clearly the inscriptions seek to relate the mythical past to the reign of living men, thus supporting their political power.

Only at Palenque are narratives told on such large tablets; elsewhere sculptors usually carved briefer texts on tall upright stones called stelae (page 791).

THE WHEELS OF TIME ground exceeding fine for the Maya. To be able to predict the seasons for farmers and astronomical events for religious rites, they utilized a calendar of two meshing, repeating cycles. Maya mathematicians could project this calendar millions of years into the past and the future; time had no beginning, no end.

The Maya recorded numbers with a system of bars and dots. A dot equals one, a bar stands for five. The smaller wheels, at left, together represent the 260-day Sacred Round; the inner wheel, with the numbers one to thirteen, meshes with the glyphs for the



20 day names on the outer wheel. A section of a larger wheel, at right, represents part of the 365-day year—18 months of 20 days each (numbered 0-19). The five days remaining at year's end were considered evil. In Chamula, Mexico, today the five dread days are observed at the same time as Carnival (page 734).

In the diagram, the day shown is read 4 Ahau 8 Cumku. As the wheels turn in the direction of the arrows, in four days it will read 8 Kan 12 Cumku. Any day calculated on these cycles would not repeat for 18,980 days—52 years.

DAVID ALAN HARVEY (FACING PAGE)
ARTWORK BY CHARLES NETT





JOHN M. KESHISHIAN, M.D. (ABOVE); OTIS IMBODEN



(Continued from page 773) Leonardo, were clearing brush from a mound when they uncovered part of a carved stone, all but buried by rubble. We carefully scraped away the dirt and rocks and roots, forgetting the mosquitoes and stifling heat as row after row of glyph blocks came to light. I recognized the characteristic calendar glyphs, with their bar-and-dot numbers. The piece obviously had broken from an upright monument, across the headdress of a large figure.

Glyphs Pinpoint a Day Long Ago

The exposed stone quickly dried to a uniform whiteness that obscured the badly eroded glyphs in the brilliant sunlight. Draping a heavy tarpaulin over me to form a darkened tent, I set to work with graph paper, tape, pencil, and flashlight, playing the beam over different glyph blocks at varying angles to bring finer points into view.

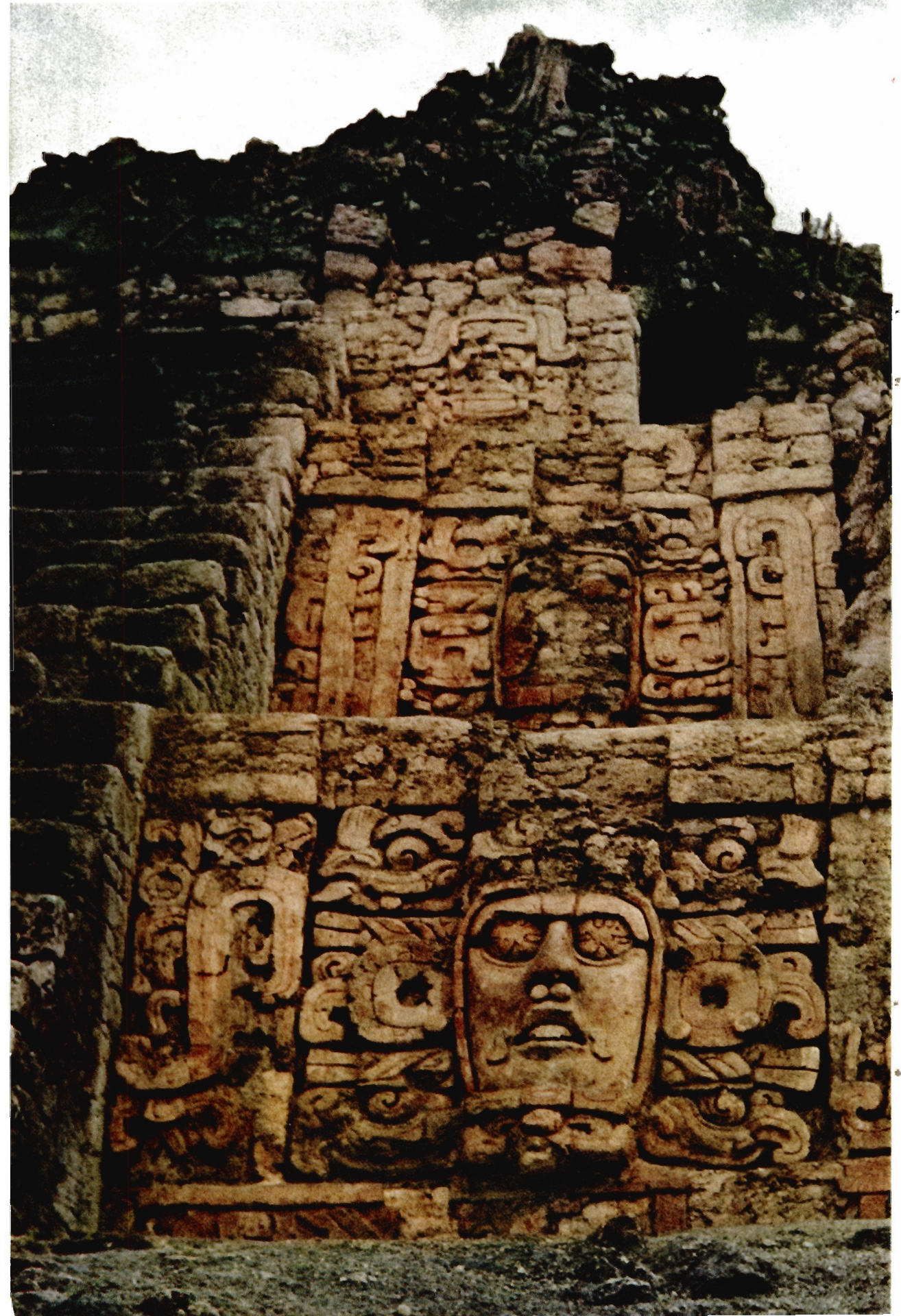
It took me several hours—emerging occasionally for a gasp of air—to complete a scale drawing of the inscription.

At last I began to count: First, the *baktun*, or 144,000-day periods—there were nine of these. Next, the *katun*, signifying 7,200 days; 17 of these. Then, ten 360-day periods called *tun*. The next two glyphs—the 20-day *uinal* and the bearded sun sign for *kin*, or one day—were accompanied by symbols for zero.

Arithmetic brought the day count out of the dim reaches of the fourth millennium B.C.: The inscription signified 1,422,000 days after that mystical August 11, 3114 B.C. The sculptor had carved the date—in our terms—of November 30, (Continued on page 788)

Crest of a ruin—perhaps the most massive in the Maya world—protrudes from a lofty forest canopy and hints at the majesty of Guatemala's isolated and mysterious El Mirador. A helicopter delivered NATIONAL GEOGRAPHIC photographer Otis Imboden to the top of this crumbling pyramid (above). In preliminary surveys, archeologist Ian Graham measured the remains of more than 200 buildings and a dozen great pyramids—one, he feels, surpassing the largest at Tikal, 40 miles away.

A causeway linking El Mirador and Tintal, 12 miles to the south, cuts arrow straight across a dry lakebed (left). Light and dark areas may be ancient canals and raised fields, indicating intensive agriculture.



What price looting?

SNATCHING MAYA ART from its setting, thieves feed a voracious black market for stolen antiquities. Would-be crooks discovered a treasure—these unusual stucco masks of the Sun God on a pyramid at Kohunlich, Mexico (left). In a switch on the usual pattern, an informer alerted government authorities in time to prevent the looting. Now archeologist Victor Segovia excavates the guarded site.

GEORGE E. STUART

Sacrificed to greed, Chac, the Rain God, lost his head in Tanchah sometime before 1971, when Dr. Arthur G. Miller, studying murals under a National Geographic Society grant, found only this gaping hole (right). The entire mural seemed hopelessly lost under 700 years of limestone accretions. Artist Felipe Dávalos Gonzalez, working with Dr. Miller, traced line and color to reconstruct Chac holding an ax and offering (upper right). He filled in the head based on a kneeling Chac alongside.

A shattered stela at Tikal (right) tells a sorry tale of loss to Washington, D. C., surgeon John Keshishian, center, who had admired it earlier at Aguateca, 70 miles to the southwest. Looters broke the heavy monument apart for easier transport and wrecked major glyphs. Police captured the men, but not before they had sold part of the loot. Miguel Orrego Corzo, Tikal National Park archeologist, right, and a guard discuss the impossible task of trying to safeguard countless Middle American sites.



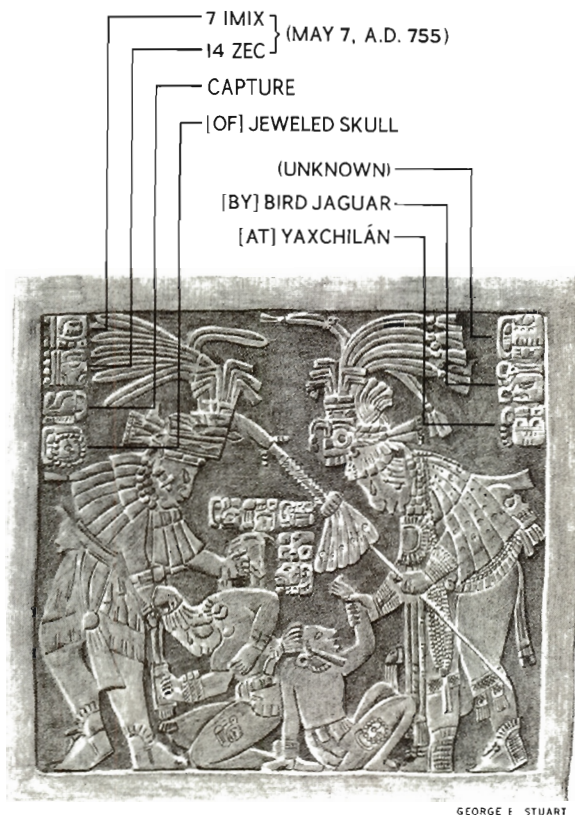
ARTHUR G. MILLER



OTIS IMBODEN



W. L. GARRETT, NATIONAL GEOGRAPHIC STAFF



Glorifying military conquest, this scene with inscriptions on a lintel from Yaxchilán shows actual historical events. Bird Jaguar, successor to Shield Jaguar, brandishes a spear and grasps a fallen captive, called Jeweled Skull. Bird Jaguar's subordinate grasps another prisoner's hair, the most demeaning of gestures. Glyphs on the conquered men's legs may be their names or those of their peoples. Such evidence points to city-states ruled by military might in the Maya world of the eighth century.

A.D. 780. Whatever his intent, he had added nearly a century to the known Classic Period occupation of Cobá.

Since dates or recordings of time spans pervaded Maya texts, scholars had long thought that the inscriptions dealt exclusively with the mechanism and mythology of time. But in the 1950's some Mayanists began to feel that this could not be so.

For one thing, too many noncalendrical glyph blocks had come to light; some short inscriptions contained no calendar material. The whole concept of what the Maya had been recording began to change rapidly.

Epigrapher Heinrich Berlin, who has devoted years to interpreting the panels that

grace the serene temples of Palenque, noted an interesting repetition: Among the inscriptions of Palenque and those of other Classic centers across the southern lowlands—among them Tikal, Naranjo, Yaxchilán, and Copán—there occurred strikingly similar glyph blocks. They contained the same kinds of prefixes, but different main signs, and they appeared in similar context from site to site.

The change in the main sign appeared to be dictated by the site where the glyph occurred. Berlin cautiously dubbed them "emblem glyphs," for each was generally found only at a specific site. He reasoned that such glyphs probably functioned either as place-names of the centers or, possibly, as names or symbols of their ruling lineages.

Emblem glyphs give us a fascinating glimpse of relationships among the Maya centers. An intriguing link between Copán, Tikal, and Palenque, for example, is hinted at by the occurrence of both the Tikal and Palenque emblem glyphs in the inscription on Stela A at Copán. Were the places tied politically? Were their ruling families perhaps related? We should know someday.

New Meanings Begin to Emerge

The greatest breakthrough of all came in 1959, when Mayanist Tatiana Proskouriakoff, then with the Carnegie Institution of Washington, D. C., found patterns in dates at Piedras Negras, Guatemala, that suggested a record of milestones in the lives of individuals.

On Stela 14 at Piedras Negras, a young man in Classic Maya regalia sits cross-legged in a large niche. A carved ladderlike band marked with footprints rises toward the niche, and a woman stands gazing upward at the seated figure. The monument, even by Maya standards, is unusual, but others bearing the same general motif occur at Piedras Negras—and each is the earliest in a group of monuments set up in front of a building.

"My first thought," recalled Miss Proskouriakoff, "was that the 'niche' motif represented the dedication of a new temple, and that the footsteps symbolized the rise to the sky of the victim of sacrifice. I thought I might find the glyphic evidence for human sacrifice. What I found instead started an entirely new train of thought and led to surprising conclusions."

Delving into the complex series of dates, Miss Proskouriakoff began to see intriguing patterns. For instance, an important event

appeared to be symbolized by what Sir Eric Thompson called the “toothache” glyph, a solemn bird head or other form bound by a knotted cloth. Another significant event was marked by the picture of an upended frog head. The time intervals associated with these events proved the most fascinating of all.

The total time span recorded for each set of monuments ranged from 56 to 64 years. Human life spans? In these same groups, the upended-frog event preceded the toothache event by from 12 to 31 years. One might reasonably infer that the frog represented birth, or birthday; and the toothache, some milestone in a person’s life—perhaps accession to power. The latter might be symbolized as well by the ascending footprints.

Analysis of all the monuments, their date combinations, and the portraits of women, children, and young lords only reinforced Miss Proskouriakoff’s startling contribution—our first glimpse of Maya political dynasties of the seventh and eighth centuries.

Miss Proskouriakoff’s interpretation of the Piedras Negras monuments opened a whole new world. David Kelley, now with the University of Calgary, found comparable data among the inscriptions of Quiriguá, one of the main centers of ancient Maya astronomy. Tatiana Proskouriakoff herself turned her attention to Yaxchilán, a major site upstream and across the Río Usumacinta from Piedras Negras. Again, the intellectual quest paid off.

The ruins of Yaxchilán are arranged in a great crescent that parallels the biggest meander loop of the Usumacinta. The terrain rises from the river in vast jungle-covered heaps, and the rich, dark drapery of green perfectly complements the ancient buildings and moss-covered carvings that lie about.

This was the setting for inscriptions that highlighted the lives and reigns of two of the most illustrious rulers of American antiquity—Shield Jaguar and Bird Jaguar, so-called simply from the pictures that make up their name glyphs.

A Tale of Rulers and a Usurper

Among more than a hundred scenes and texts on the lintels, stelae, and stairways of Yaxchilán, Miss Proskouriakoff found that the earliest recognizable ruler in the inscriptions, Shield Jaguar, was probably born around A.D. 650. Since there is no apparent record of his accession, she speculates, Shield Jaguar may have been a usurper. Also, since

some dates associated with him reflect a distinctive one-day “error,” he may have been a “foreigner” from northern Yucatán, where such a calendar anomaly often occurs.

Whatever his origins, Shield Jaguar appears to have lived to be more than 90 years old. Events of his military career are depicted in scenes of conquest. The lintels of one building suggest a combined obituary for the ruler and three other persons; their name glyphs are preceded by the distinctive prefix that signifies “female.”

Mexican archeologist Roberto García Moll, who is excavating at the site, may someday find—if Miss Proskouriakoff’s reading of the inscriptions accurately reflects the events of 1,200 years ago—a tomb containing remains of an old man and three women.

More is known of Shield Jaguar’s successor, Bird Jaguar. Near the riverbank where it now rests, I saw Stela 11, the underside of which shows Bird Jaguar around A.D. 750, just before he ascended to rulership. Elegantly garbed and wearing a mask of the Sun God, he stands before three kneeling figures, surely captives. A panel above memorializes the dead Shield Jaguar and his wife.

Fun With Puns Compounds the Problem

What did Bird Jaguar’s subjects actually call him? The question underscores the most difficult task involved in glyphic research—to discover the true phonetic translation, as opposed to the meaning, of the various pictures and symbols in Maya inscriptions.

With surviving colonial Maya-Spanish dictionaries, and grammars of modern Maya dialects, such translation would seem easy. After all, Michael Ventris cracked Minoan Linear B, an ancient script, by using code-breaking techniques—without even knowing what language it was in!

But Maya texts are filled with obscure allusions and metaphors, and—worse, for the epigrapher—their authors loved plays on words, or puns. We constantly find homonyms, words of identical sound with different meaning. This devastates, in advance, any cryptographic analysis of the glyphs.

As one example, small pictures of fish sometimes flank the large glyphs that lead off Long Count dates. Thompson has shown that one Maya word for a certain large fish was *xoc*, and *xoc* is also the root of the words for “count” or “read.” Thus, in the date-introductory glyph, the fish almost certainly



OTIS IMBODEN

signifies “count.” Another element in that introductory glyph is the *tun*, or the 360-day period. Thus the ancients might have read the whole glyph as, [“What follows is] the count [of the] tuns.”

Some experts disagree even on the basic principles of translating Maya glyphs. The Russian scholar Yuri Knorozov believes that, in addition to the inventory of word signs, there are a number of glyphic elements that represent not ideas but single syllables. Linked together, these syllables can “sound out” meaningful words and phrases.

Pieces Seem to Fit Together

Thompson disagreed. “Maya writing is not syllabic or alphabetic in part or in whole,” he wrote. Each glyphic element has an intrinsic meaning, he concluded.

Nevertheless, some of Knorozov’s readings work beautifully: His signs for *chu*, *ca*, and *ha*, for example—the very elements shown in the “capture” glyph in a scene with Bird Jaguar (page 788)—yield, by Knorozov’s system, the word *chucuh*. One of its meanings, according to the old dictionaries: to seize.

By employing similar phonetic principles, David Kelley and Yale University linguist Floyd Lounsbury have been able to read the name of the man found in the magnificent tomb beneath the Temple of the Inscriptions at Palenque as “Pacal,” or “Shield.” Sometimes the name is shown simply as the picture of a shield. In other instances it is written as three glyph elements that by phonetic interpretation read *pa-ca-la*.

In their careful work with the inscriptions and accompanying motifs, Lounsbury and



GEORGE E. STUART
AND DAVID S. STUART

With fear and wonder, eyes of the multitudes once fixed on the temple atop this man-made pyramid (left), towering some 12 stories at Cobá in Yucatán. Priests led processions up the great stairs to conduct rites on the heights.

In the plaza below, an eight-foot carved stela again stands sentinel (above, drawing). English scholar Sir Eric Thompson found the broken lower part in 1930. Last year Mexicans working with the author located the missing upper corner. The stela portrays a ruler, ceremonial bar in hand, standing on kneeling prisoners. The date: November 30, 780.

colleagues Linda Schele of the University of South Alabama and Peter Mathews of Calgary are reconstructing the list of Palenque's rulers through the Late Classic Period. So far they have identified at least 15. They have made other discoveries as well. Lounsbury, for example, has isolated what appears to be another event glyph—that for “burial.” Thus he has completed, in a sense, the set that Miss Proskouriakoff began with the upended frog, or “birth.”

Obviously, the small dedicated group who seek the content of the Maya inscriptions, from John Graham of the University of California at Berkeley to Thomas Barthel of the University of Tübingen, West Germany, can't work in isolation. The task of decipherment comes only in bits and pieces that build slowly on the work of others.

As one of my colleagues put it, “There can be no single key to this sort of thing because there's no single lock. I doubt that we'll ever have anything like the Rosetta stone. What we really need are good copies of *all* the inscriptions.”

This task is underway. Undaunted by the shooting at La Naya, Ian Graham continues to comb the lowlands for new texts. He and his colleague, Eric von Euw, have together added 55 new monuments to the known inventory in six years. But the race between scholarship and thievery continues.

Not long ago I visited an art museum in Texas. Mounted on one wall was a beautiful Maya stela bearing a huge figure in full regalia flanked by glyph panels. Its looters had “thinned” the monument to a sheet of stone only an inch and a half thick, then sawed the sheet into smaller squares, damaging parts of the sculpture. Where had it stood? Only its looters knew.

Large carvings are not the only pawns in this illicit trade. The famed Maya polychrome cylinder vases of the Classic Period, things of indescribable beauty, show up in art shops from San Diego to Geneva, then vanish into private collections.

This is a tragedy for mankind, really, for each is, in effect, a new codex, replete with scenes of action—ball games, royal courts, ceremonies, and processions—most often with texts that explain them. One such vessel that was exhibited in New York City bore the pictures of 31 small figures, beings of the Maya pantheon, or mythology, hitherto unknown to archeology. One can only wonder what else the looter found in the tomb that would have added to our knowledge of the Maya and the ways of the Maya mind.

Time Works Toward Dispelling Mystery

I recently returned to Cobá with Sir Eric Thompson, only a few months before he died. The dated fragment we had helped uncover last year was now reunited—after more than a thousand years—with three other pieces of the same stela (left) that Eric had found when he was last at the site, on his honeymoon, in 1930.

As we stood in the brilliant sunlight before the whole magnificent carving, I reflected on such discoveries, and how they so often transcend the lifetimes of many scholars as they move toward complete knowledge of the Maya and their civilization. The old priests, with their fascination with time and its attendant good fortune, would have liked the idea. □

THE MAYA Resurrecting

By WILLIAM R. COE, Ph.D. DIRECTOR OF RESEARCH, TIKAL PROJECT,

IT WAS LYING in 174 incoherent pieces—this magnificent jade mosaic mask (facing page)—when archeologists in 1963 opened a rock-cut tomb in Tikal, the supreme Maya center. Locked in the grip of Guatemala's jungle for 1,000 years, the onetime metropolis was yielding its secrets during the most extensive archeological excavation ever undertaken in the New World.

Midway through the 14-year-long project, sponsored by the University of Pennsylvania Museum, we dug into one of dozens of temple-pyramids and found the burial crypt. Its roof had partly collapsed, scattering rock over the skeleton of a 45- to 50-year-old man and smashing his mask. Two other skeletons, youths with broken backs, lay in positions of extreme agony, suggesting last-minute sacrifices before the crypt was sealed.

Opening ancient tombs has always captured the public imagination, but now Mayanists have greater cause for excitement. We are linking such burials and their treasures to hieroglyphic inscriptions and discovering the names of rulers and facts about their reigns.

A date painted on the wall of this crypt, for example, matched that on a fragment of a stela found on an adjoining plaza. The stela apparently commemorates the son-in-law of an illustrious fifth-century ruler named Kan-Boar. Perhaps then the tomb belongs to a high-ranking member of the royal family.

Jungle Shrouds Sprawling Ruins

For generations, Tikal had been the dream of Mayanists who assumed that the biggest had to be the best. And we knew it was big, even though it was shrouded in a nearly impenetrable tangle of vines, mahogany, cedar, sapodilla, and palm. Maps and descriptions by archeologist-explorers hinted at its magnitude. Anyone flying over could see five stone roof combs protruding high above the 100-foot forest, forming the tallest group of temple-pyramids in the New World.

We assumed that Tikal was a ceremonial center where ruling priests periodically performed rituals for the benefit of local farmers. We visualized simple peasants dispersed uniformly and thinly in the hinterland, tending their corn patches. Finally, peasant revolt against priestly overlords would account for the death of the center, or so we surmised.

Yet why, we wondered, would the Maya develop their largest center in the seemingly remote interior of what is today northern Guatemala? We needed to know more, and we believed archeological data, logically collected and processed, would yield answers.

Uncovering the Heart of a Metropolis

Flying to an airstrip hacked from the jungle, DC-3's began to ferry in supplies and scholars in 1956. Over the years we invited more than a hundred specialists to study everything from architecture to soil type. From the first, camp life meant hammocks and palm-thatched huts, axes and machetes, beans and tortillas, and brackish drinking water from an earthen reservoir, designed by the ancients and now inhabited by a lone crocodile. Workmen started the task of clearing. At last, the breathtaking heart of Tikal, its Great Plaza, came into view (pages 796-8).

Mapping was our initial task, and it could be accomplished only by walking the area and recording with camera and pencil all visible remains: dozens of temple-pyramids; carved and plain stelae and altars; chultuns, those peculiar underground chambers cut into bedrock; freeway-size causeways; and thousands of small, rectangular elevations that we later learned were house mounds. We even recorded the graffiti scratched in the plaster of surviving buildings.

Our early map, covering six square miles, gave us a pair of eyes into the jungle, suggesting where to clear and what to dig.

A trench 35 feet wide and at times 100 feet deep was cut through the two-acre religious

the Grandeur of Tikal

AND PROFESSOR OF ANTHROPOLOGY, UNIVERSITY OF PENNSYLVANIA

complex called the North Acropolis. It revealed a fantastic story of creation and destruction. At bedrock we found the earliest evidence of human settlement, charcoal from fires that burned in 600 B.C. Above this foundation, the Maya, beginning in 300 B.C., built one limestone-and-plaster temple-pyramid after another. Before they added, they razed, sometimes ripping off roof combs, at other times demolishing entire shrines down to the plaster foundation.

On such platforms I have traced the original scribe line scratched with a flint blade by an ancient architect.

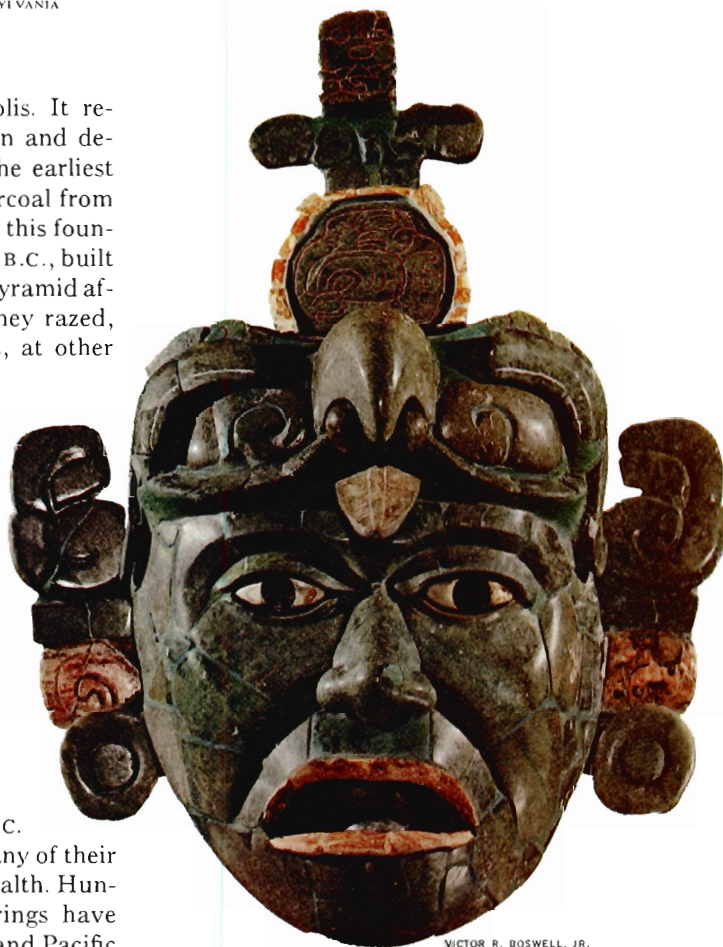
Yet the Maya constantly recycled materials. Demolished buildings were used and reused as fill. We found a small carved limestone fragment in the debris of the roof comb of Temple II, which was built in A.D. 700.

Later a perfectly matched second fragment turned up in a floor of the North Acropolis, laid in 100 B.C.

The Maya not only destroyed many of their buildings but also buried much wealth. Hundreds of graves and cached offerings have yielded seashells from the Atlantic and Pacific coasts, green obsidian from Mexico, jade and other precious minerals from the highlands.

Empty City Again Draws Throngs

Elsewhere in central Tikal we cut hundreds of trenches and pits deep into ball courts, a covered marketplace, causeways, a residential complex dubbed the Central Acropolis, a sweathouse, and more than 120 elevated house mounds. These turned out to be family compounds of three or four houses built on a single plastered platform. To the east of the residences was found a building—apparently a family shrine—that contained burned copal, cached offerings, and graves of elderly men, no doubt family patriarchs.



VICTOR R. BOSWELL, JR.

Like a voice from the grave, a life-size mosaic funeral mask of jade, pyrite, and shell bespeaks the wealth of a noble buried about A.D. 527 at Tikal in what is now Guatemala. Heavy-lidded eyes and protruding mouth suggest the style of distant Teotihuacán, rival city of central Mexico, and hint of intensive trade and cultural interchange. Compiling such clues, archeologists now piece together the story of Tikal, greatest of all Maya centers.



Architect of genius, who brought Tikal to its finest hour, achieves immortality with this jade mosaic portrait jar, buried with him about A.D. 730. Found in his vaulted tomb under the Temple of the Giant Jaguar, the jar bears glyphs that reveal his identity: Double-Comb, ruler of Tikal, who died in his fourth *katun*—60 to 80 years of age. Another vessel, below, came from a tomb dated 758 that resembles Double-Comb's, suggesting the occupant was a son.

To fashion the treasures, Maya lapidaries drilled a hole in each of the polished plaques—900 in all—applied resin glue and pegged them to wooden cylinders. A tiny jade plug covered each wooden nail.

VICTOR R. BOSWELL, JR.
ACTUAL SIZE, LEFT



1/2 ACTUAL SIZE

Elsewhere in the compounds we discovered signs of various occupations—maker of flint tools, potter, sculptor—clear proof of a flourishing middle class.

Such exciting discoveries encouraged the Guatemalan Government to contribute more than \$500,000 to fill up our trenches, repair crumbling temples, and prepare the site for tourists. Guatemalan workmen quarried local limestone, burned it for plaster in the time-honored fashion, and remade a city that had been built over so many times in the past. Now Tikal National Park welcomes 40,000 visitors a year.

Final Map Proves a Surprise

When excavation ended in central Tikal in 1965, we were still curious about how people lived in the countryside. Guatemalan engineers had already cut four trails extending from the Great Plaza for seven miles in each direction. Archeologists surveyed 250 yards on each side of these trails, calling out every feature: house mounds, chultuns, vegetation. Then with posthole diggers they looked in selected mounds for pottery sherds that would aid in dating. Where mounds became less frequent, we drew the boundary line for eighth-century Tikal.

The final map was astonishing. The so-called countryside was heavily populated over an area of 50 square miles. Rarely were family compounds more than 500 yards apart; nowhere was there enough space for the slash-and-burn practices of Maya corn growers.

The people must have been backyard horticulturists. Breadnut—the fruit of the ramon tree—and root crops were probably staples. Most likely, subsistence was based on highly productive kitchen gardens; fresh produce could be carried to the central market and surpluses stored in those subterranean chultuns. Utilizing their environment to the fullest, Tikal people perhaps built up low-lying areas, or *bajos*, into raised fields.

After 14 years of investigation, with tons of stored artifacts from pearls to potsherds, with 500 buildings excavated, and more than 60,000 photographs, how do we now picture ancient Tikal?

From dim origins some six centuries before Christ, Tikal grew rapidly over the low, well-drained limestone hill underlying its center. Huge plazas and majestic architectural complexes, in existence by the second century B.C., became the foundation of future development,

a slow, steady growth involving the destruction and immolation of thousands of buildings and platforms. Nothing was made to last forever. Had Tikal persisted, the edifices we see today would almost surely have been sealed beneath something even grander.

At its height in the eighth century, Tikal was populated by perhaps 40,000 people, a figure that might be halved or doubled in view of the uncertainties in such calculations. With few resources beyond flint and farmland, the city depended on a complicated trade network that reached from ocean to ocean and from central Mexico to Costa Rica. The city's jungle location began to make sense, for it lay on a plausible portage route between two great river systems, one leading to the Gulf of Mexico and the other to the Caribbean (map, pages 736-7).

This was no priest-plus-peasant society, but a vastly complex, stratified, cosmopolitan culture. At its head, dynasties of strong men prevailed, although women were often prominent. Noble families resided in elaborate compounds, such as the Central Acropolis, and used nearby temples as personal family shrines. Most exciting of all, a succession of three rulers, starting with a man named Double-Comb, has been positively identified.

Seeking Clues to a Time of Doom

Then, suddenly, Tikal died. Its last stela, set in the Great Plaza in A.D. 889, was an exclamation mark on a cultural system that had endured for 1,000 years. Squatters moved in, living amid their garbage, while buildings crumbled and the jungle crept closer.

What had happened? Military raids in distant river valleys may have snapped critical trade routes. Population increase likely warped the delicately balanced agricultural base. A rigid bureaucracy and political usurpations—all are possibilities.

Now we have enough data to permit lively speculation by my colleagues about the daily life of Tikal at its zenith (portfolio of paintings, pages 799-811). Only years of analysis can verify the details. Today, from Tucson to Zurich, the excavators of Tikal are preparing the millions of units of information they have collected for publication.

When that monumental task is completed, many of us are ready to shoulder our pickaxes and head back to look for even more information still concealed by this enigmatic, ever fascinating metropolis. □





A Traveler's Tale of Ancient Tikal

A PORTFOLIO OF PAINTINGS BY PETER SPIER
WITH TEXT BY ALICE J. HALL NATIONAL GEOGRAPHIC STAFF



Life returns to a dead metropolis

FREED from strangling jungle, Tikal bares its heart: the Great Plaza, surrounded by temples and palaces. Beneath the surrounding forest still lie the ruins of an immense city that covered 50 square miles in the eighth century A.D.

Tikal seems at one with the universe, which the Maya visualized as four-sided and many-storied, with a deity ruling every aspect. Its ritual center for eight centuries was the North Acropolis, at lower left. Archeologists have located more than fifty temples underlying those visible today.

By the end of the seventh century, the religious focus had shifted to the Great Plaza, its 2½-acre plaster surface now blanketed with grass. After Double-Comb ascended to power in 682, he built a pyramid-temple to the west, far right, realm of the setting sun. Apparently it honored his wife, whose portrait appears on a wooden lintel above an interior door.

The ruler reserved the opposite site, where the sun rose, for his own stunning monument—the Temple of the Giant Jaguar. Tunneling into the pyramid, archeologists in 1962 penetrated a room-size crypt; in it they found a jade portrait jar (page 794), pearls, and well-worn hair tweezers inscribed with Double-Comb's glyph. And among his possessions lay the skeleton of the old man himself. W. E. GARRETT





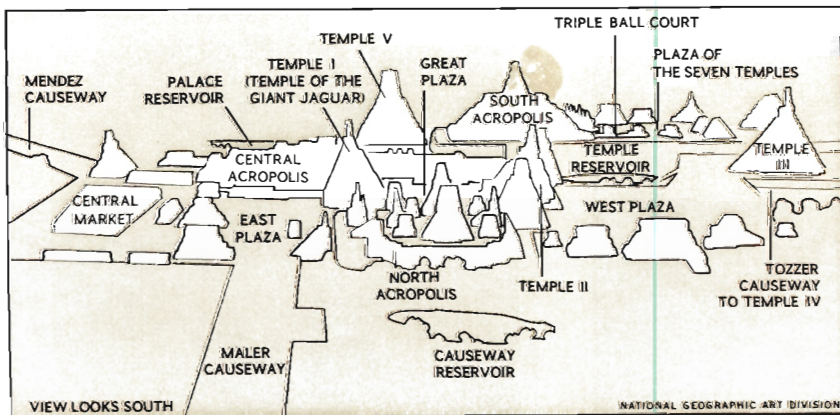
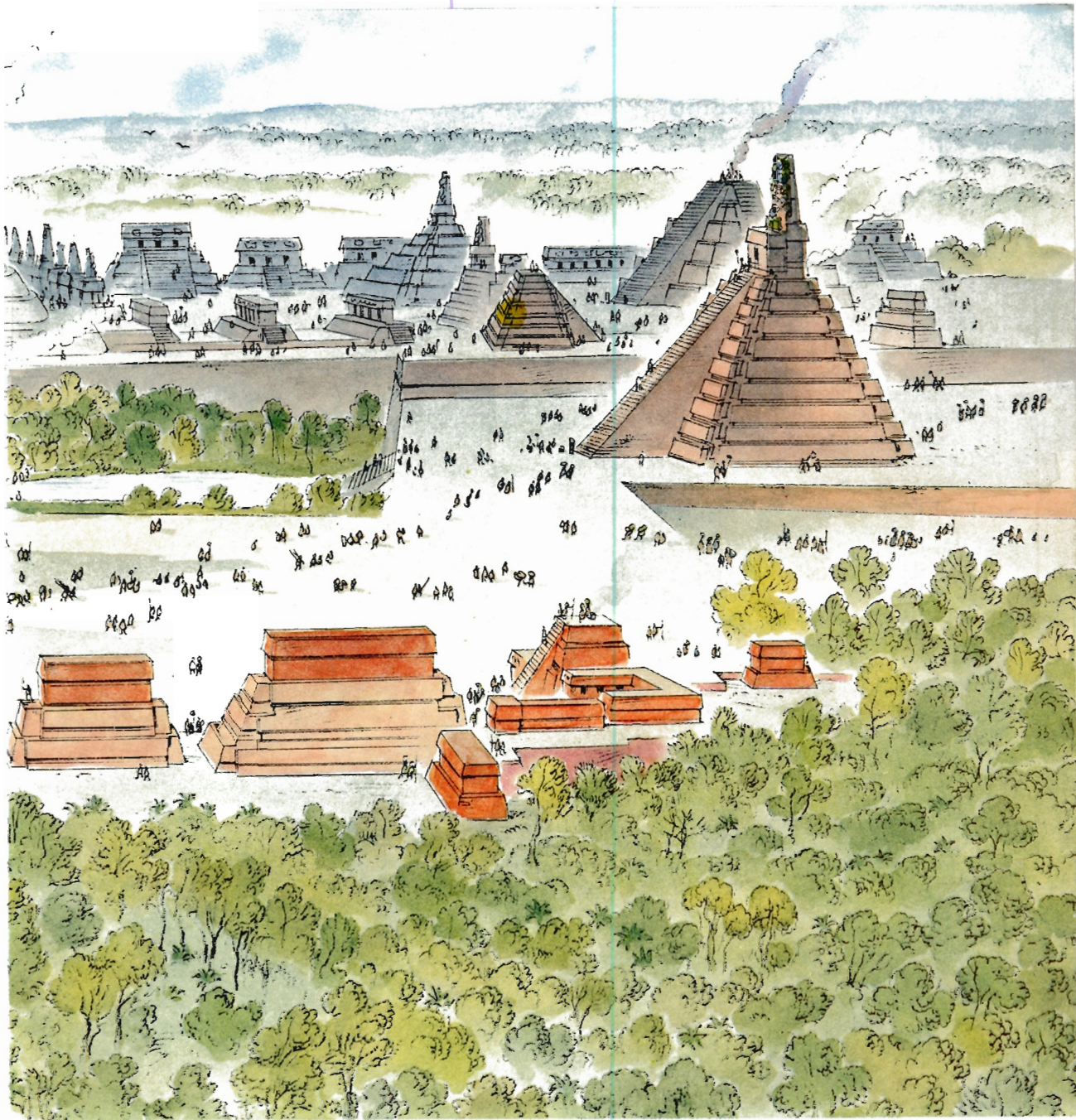
THE MAYA GODS must have smiled upon such a city, with its temple-crowned pyramids, its great homes for the nobility, its pulsating market, and its tiered courts for games of high skill and deadly risk.

Would just looking at Tikal stop the heart? So the young stranger—let us call him Chan and fancy that he comes from an obscure hamlet—wonders as he nears the city, splendid crown of Maya civilization.

A wall protects it, he learns, as he passes immense earthworks, two and a half miles out on the north road. There he pays a tax on the heavy

bundle of *zapote* firewood he carries on this first journey to the great market of Tikal; his father has promised that half his profit will be used to help buy him a bride. A mile out, Chan skirts a gateway shrine reserved for the elite. Then he steps up onto a paved causeway, 80 feet wide, lower left. Soon he spies one of the reservoirs that provide water during the dry season.

Now Chan reaches the broad East Plaza. Ahead lies the Central Acropolis, with its religious schools and dormitories, government offices and palaces. Climbing, exploring, Chan sees sunshine chase shadow in the infinitely varied cityscape.



Consultant: Dr. Peter D. Harrison, veteran of 48 months at the Tikal excavation and research associate of the Royal Ontario Museum, helped prepare this lively re-creation of Tikal as it may have looked around A.D. 800. Speculation is based on archeological data, Spanish chronicles, and the customs of modern Maya "to give quickening color to the dead past," in the words of the late Sir Eric Thompson, who adapted this technique to Maya scholarship.

Mighty rulers raise new temples atop the old

A SWARM OF WORKMEN on the North Acropolis construct a new temple to the rain gods in a scene Chan would have witnessed had he arrived a century earlier. A ruler has died and been interred in an older temple on this spot, and now his tomb has been engulfed by an even grander monument. Thus ancestors are so closely associated with divinity that they become as gods.

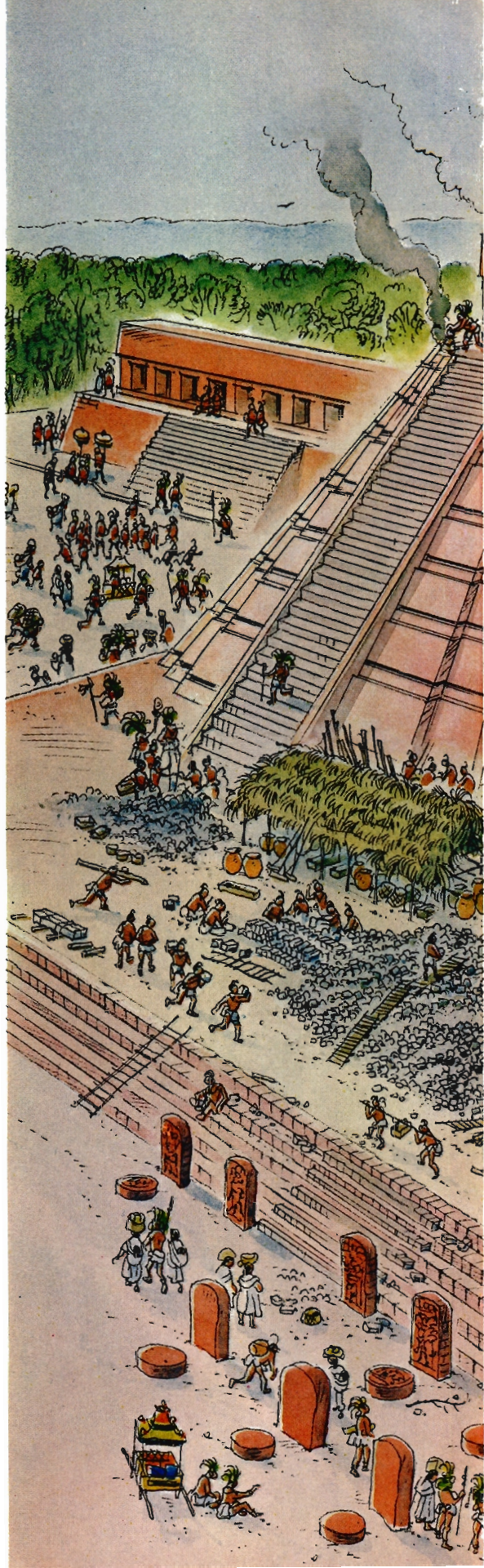
Construction techniques are truly marvelous. Laborers cement together rough-stone walls, filling the space between with rubble, mortar, and trash. Then they level them over with plaster and build another tier.

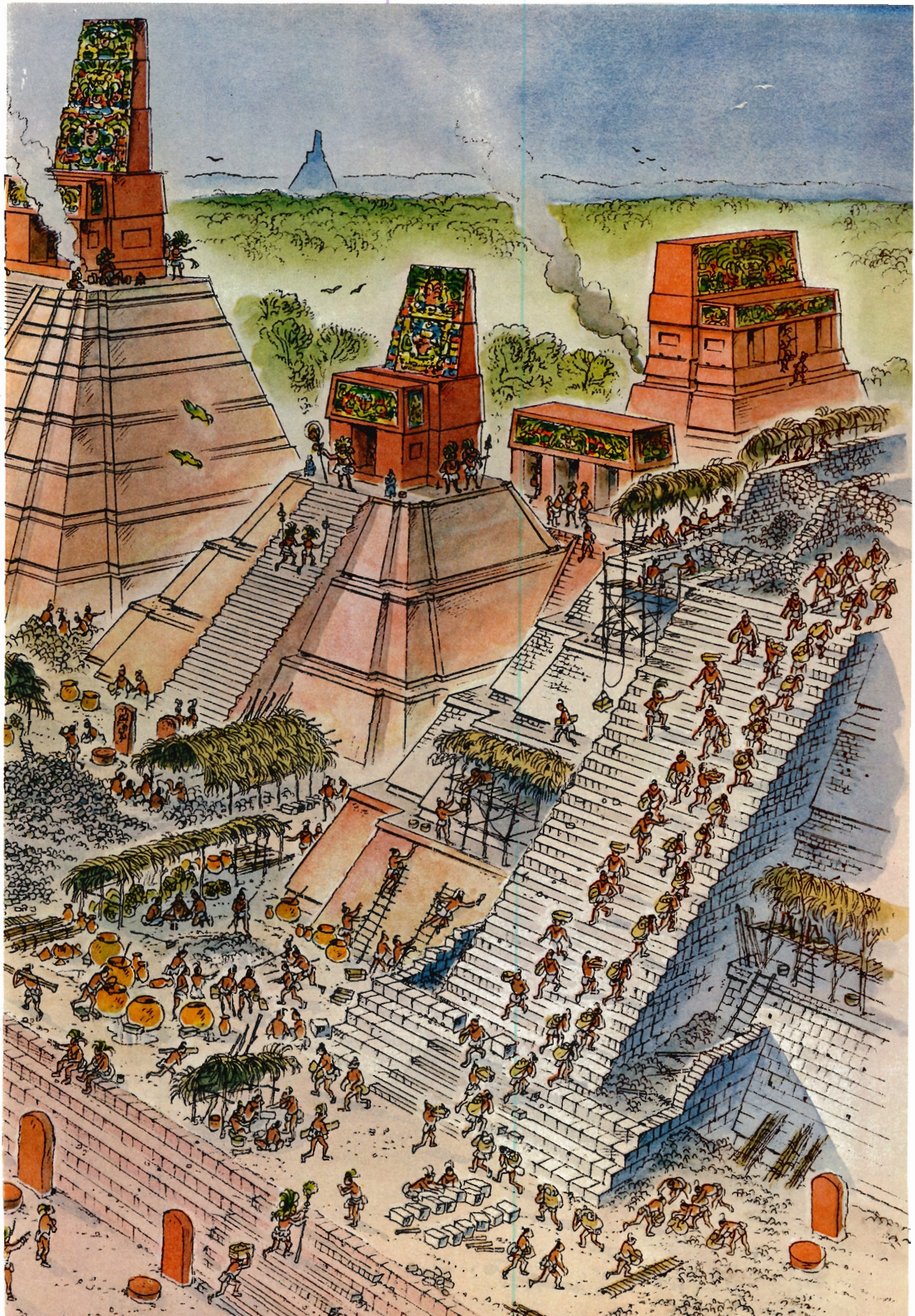
Simultaneously, masons face exterior walls with fine-cut limestone. Men carry the blocks on slings, for there are no beasts of burden or wheeled vehicles. Workers heat stone for powdered lime to mix with water and make mortar, stucco, and plaster. The plasterers spread a fine surface on the first and second levels. After the pyramid reaches about seventy feet, its top will be leveled to hold a two-room high-walled temple with a crest of stuccoed relief showing rulers who would be gods.

This imposing Chac temple will serve as the northern pivot for ceremonies on the Great Plaza, with its stelae and altars.

Sculptors (**below**) put the finishing touches on a new stela that portrays a ruler and the cycle of his days.

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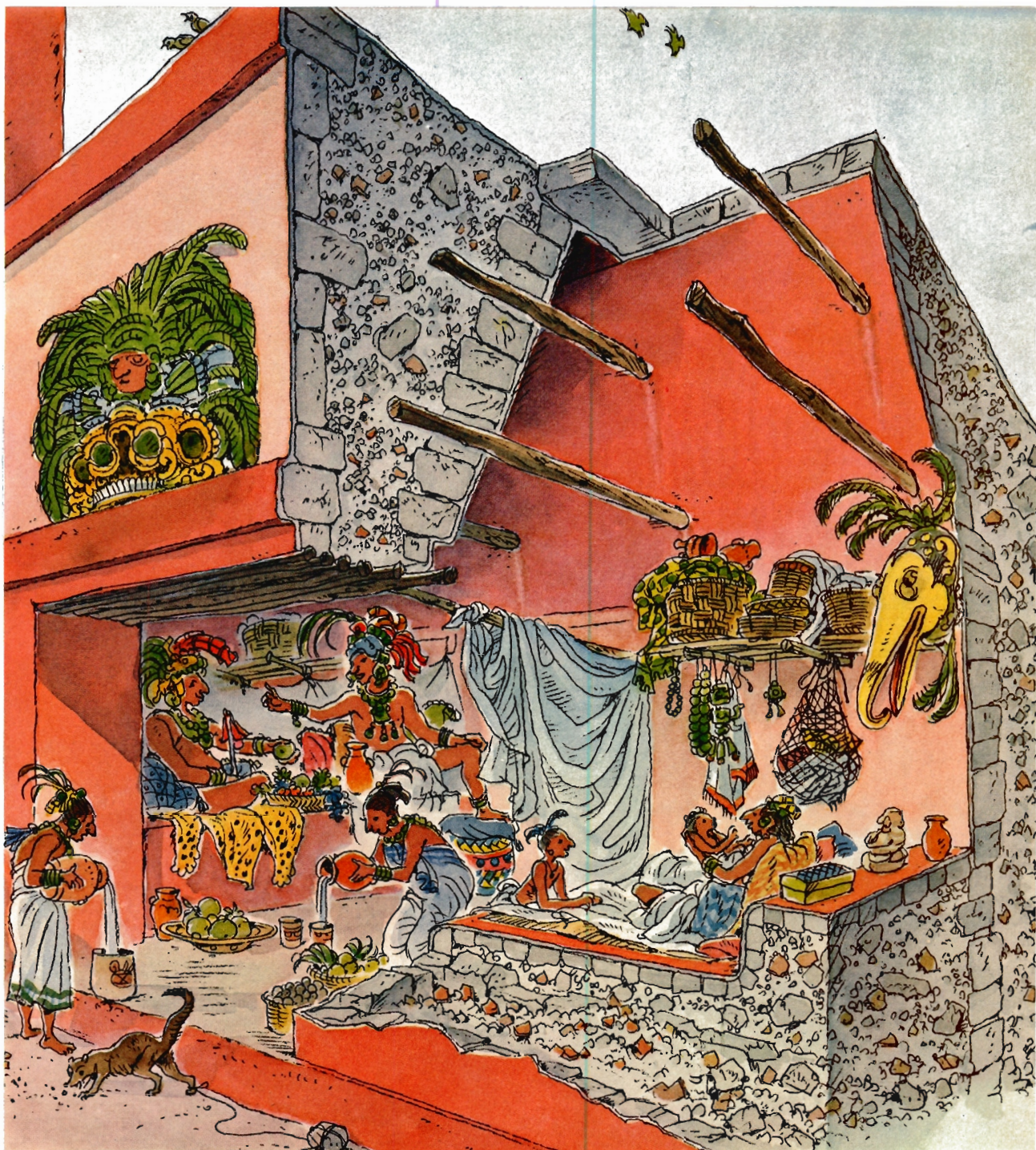




Palace homes offer nobility a life of ease

SURROUNDED BY TRAPPINGS OF RANK, the family of a nobleman relaxes before the noonday meal. These aristocrats live in one wing of a two-story palace in Tikal's Central Acropolis. Above the doorway a stucco head of the jaguar god proclaims divine protection for members of the royal jaguar dynasty.

The young nobleman, seated on jaguar skins and laden with jade, offers fruit to his brother as they confer about affairs of state. Behind a half-



raised cotton drape his wife coddles the baby on a hard bench-bed made comfortable with cushions and cotton sheets. A huge bird mask of lightweight papier-mâché and feathers, far right, hangs ready for the next city-wide ceremony. Other possessions rest on shelves or hang in net bags.

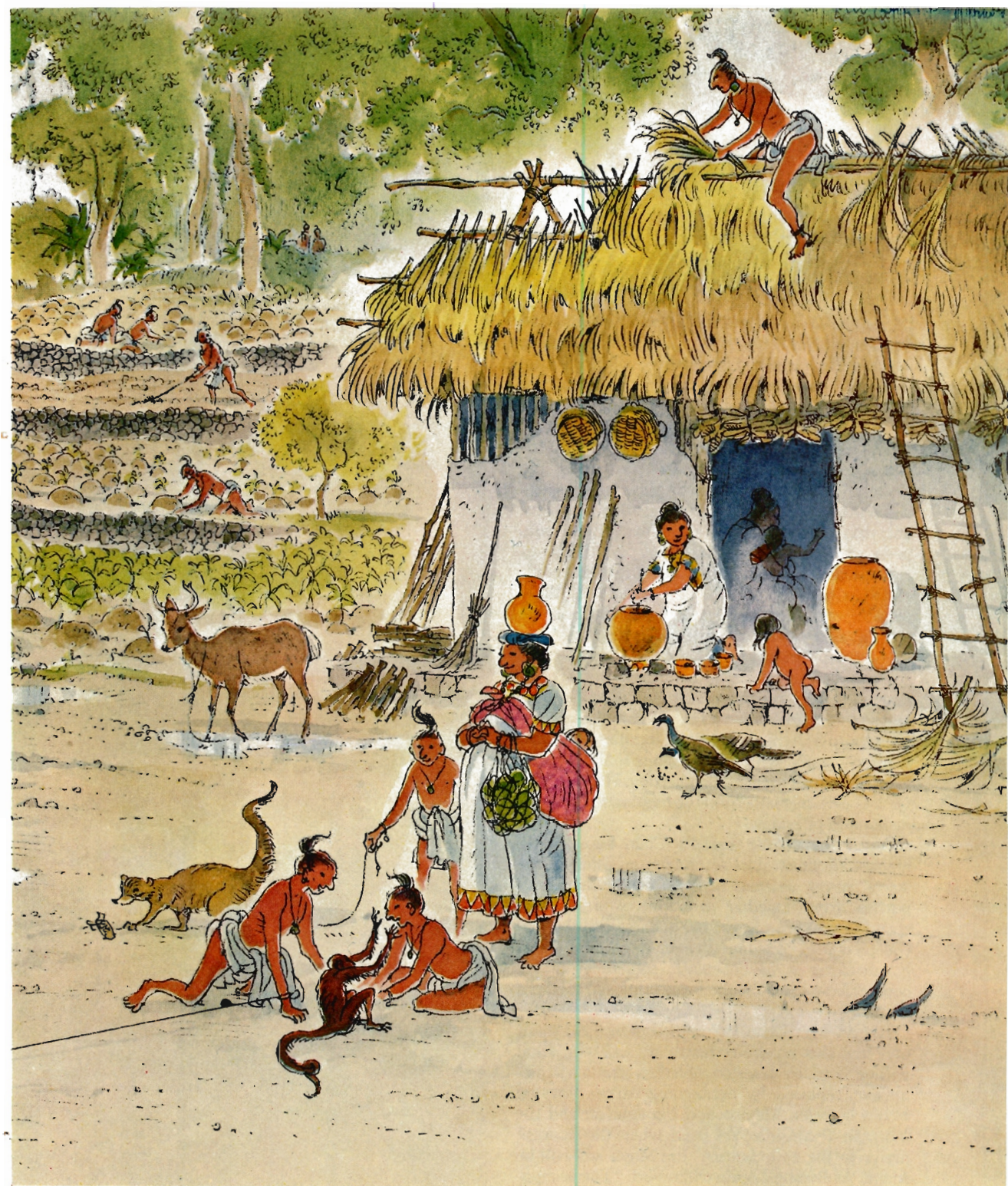
In the sunny patio a workman patches rain-damaged plaster, a never-ending task. Other servants pour drinking water and scoop maize to make gruel. A raccoonlike coati on a tether seeks

scraps amid trash that will pile up until moved to the community dump, source of construction fill, as seen in these cutaway walls. The home is built as sturdily as a temple. Walls made of facing stones and fill are slanted toward each other until the gap is closed with capstones, forming a corbeled vault, a hallmark of the Classic Maya. As the population grows, residents remodel, constantly seeking privacy by sealing doorways and adding wings with private patios such as this.



The people who feed Tikal

OFF ON A COUNTRY RAMBLE, Chan meets a farm family that reminds him of his own. Tied to the cycle of their crops, they raise vegetables to sell in Tikal. Around a courtyard, a father and his married sons have built cool pole-and-stucco homes with thatched roofs. Kneeling over her



metate, a mother grinds breadnuts, picked from ramon trees; she will bake loaves with a flavor like chestnuts. Using a hip loom, a daughter weaves intricately designed cotton cloth. Wild animals trapped in the forest, spider monkeys and a coati, have become pampered pets for the

children; a young deer and turkeys face slaughter for feasts on special occasions. On small terraces built to trap soil, men tend an array of crops: corn, beans, squash, chilies, tomatoes, pumpkins, and gourds. Orchards of papaya and protein-rich avocado flourish nearby.

Market day at Tikal: showplace of tropical bounty

IN RAINBOW PROFUSION, local and imported goods vie for Chan's attention at the Central Market. He bargained hard before selling his firewood and now carries in his pouch the currency of Tikal, 20 shiny brown cacao beans. He must resist the temptation to spend as he strolls the long galleries. Here a hunter offers cured skins and the carcasses of rabbit, turkey, deer, armadillo, and iguana. There a merchant displays fine textiles. Tikal's own workshops provide other products: everyday pottery, gourd containers, flint tools, beeswax candles, woven baskets.

From distant mountains and shores have come obsidian blades, tobacco, salt, dried fish fillets, metates of abrasive volcanic stone. And on the steps at right, a woman ladles out a stew that bubbles over a charcoal fire.

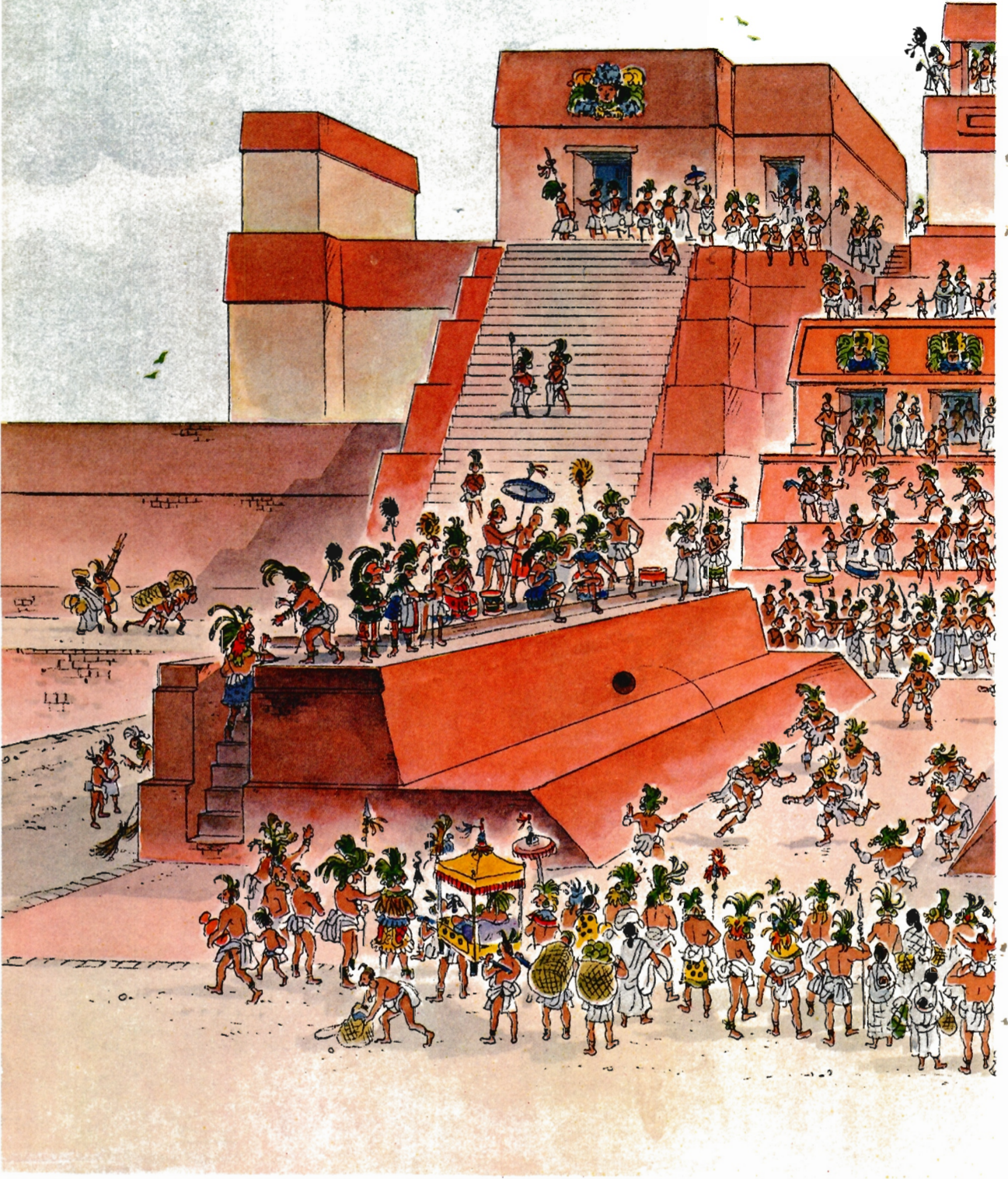
Behind the cook a man bent under his net bag enters the inner court, where sacred paraphernalia and luxuries are sold: masks, medicinal herbs, incense burners, whistle figurines, bundles of quetzal feathers, staffs with oddly shaped flint blades, stingray spines used in bloodletting. Hidden from view is precious jade from the highlands, for ornaments and offerings.

As in the village markets Chan knows well, market administrators set maximum prices. Contracts, never written, become valid when both parties drink together in public. Many people spend shiny cacao beans like Chan's, but the rich conspicuously consume their money, Chan hears, by drinking it as chocolate; sometimes clever counterfeiters remove the bean skins and fill them with clay.

Everywhere Chan looks—prosperity. No shadows hint that a century hence, by A.D. 900, Tikal will be virtually deserted. Overland trade will disappear, replaced by oceangoing canoes ferrying riches between Mexico and Panama around the Yucatán Peninsula. Yet even when the Spanish arrive in the 16th century, the Maya will still be Maya. As Bishop Landa will report: "The occupation to which they are most inclined is trading."







Ceremony and sport: the Maya ball game

SHOUTS of the spectators, the smack of a hard rubber ball against masonry, the thud of bodies in collision—the sounds of a Maya ball game lure Chan to this scene.

Padded players, forbidden to use their hands, strike the ball with the hip, sending it ricocheting around the court. If the ball drops to the paved floor, it is “dead,” and so too may be the team at fault. Losing players sometimes become sacrifices, so serious is this game. Varying versions developed across Middle America, including a central Mexican contest using stone rings on court walls as goals.

In this game at Tikal, privileged nobles cheer the action from atop the walls, while ordinary spectators line end zones and the platforms and galleries of the towering Central Acropolis.

The teams had practiced hard, purified themselves in the ritual sweathouse, and uttered incantations over their equipment. A priest blessed the court, and play began. Now agile players leap to make a block or circle to return a volley.

Chan sees spectators make bets. He hears that some men gamble heavily on the game, wagering homes, jewelry, children, and even themselves as slave laborers.

The fast, violent game upsets and confuses Chan, and he turns toward his rural home with his little horde of cacao-bean currency intact. Had he but known, his Tikal visit had shown him one of the world's leading cities of his day, rivaling Rome, Alexandria, and the great centers of China. □

