

Death and Rebirth at Copán

An ancient
Maya city
enters its
scientific
afterlife

By BRUCE BOWER

Last June, as scientists were tunneling under a temple at the Maya site of Copán in Honduras, they happened upon a royal tomb. Invigorated by their good luck, they proceeded to uncover the bones of a man in his 30s — apparently the son of Smoke Imix, who reigned as Copán's king from A.D. 628 to 695 and directed construction of the massive "Hieroglyphic Stairway" running up one side of the temple.

The young noble seemed amply prepared for his trip to the Maya underworld and an encounter with the Lords of Death: Near his bones were the remains of a boy, probably sacrificed to join the royal sojourn, and carved jade pieces depicting symbols of nobility and the underworld.

Death, as portrayed in the writings and ritual remains of the Classic-era Maya, who prospered between A.D. 250 and 900, was the beginning of a journey toward rebirth and reunion with other reborn ancestors (SN: 6/7/86, p.360). Given this belief in the afterlife, Smoke Imix and his son would not be surprised today to learn that their once-majestic city is experiencing its own rebirth.

According to presentations at November's annual meeting of the American Anthropological Association in Washington, D.C., archaeologists, anthropologists and epigraphers (who decipher the complex Maya writing system) are rapidly transforming scientific understanding of Classic Copán's political structure, procession of kings and settlement history.

"The work at Copán is the first to demonstrate that whole new worlds open up when archaeological and epigraphic data are combined," says David C. Grove of the University of Illinois in Urbana.

Copán, a city-state located in a valley of the same name, has attracted four major archaeological investigations since 1839. The current phase of research began in 1975.

One surprising revelation of last year's work concerns the hieroglyphic inscriptions on stone monuments and temples in Copán's "Main Group," composed of the Acropolis—the architectural center of the ancient city — and surrounding platforms, pyramids, stairways and plazas. Epigraphers have made great strides in decoding Maya glyphs in the past 20 years. Many researchers, however, have questioned the reliability of these beautifully rendered pictographs and signs as historical records, contending the glyphs

instead represent the political propaganda of Classic Maya kings.

"Our archaeological work shows there was no extensive rewriting of history on Copán's stone monuments," asserts William L. Fash Jr., of Northern Illinois University in De Kalb, director of excavations at the Copán Acropolis. "I view the inscribed monuments as concise and clear records of Copán's political history."

That history is inextricably linked to the Acropolis, which served as the seat of power for a dynasty of at least 16 Maya kings that dominated for nearly 400 years, from about A.D. 426 to 822.

Remnants of a vaulted chamber dubbed the "Founder's Room," uncovered last spring beneath the same temple housing the royal tomb, date back to the founder of the Copán dynasty, says Richard Williamson of Tulane University in New Orleans. The room contains a stone monument with the earliest known hieroglyphic date at Copán, A.D. 435, notes Williamson, an anthropology graduate student who codirected the excavation. That date often appears on the monuments of later rulers in conjunction with the name of the founder of the Copán dynasty, Yax K'uk'Mo.

The Founder's Room was built next to a ballcourt and was used for about 300 years, Williamson says. Contests on Classic Maya ballcourts were more than sport; they also served as metaphors for the king's eventual triumph over death and his rebirth as a guiding spirit for his lineage. Subsequent generations did not raze Yax K'uk'Mo's chamber for the large construction projects of later Copán kings, Williamson points out, "probably because of its prestige."

Researchers know little about the kings who succeeded Yax K'uk'Mo until the appearance of Smoke Imix, Copán's 12th ruler, whose nearly 70-year reign witnessed the flowering of construction and population growth at Copán. His name turns up on a stone monument at Quiriguá, 30 miles north of Copán, notes David Stuart of Vanderbilt University in Nashville, who says the monument may mark a successful battle at Quiriguá by the forces of Smoke Imix.

When Smoke Imix died in his 80s, 18 Rabbit inherited the throne. Many monuments in the Great Plaza adjacent to the

Acropolis depict 18 Rabbit with Classic Maya symbols of power, including a jade belt of ancestor heads and sacred mirrors, a headdress and giant macaw heads. But 18 Rabbit met an inglorious end when he was captured and beheaded by the king of neighboring Quiriguá. Carved inscriptions at Quiriguá, deciphered last summer, place that occurrence on May 3, A.D. 738, Stuart says.

"18 Rabbit apparently launched a raid to obtain captives and got nailed himself," Stuart remarks.

In the wake of 18 Rabbit's decapitation, confidence in royal authority at Copán waned. The new king, Smoke Monkey, tried to stem the crisis by building a community house where the leaders of various settlements in the Copán Valley could meet and participate in political decision-making, Fash asserts.

"He didn't want a democracy," Fash says. "He used a stopgap measure to appease local chieftains and obtain their support."

Following Smoke Monkey's short reign of 11 years, his son Smoke Shell assumed the throne. Smoke Shell undertook vast new construction projects, including the 50-foot-wide, 72-step Hieroglyphic Stairway that ascends the temple housing the Founder's Room. The magnificent undertaking probably represented an attempt to restore the glory days of Smoke Imix, Fash maintains, but foreboding signs of the impending collapse of Copán's royal line were already apparent. For instance, economic pressures apparently forced

Doorway leads into a building unearthed last year beneath Copán's East Court. The structure dates to the 5th century A.D.



Robert J. Sharer

The aging of the urban Maya

Classic-period cities such as Copán attract the bulk of scientific attention, but they were not the first urban enclaves of the Maya. In fact, archaeologists last year uncovered the earliest known Maya city. Excavations at Nakbe, a site in the tropical forest of northern Guatemala, yielded nearly 100 stone temples and buildings, as well as carved monuments depicting the activities of kings and thousands of stone tools and pottery fragments.

Carbon dating and ceramic styles indicate Nakbe was a flourishing city around 600 B.C. "This may be the earliest major center of Maya civilization," says excavation director Richard Hansen of the University of California, Los Angeles. "The advances that created the most sophisticated pre-Colum-

bian society in the New World may have occurred much earlier than was previously assumed."

Until the Nakbe discovery, researchers thought the Maya did not push beyond simple village life before 200 B.C. Maya urban development was considered slower than that of other ancient American societies, such as the Olmec of Mexico. It now appears, however, that many of the complex pre-Columbian societies of Central and South America developed at much the same pace.

Evidence of an earlier village lies beneath the city at Nakbe, Hansen adds. Future research will attempt to unravel the cultural forces that transformed a modest rural outpost into a teeming urban center. — B. Bower

workers to use poor-quality sediment under the temple for support, leading much of the stairway to collapse in the 1800s.

The 16th king of Copán, Yax Pac, took power in A.D. 763 and continued the rapid pace of building set by his predecessor. But around A.D. 822, two years after Yax Pac's death, the written history of Copán's royal dynasty abruptly ends. One stone monument apparently refers to the destruction of the lineage, Stuart says. Though researchers are still in the early stages of deciphering the monument, they have determined that it depicts Yax Pac standing over a cave or sacred well — both symbols of death — and makes reference to the destruction of the house of Yax K'uk'Mo.

to as far back as A.D. 100; the archaeological sequence extends through four episodes of major renovation and construction until A.D. 800.

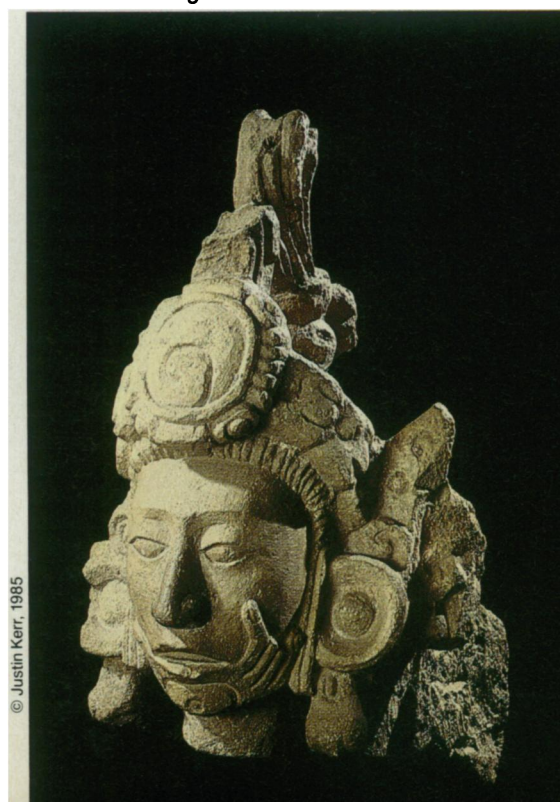
In Sharer's view, historical evidence pertaining to Copán rulers before the emergence of the Classic dynasty suggests Yax K'uk'Mo belonged to a Maya group from outside Copán that took over the region and established the Acropolis as its seat of power.

The archaeological findings of Sharer and company, as well as recent glyph decipherments, indicate Classic Copán

This head of a Maya god, found at Copán more than 100 years ago, was originally intended to emerge from the wall of a building.

Research begun last year in one part of the Acropolis should provide "an independent barometer" of the origins and evolution of Copán's political system, according to archaeologist Robert J. Sharer of the University of Pennsylvania in Philadelphia. He and his co-workers are exploring the East Court, a rectangular plaza with major buildings lying within the Acropolis.

The Copán River has carved out an immense cross section of the buried East Court, exposing numerous construction sequences to scientific scrutiny. Evidence from excavations, test pits and tunnels dug under the East Court suggests it was the original Acropolis, founded by Copán's first king and intended as an administrative, residential and ritual center for later rulers, Sharer says. A small-scale version of the currently visible East Court was also uncovered beneath the plaza and dates to the reign of Yax K'uk'Mo. Sharer's team has dated some remains found below the East Court



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was a full-fledged political state "from the founder on up," contends epigrapher and art historian Linda Schele of the University of Texas in Austin. Throughout the 16-king dynasty, she says, the written record shows little change in the way the rulers exercised their power. Impressive ritual and political displays orchestrated by Copán's kings began with Yax K'uk'Mo, who is represented by the same glyph for "king" used to signify later rulers, she adds.

Other researchers place the emergence of statehood at Copán considerably later than Yax K'uk'Mo's reign. Fash estimates a political state took shape about 200 years after the founding of the Copán dynasty, when Smoke Imix oversaw major construction efforts and the population expanded to at least 10,000 people. Only then could the traits of a political state develop, he says. These include ranked social classes, the concentration of wealth and political power in the hands of a few people and a bureaucracy to administer the government.

But extensive surveys of Maya settlements in the Copán Valley indicate that, if Copán achieved statehood at all, it was with the 16th ruler, Yax Pac, argues David Webster of Pennsylvania State University in University Park. For the past decade, Webster and Penn

State colleague William T. Sanders have directed research into the settlement history of Copán. They and their co-workers have mapped 1,425 archaeological sites, most consisting of rural farmers' dwellings grouped around courtyards. A few sites near the Main Group contain the more elaborate homes, temples and workshops of the "nonroyal elite" — nobles, tradesmen and artists.

People began to farm the fertile bottomland of the Copán Valley around 1000 B.C. But extensive dating of obsidian, a native stone used for knives and jewelry, excavated at sites in the valley indicates substantial Maya occupation in the region began around A.D. 400 and continued until approximately A.D. 1200, Webster says. Thus, farmers and nonroyal elites preceded and ultimately outlasted Copán's Classic-era kings and their retinues.

Webster's team estimates Copán's population peaked at about 20,000 during Yax Pac's reign. At that time, settlements linked to the Main Group were mainly confined to a 5-mile stretch of the Copán River, Webster notes. Other Classic Maya cities, such as Tikal in Guatemala, held populations about twice as large and covered much more territory.

The 800-year stretch of substantial settlement at Copán demonstrates that, contrary to the views of many investigators, royal power was weak during the

Classic period, Webster argues. There were numerous political interest groups that wielded tremendous power, including second-level elites who represented the extended families working the land and who underwrote the projects of the Copán dynasty. These families persisted in the Copán area for nearly 400 years after Yax Pac's demise.

Furthermore, the population collapse at Copán occurred far more gradually than previously thought, Webster maintains. Rapid population growth and intensive farming of hillsides during the 8th and 9th centuries A.D. led to massive soil erosion and food shortages, promoting the royal collapse. Indeed, preliminary analyses of Copán skeletal remains reveal signs of malnutrition and disease — even among the royalty — around A.D. 800. Continuing erosion and overfarming of a limited area eventually led the Maya to abandon the entire region around A.D. 1200. Only then, according to recent pollen studies, did the forest begin its recovery.

More surprises undoubtedly await scientists who study the workings of Copán, but Grove cautions against the temptation to overinterpret new finds. With tongue only partly in cheek, the University of Illinois researcher remarks: "A little knowledge is a dangerous thing, particularly in the hands of an archaeologist." □

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nutrition, but this is somewhat suspect because improved nutrition should produce a rapid increase in size, over one or at most two generations. But the imprinting of information on the genes of one's offspring — saying, in effect, "I grew well, so you try to grow taller" — might provide a better explanation of this gradual increase in size.

David C. Hobby
New Paltz, N.Y.

Too soon to say

"New Therapies Brighten Stroke Horizon" (SN: 11/4/89, p.292) includes a discussion of our views on new forms of stroke therapy. Although the substance of the report is an accurate reflection of my opinions, one statement is incorrect. I supposedly said that some patients can expect "significant protection" against stroke-induced neuronal injury "within two years max." Although I am quite hopeful that new forms of therapy will be available within the next few years, I am unable to confidently predict a precise schedule. Clinical studies are currently in progress which appear to be quite promising, but unless we are very lucky, it is unlikely that these investigations will be completed in the next two years.

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We appreciate the clarification but in all fairness must add that the notes our reporter took during Dr. Zivin's scientific presentation at the

Society for Neuroscience meeting show the phrases "significant protection" and "two years max" enclosed by quotation marks.

— P. Young, Editor

Quake comparison miscalculated

In "Earthquake leaves Bay area still vulnerable" (SN: 10/21/89, p.261), you state: "Because the magnitude scale is logarithmic, a magnitude 8 quake is 10 times stronger than a magnitude 7."

It is true that the Richter magnitude scale is logarithmic, but to compare the difference in strengths of, for example, two earthquakes of magnitudes 7 and 8, one should estimate the seismic energy E released by calculating:
$$\log E = 11.8 + 1.5 M_s$$
where M_s is the surface wave magnitude. Thus a magnitude 8 earthquake is not 10 times stronger than a magnitude 7, but rather about 30 times stronger.

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Moon models

The grooves and crater chains of Mars' satellite Phobos are an interesting mystery, and the experiments of Kevin Horstman and Jay Melosh help show how such features could arise by regolith powders draining into underground fractures ("Phobos: Moonlet of the Pits," SN: 11/4/89, p.301). However, their model does not go far enough.

As I pointed out in a 1980 ICARUS paper, some craters in the chains have raised rims, showing that they did not form simply by

drainage, but rather by ejecting at least some material, possibly by degassing of sublimed ice or other volatiles through the fractures. The new Phobos-2 measurement of a very low density for Phobos supports the hypothesis that Phobos' interior contains, or originally contained, volatiles and that the grooves and crater chains may have involved not only fractures but also venting.

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The grooves on Phobos may indeed be the result of a collision with Martian impact ejecta ("Martian impacts and Phobos' grooves," SN: 11/18/89, p.334). But I recall the very thin F-ring shadow on one of Saturn's co-orbital moons. It would seem that Phobos, as part of a "perturbed asteroid" scenario, could also have plowed into a slightly clumpy, perhaps Jovian, F-ring analog at some point in its journey to Mars-orbit.

Anyway, it's fun to wonder, and I think the state of planetary science is such that even amateurs like me can feel part of the "knowledge accretion" process.

Jon Alexandr
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CORRECTION

In "Natural Selection for Computers" (SN: 11/25/89), the diagram on page 347 was copyrighted by the American Society of Civil Engineers and should have been credited to that organization. In "Reopening Old Wounds" (SN: 1/20/90), the credits for the two photographs on page 42 were mistakenly reversed.