

A pyramid 90 feet tall and a platform adorned with a feathered serpent's head testify to the former glory of Chichén Itzá, now a popular tourist destination. This once powerful city was built in about the ninth century, likely aligned with four sacred cenotes and with the sun's seasonal movements.

On the edge of a small cornfield near the ruined Maya city of Chichén Itzá, in the sparse shade of

a tropical tree, a voice ricochets wildly up the mouth of a well. "¡Lo vi! ¡Lo vi!" the shout proclaims. "I saw it, I saw it!" "¡Sí, es verdad! Yes, it's true!"

Leaning over the mouth of the well, underwater archaeologist Guillermo de Anda needs to make sure that this is what he has been longing to hear for so many months. "What is true, Arturo?" And his fellow archaeologist Arturo Montero, floating down at the bottom of the well, yells up again, "The zenith light! It really works! Get down here!" Then he whoops ecstatically.

What de Anda has been waiting anxiously for his friend Montero to determine is whether the water at the bottom of this nondescript natural well, or cenote, had acted as a sacred sundial and timekeeper for the ancient Maya on the two days of the year, May 23 and July 19, when the sun reaches its zenith. At that moment it is vertically overhead, and no shadow is cast. The fact that the cenote is directly northwest of the main staircase of El Castillo, the famous central pyramid of Chichén Itzá, and within that mysterious city's urban limits, made de Anda's question particularly intriguing.

Centuries earlier, had Maya priests waited in this very well to observe and correct their measurements of the sun's angle when it reached the zenith, as it does only in the tropics? Did they come here during times of drought to deliver anxious offerings and at other times to give thanks for a plentiful harvest? Did they believe this was a place where the sun and the generous waters met and brought forth life? These and other questions involving the Maya people's relation to their gods, their sacred city, and their extraordinarily accurate calendar were what the two archaeologists were investigating.

De Anda, renowned for his skills as an underwater archaeologist, had been able to work in the Holtún cenote only occasionally and with minimal financing. Montero, from the University of Tepeyac, was at the well on his own money. He had been in the nearby city of Mérida on May 23, leading an archaeoastronomy seminar at the University of Yucatán, where de Anda was teaching. This morning, the day after the zenith, they were at last heading for the Holtún cenote. Their start had been disastrous—a flat tire, a shortage of gasoline, and sundry other hindrances had landed them at the well just as the sun was about to reach its near-zenith position. With minutes to go, Montero and Dante García Sedano, an undergraduate student, had struggled into their diving suits, clipped themselves into harnesses, and been lowered into the well by a crew of local Maya farmers.

Now Montero was yelling and whooping, and the farmers were lowering first a rubber raft and then me into the well. De Anda, drenched in sweat in the grilling Yucatán heat, was having a hard time with his rubbery suit. But finally he too was lowered 72 feet into the well, making the four of us in all likelihood the first persons in centuries to watch the path the sun god was tracing across these waters.

Beneath the narrow mouth of the cenote, the walls opened up to become a giant dome. cathedral-like except for the roots of trees grasping through the rock for the water. Focused by the small opening—shaped into a rectangle likely to mirror the four-cornered Maya cosmos—the shaft of sunlight danced like fire on the delicate frillery of surrounding stalactites. The edge of the water too seemed to ignite when it was hit by the light, and beneath the normally dark surface the waters turned a transparent turquoise blue. The sun's rays came so close to vertical that Montero now knew that yesterday, at the zenith moment, a pillar of light

KEY TO SURVIVAL LINITED STATES In this harsh region with no rivers the limestone sinkholes, or cenotes. Historical Maya area are the only permanent sources of fresh water. More than 3,500 hold MEXICO rainwater that has been collecting for eons. OCEAN GUATEMALA L SALVADOR would have plunged straight into the water. One didn't have to be Maya to feel awe.

uring the past couple of decades archaeologists have begun paying close attention to the role of caves, the zenith sun, and now-through de Anda-cenotes, in the beliefs and world vision of the ancient Maya of Yucatán. Archaeologists had known that the Maya regarded both caves and cenotes as mouths that opened into an otherworld inhabited by Chaak, the god of life-giving rain, but the consequences of this fact for architecture and city planning have only recently started to become clear.

In 2010 de Anda, who by then had dived in scores of cenotes, began exploring Holtún at the invitation of Rafael Cobos, a recognized archaeologist and project director who has been busy investigating and mapping the hundreds of ancient structures, promontories, and wells in the Chichén Itzá region. De Anda also had the cooperation of the National Institute of Anthropology and History. Examining the walls of the pool a few yards below the surface, he emerged from a small hollow and felt a protrusion above his head. He was astonished to find that this natural rock shelf held an offering of a human skull, pottery, the skull of a dog, deer bones, and a two-edged knife probably used for sacrifices, all neatly placed there centuries earlier. His headlamp, pointed straight down at the cenote's depths, revealed broken columns, a carved anthropomorphic jaguar, and a figure similar to one of the little stone men at Chichén Itzá's Temple of the Warriors, sculpted to look as if they were holding up the sky. This well in the middle of a cornfield was clearly a sacred site.

Now, three years later, de Anda and Montero had discovered not only a connection between the zenith sun and Holtún but apparently also the role of that sun and the cenote in the siting and orientation of Chichén Itzá's El Castillo pyramid. It was already known that at the spring equinox a snake of sunlight slithers down one side of the pyramid's central staircase—a sight witnessed every year by thousands of tourists. Some walk the short distance to the famous



Pleading for rain for the village of Yaxuná a kneeling shaman chants prayers at a rectangular altar, which symbolizes the four-cornered shape of the Maya universe. During this age-old ceremony, men circle with offerings of food, while crouching boys imitate the sounds that frogs make when it rains.

Sacred Cenote, which, over the centuries that Chichén Itzá was a great city-state, received in its mouth any number of human beings and other precious offerings. Early on May 23, the zenith day, Montero had gone to the central pyramid and discovered that the sun, K'inich Ajaw, rises in line with the pyramid's northeast corner. It then sets in line with the pyramid's western staircase and the nondescript Holtún well.

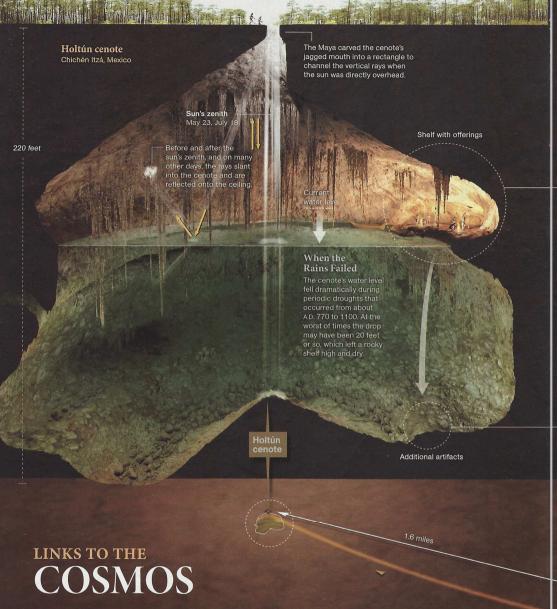
The Maya, to calibrate their calendar, which is justly famous to this day, had to determine the days of the year when the sun shone exactly overhead, not one fraction of a degree lower or higher. Montero and de Anda speculated that Maya astronomers waited inside the Holtún well for those two zenith moments in the year when a vertical pillar of sunlight pierces the water without reflecting onto the dome.

For the Maya, astronomy was a sacred activity, as were architecture and city planning. De Anda and Montero now think that not just Holtún but other cenotes may have played an important role in determining where to site buildings. The Sacred Cenote lies north of El Castillo. Two other cenotes lie to its south and southeast. The Holtún cenote, directly northwest of the pyramid, may have completed the diamond configuration that allowed the Itzá people to determine where to build their sacred city and how to angle its main pyramid. If further studies corroborate all this, the most important coordinates of Chichén Itzá's overarching design will snap into place.

Such at least is de Anda's hope. But on this day he and Montero had already accomplished much. The sun drew up its spears of light and continued on its way across the face of the Earth,

Alma Guillermoprieto, a frequent contributor, won an Overseas Press Club award for her May 2010 story on Mexico's new saints. Photographer Paul Nicklen underwent extensive cave-diving training for this story. Shaul Schwarz traced Maya culture in the Yucatán above water.



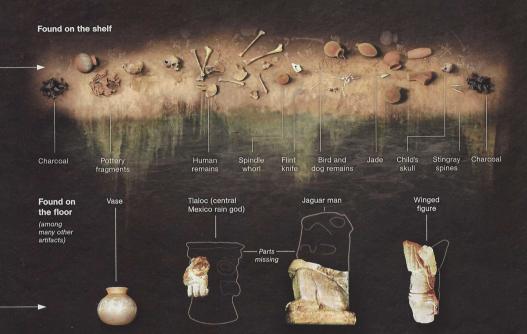


The pyramid at Chichén Itzá was planned with precision. Experts believe it is aligned to the March and September equinoxes, when the sun's passage makes a serpent-like shadow slither down its side. Guillermo de Anda recently discovered that the structure also stands in the middle of four cenotes (where the white lines cross, right), probably symbolizing the sacred mountain at the center of the Maya universe. It was also oriented to the moments when the sun reaches its highest point in the sky (far right), further connecting it to the cycles of the heavens.

JUAN VELASCO, NGM STAFF, ART BY HERNÁN CAÑELLAS SOURCES: GUILLERMO DE ANDA, UNIVERSITY OF YUCATÁN; ARTURO MONTERO, UNIVERSITY OF TEPEYAC

A PLACE OF PRAYER

Desperate for water for their crops, the Maya petitioned the rain god Chaak from deep inside the cenote. On a rocky shelf exposed during droughts, they laid out offerings and performed rituals, which may have included bloodletting. Archaeologists found artifacts scattered on the floor of the cenote. They believe the Maya sacrificed sculptures and other objects by throwing them off the shelf. Human bones and ceramics may also have fallen to the depths on their own.





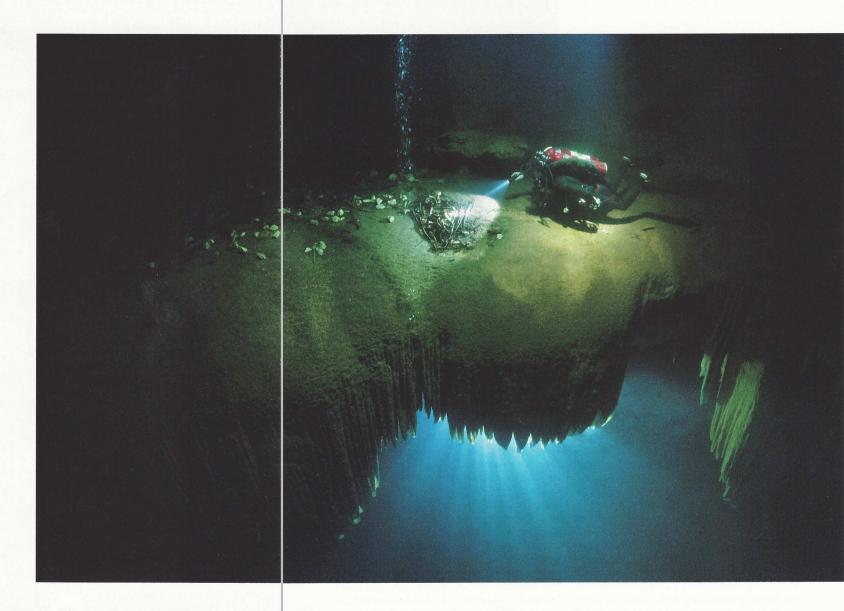
DE ANDA WAS ASTONISHED TO FIND THAT THE NATURAL ROCK SHELF HELD AN OFFERING OF A HUMAN SKULL.

while in the renewed dark the two chattered excitedly about what they had seen and what it meant. "¡Un abrazo, hermano!" Montero exclaimed, and the two men surged toward each other in the water and flappingly embraced.

boveground the crew of Maya farmers, in shorts and flip-flops, had to work hard to haul the explorers up again. Around us were rustling cornfields that had been waiting for the rain too long, but team master Luis Un Ken, a smiling man respected by everyone in his nearby village, is by nature an optimist. "There was a good rain the other day," he said, patting the sweat off his face. "The Chaak moved."

For men like Un Ken, the old gods are still very much alive, and Chaak, ruler of cenotes and caves, is among the most important gods of all. For the benefit of living things, he pours from the skies the water he keeps in earthenware jars in caves. Chaak is one and many: Each thunderclap is a separate Chaak in action, breaking a jar open and letting the rain fall. Each god inhabits a separate layer of reality, along with dozens of alternately complacent and ferocious gods that live in the 13 otherworlds above and the 9 otherworlds below. Together, they filled the Maya people's lives with dreams, visions, and nightmares; a complicated calendar of agricultural times and fertility rituals; and a firm sense of the way things must be done. Chaak had moved, Un Ken said, and that meant the planting season would soon arrive.

Chaak's absence can cause the Yucatán Maya untold disasters, tragedies properly understood only when one is standing on the hard, lunar surface of their former empire, an endless shelf of karstic rock, or limestone. Rain seeps straight through the karst to groundwater levels, and as a result no river or brook runs through the land. (Cenotes are actually sinkholes that extend to the water table.) From the air one sees a green sea of dense jungle. At ground level the tropical forest is thin—spindly trees whose stubborn roots are adapted to the pockets of soil that dot the karst. Wherever the soil hollows are large enough, Maya will plant corn or a milpa, a wise



Hovering above the offering shelf in the Holtún cenote, Guillermo de Anda surveys a pile of bones. "This work is about millimeters," says photographer Paul Nicklen. "You're right above remains that haven't been moved in centuries, so you have to have impeccable diving skills."

PAUL NICKLEN

combination of the corn, beans, and squash that constitute their basic source of protein. But corn is a hungry crop; it sucks lots of nutrients from the soil. For thousands of years milpa farmers have kept their small fields productive by burning a different patch of trees every year and planting in the corn-friendly ashes. We call this deforestation, but to the Maya it means survival.

As for water for the fields...well, that's where Chaak comes in. Only seasonal rains can make the corn grow, and they must arrive in an excruciatingly accurate pattern: no rain in winter, so that the fields and forest will be dry enough to burn by March; some rain in early May to soften up the soil for planting; then very gentle rain to allow the planted seeds to sprout and the young corn god to make his appearance in the shape of a barely formed corn ear; finally plenty of rain to send the cornstalks shooting skyward and fatten the kernels on the mature corn. At any point in the yearly cycle irregular rains mean a smaller ration of food for a family.

The unsolved archaeological question is why the great Yucatán Maya city-states collapsed one after another. The miracle is that they survived at all, fed by corn grown in such a harsh environment.

Tet they did survive—and prospered too sometimes reaping a plentiful harvest and sometimes, as Guillermo de Anda believes happened at the Holtún well, placing offerings inside a cenote during a prolonged drought, when the water table could sink by 20 feet. With a population estimated in the millions a thousand years ago, the northern Maya built so many cities—in the dry north, always next to a life-giving cenote—that one starts to think the Yucatán forest is an archaeologist's do-it-yourself: Anyone can trip over an untouched ruin. In fact a couple of days after the Yucatán zenith day, I was trudging down a path between milpas and forest a few miles from Chichén Itzá with archaeologist and cave explorer Donald Slater, when he nodded toward our right and said, "There it is." There what was? I looked around and saw cornfields to our left



A ceramic flute displays a human face (at left) beneath a curved bird's beak. Archaeologist Donald Slater and colleague Sabrina Simon found the offering near a natural stone altar deep in a cave.

and forest to our right. "There," Slater insisted. Just skinny trees, and behind those, more trees. Then what looked like a blurry thickening of the forest about 50 yards off the path turned out to be a steeply pitched hill. Of course there are no steep hills anywhere in the neighborhood. But there are pyramids. This was a particularly tall one, and directly facing its southwest corner was a very big cave.

To the Maya the cave would have been a mouth, the gaping jaws of a devouring Earth deity or one of the dwelling places of Chaak. Slater was hoping to document his claim that this cave was a sacred observation point from which to greet the arrival of the sun on its zenith day and that this pyramid—which has been known about but never fully explored—was built or at least oriented specifically in relation to the cave.

Before our visit Slater had asked a crew of Maya farmers to clear the jungle growth covering the structure's western face so that the zenith sun's track could be observed more clearly.



Illuminating his discovery, Guillermo de Anda shows off the only known sacbe, or sacred path, inside a cave. At the rock column this stone walkway turns west, toward a cenote's shimmering pool. The ancient Maya believed that was the direction leading to the underworld, a stop on the journey to heaven

At the cave's lip Slater pointed out the remains of a set of stairs rough-hewed centuries before, perhaps to give shamans access to this terrifying maw of the Earth. Slater speculates that the solar priests would have spent the night before the zenith sun fasting, dancing, and chanting to the sound of drums and double-chambered clay flutes like those he found deep inside the cave, praising the sun god for bringing the zenith day around once more, and with it, the rains.

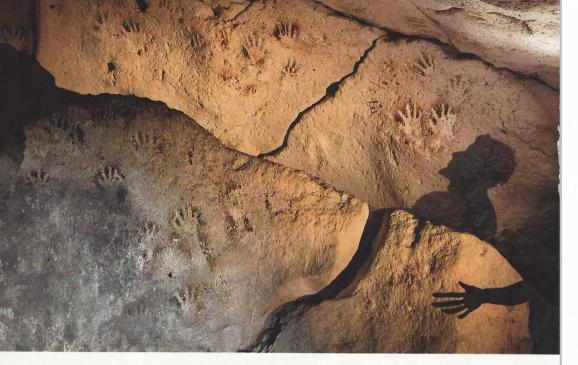
As we stood where the holy men once might have, the entire pyramid loomed before us. We waited. At 8:07 a.m. a fat, orange globe bobbled up behind the pyramid, appeared to pause for a second or two, and then displayed itself in blinding glory as it cleared the top, filling our cave with its fiery light. Centuries ago on the two zenith days, Slater explained, it would have performed its bobble dance on what are now the ruins of a platform on the top southwest corner of the structure.

To the sky-gazing Maya, the pyramids in the

Yucatán, others of which were aligned with the rising and setting suns of equinox and zenith days, would have seemed not landbound piles of stone but cosmic timekeepers—upward-yearning structures in constant interaction with the heavens. And the interaction of K'inich Ajaw, the sun, and the sacred waters of Chaak was the dance of life that made the cornfields possible.

was on my own modest search for Chaak. Roaming the Yucatán Peninsula, I was look-Ling for rituals and beliefs held by modern Maya that might help me understand their link to their glorious ancestors. Most Maya today live in poor farming communities, and Chaak, who remains so important to them, is celebrated seasonally in an extended rain-calling prayer known as a Cha Chaak.

Some 80 miles southeast of Chichén Itzá, approaching the area now known by the misleading, if glamorous, name of the Maya Riviera, lies the village of Chunpón. It is part of



Scattered handprints, some from children, mark the walls of a cave next to the shadows cast by Dante García Sedano, Guillermo de Anda's assistant. This cave likely was part of a ritual landscape that included four cenotes, where the Maya left more handprints, human bones, and offerings of ceramics.

a government-designated Zona Maya that covers a sizable portion of the Yucatán Peninsula. I visited Chunpón in the company of a man named Pastor Caamal. During work hours he is a proudly independent tour guide, and like many of his neighbors and Luis Un Ken, he is a Cruzoob, or believer in the Talking Cross, a relic from the 19th-century uprising known as the Caste War. A descendant of Maya warriors who fought government troops, he still does round-the-clock guard duty at the cross's sacred garrison two weeks out of every year.

"The Cruzoob are basically the Maya who survived," Caamal said to me on a summer afternoon as we zipped down a flat highway in the Zona Maya toward his hometown. That was something of an exaggeration: The Caste War was a strictly local affair, and there are approximately five million Maya living in an area

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that encompasses the lower third of Mexico, as well as most of Belize and Guatemala, western Honduras, and western El Salvador. But it is true that in the Yucatán, the war touched nearly every village.

I asked Caamal how he bridged the difference between the old Maya gods and Jesus Christ, whom the Maya frequently invoke, sometimes calling him Our Lord Most Holy Cross Three Persons. "We are polytheists," Caamal answered. Strikingly, there is virtually no Catholic presence in the zona; instead there are *hmem*—shamans, healers, and enchanters who usually discover their vocation in dreams, then mediate between the gods and their needy worshippers.

In answer to my increasingly desperate queries about where I might be able to witness a Cha Chaak rain ritual, Caamal said his own hmem might know of a Cha Chaak coming up somewhere, although it was late in the season.

In the bruising heat of midday we made a brief stop in Chunpón at Caamal's family

FOR MEN LIKE UN KEN, THE OLD GODS ARE ALIVE, AND CHAAK IS AMONG THE MOST IMPORTANT GODS OF ALL.

compound. In the oval kitchen hut was strung a row of hammocks, each cradling a Caamal relative who lay chatting and rocking gently. It would have been cooler without the hearth—three large stones on the dirt floor with embers glowing beneath a large iron griddle—but the kitchen embers are always stoked. Caamal's fierce, tiny mother glared at me, a "Spanish," or non-Maya, visitor, but she made some tortillas, offering them with meat and chilies. Later she would pointedly ask her son when I was planning to get out of her hammock and leave, but the rules of hospitality, as set as the movement of the stars, dictated that food be offered.

Back on the road, we saw slender trees shooting up from the bone-white, bone-hard surface of the karst. We stopped at the village of Chun-Yah, which, like many in the Zona Maya, has no land or cellular phone communication with the outside world and only rudimentary schools. In his own dusty compound of oval thatched-roof huts, Caamal's mentor and hmem, Mariano Pacheco Caamal, greeted me with a broad smile.

on Mariano said he knew how to use 40 different kinds of plants to cure illnesses and heal fractures and snakebites. At a particularly fragile time for Pastor, Don Mariano had built a protective ring of invisible fire around his friend. In dreams he had learned what to ask each god and on which day of the week. He knew where to find the sacred caves.

Don Mariano wore cutoffs and flip-flops and seemed to have remarkably few possessions for a man of his age and prestige. He spoke only elementary Spanish, and because my Mayan is nonexistent, Pastor had to translate my questions a few different ways to get the meaning across. I asked Don Mariano how he knew he was Maya. The mild-mannered hmem blinked behind his thick glasses. "Because we are poor," he said. I asked again. "Because of what we eat, our skin color, our height," came the reply, and then he thought of a better answer. "Because here there are no factories, machines, smoke. At night we have peacefulness, silence. In the morning I say, Today I will do this or that. Our work is our own.

When one works for outsiders, they say, Give me your time. But Maya are their own rulers."

Did he know of a Cha Chaak coming up? Alas, Don Mariano could only confirm that I was late. In Chun-Yah as elsewhere, the time for planting and rain invoking had already passed. Then he graciously explained how a Cha Chaak offering is set up in his small part of the Maya universe. A rectangular altar, or offering table, about three feet wide and made of saplings and a few boards, represents the world. The various foods for Chaak are placed on it in a strict order, along with half-gourd cups of a sacred fermented drink, balché, made from tree bark, and gourds filled with holy water taken from a hidden cenote or cave. The special food offering consists of 13 loaves of "bread," thick tortillas made of 13 layers of masa, or corn dough, representing the 13 layers of the otherworld above. The bread is wrapped in leaves of bakaalché, a local vine, and baked in a coffin-size pit, or pib, dug out near the altar. A cross is placed at the center back of the table to oversee the whole.

I ventured that I had heard about *sapitos*, small boys who crouch at the base of the altar table and encourage Chaak to arrive by imitating the call of frogs during the rainy season. Pastor and the hmem looked at each other and smiled.

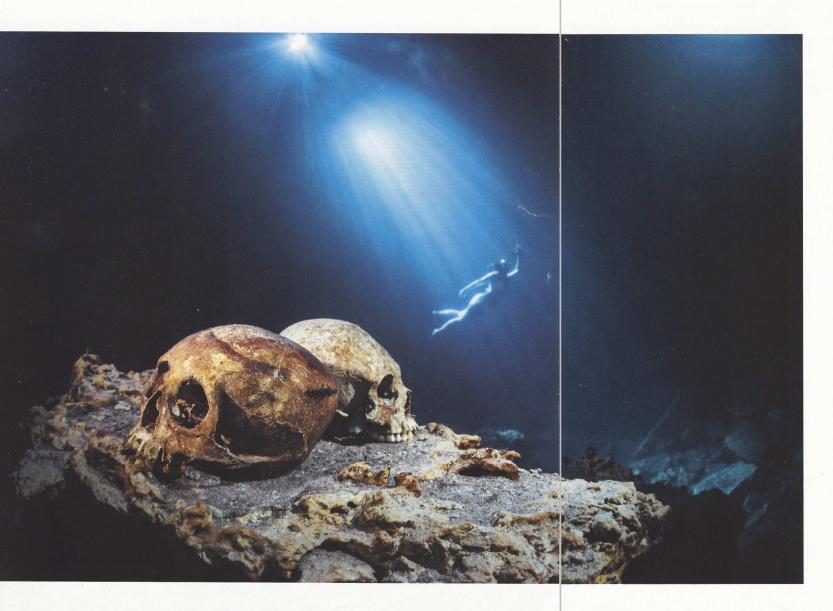
"You heard about that [near Chichén Itzá], right?" Pastor said. He imitated the boys imitating the frogs: "They go lek lek lek." He smiled again. "Muy bonita costumbre. A very pretty custom." He grinned. "We don't do that here."

In Yaxuna, a little town in the middle of the peninsula—on yet another parchingly hot morning, the rains overdue, not a cloud in sight—where a late season ceremony was being held for the laggard Chaak, they most certainly do. Yaxuna is some 12 miles south of Chichen Itza, and in this part of Yucatan many people still depend on milpa, making them the anxious subjects of Chaak.

The ceremony in Yaxuná had almost ended by the time I caught up with it. For going on two days rain-desperate villagers and their hmem had toiled without rest or sleep to persuade Chaak to come to them. They had walked



THE RAIN STARTED—A SIGN THAT CHAAK HAD RECEIVED HIS OFFERING AND WAS PLEASED.



A snorkeling tourist floats in a cenote called Las Calaveras-"the skulls"-near Tulum. Local Maya got their drinking water here until about 30 years ago, when divers found bones. Archaeologists have recorded the remains of more than . a hundred people, usually shrouded by the water's primordial darkness PAUL NICKLEN

a long way through the forest to a secret cave and scrabbled down to its center on a scary rope system to bring up the water the ceremony required. They had raised the altar, dug the pib, gone to enormous expense to provide 13 fat hens for the ritual meal, guarded the altar overnight while praying and drinking balché, patted out the stacks of 13-layer corn-and-squash-seed breads that no women had been allowed to touch, cooked them in the pib, and brought them out of their fiery bed again, leaving the pit open so that the steam could rise directly to the rain god as an offering.

And now the hmem, Hipólito Puuc Tamay, a slow-moving, leathery man in a red baseball cap and much washed shirt, was standing in front of the altar praying to Chaak, to Jesus Christ, to all the saints, to San Juan Bautista, to the forces of the Earth and sky, and to Chaak again, to let the holy blessing of rain fall on them and on all the surrounding Maya communities so that they might survive one more full cycle of the sun. On instructions from the hmem, one of the villagers crouched on a rock behind and to one side of the altar, keeping very still, only blowing from time to time into one of the gourds in which Chaak stores the wind. He was just one of the neighbors, but he was also the rain god, and he sat with his eyes closed so as not to harm the ceremony with his terrible glance. Two other participants brought him to the altar, facing backward, to receive the hmem's neutralizing blessing.

And there the little frogs were too, five slightly abashed boys crouching at the foot of the world altar, one boy at each corner and one at the center, four of them saying, hmaa, hmaa, hmaa, and the fifth, lek lek lek lek, a blended sound remarkably like that of frogs in the evening rain.

Out of nowhere a wind came up in the clearing. Thunder rolled in the blue distance.

As the ceremonial meal of chicken and the corn-and-seed bread was being distributed to the exhausted men, the rain started—a light, refreshing summer shower. A sign, the hmem said, that Chaak had received his offering and was pleased with his people's prayer. Soon, perhaps, the Earth would be ready for planting. \square