El Dorado. Atlantis. The Lost City of Z. Legends of such fabled places have enticed generations of explorers into the most remote locations on Earth. Usually they return empty-handed, if they return at all. But sometimes the pursuit of a myth leads to a real discovery.

Lure of the Lost City

In the La Mosquitia region of Honduras, former British Special Air Service officer Andrew Wood machetes a trail to ruins of a pre-Columbian city, first detected from the air by a technology called lidar.

In the ruins archaeologists discovered a cache of stone objects, possibly left as an offering. They include jars decorated with the images of vultures and snakes.

By Douglas Preston
Photographs by Dave Yoder

On February 18, 2015, a military helicopter lifted off from a shabby airstrip near the town of Catacamas, Honduras, and headed toward the mountains of La Mosquitia on the northeast horizon. Below, farms gradually gave way to steep sunlit slopes, some covered with unbroken rain forest, others partially stripped for cattle ranching. Picking his way through the summits, the pilot headed for a V-shaped notch in a distant ridge. Beyond it lay a valley surrounded by serrated peaks: an unblemished landscape of emerald and gold, dappled with the drifting shadows of clouds. Flocks of egrets flew below, and the treetops thrashed with the movement of unseen monkeys. There were no signs of human life—not a road, a trail, or a wisp of smoke. The pilot banked and descended, aiming for a clearing along a riverbank.

Among those stepping from the helicopter was an archaeologist named Chris Fisher. The valley was in a region long rumored to harbor "Ciudad Blanca"—a mythic metropolis built of white stone, also known as the Lost City of the Monkey God. Fisher did not believe in such legends. But he did believe that the valley, known to him and his companions simply as T1, contained the ruins of a real lost city, abandoned for at least half a millennium. In fact, he was certain of it.

All they had to do was go and look for it.

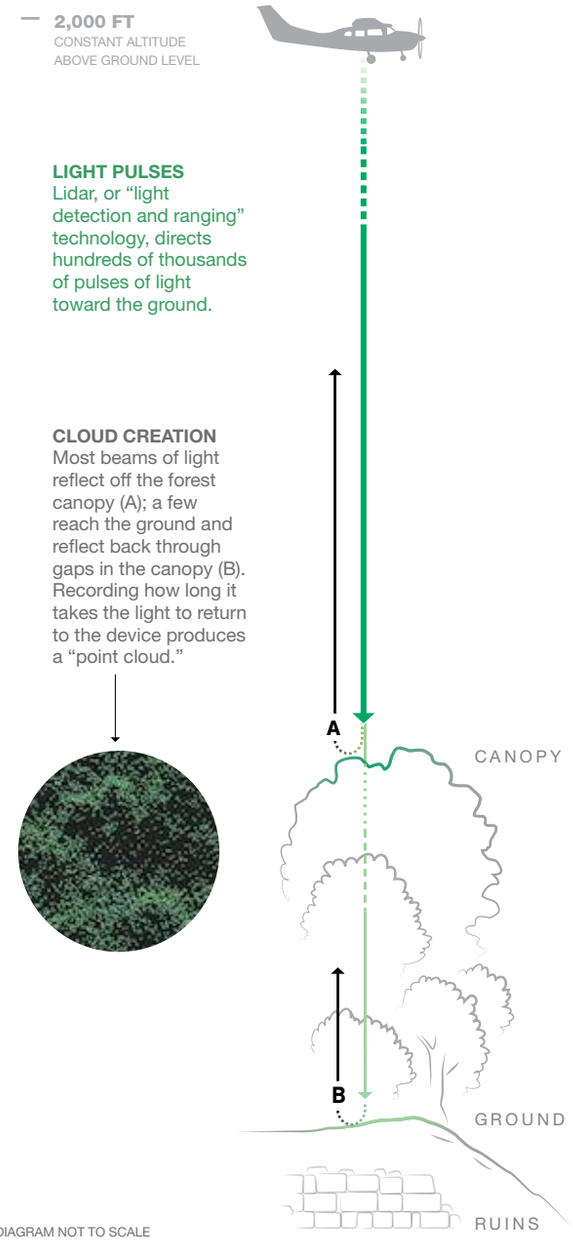
EXPLORER

Tune in Sunday, October 4 to National Geographic Channel's *Explorer* series for more on the ongoing quest in Mosquitia.

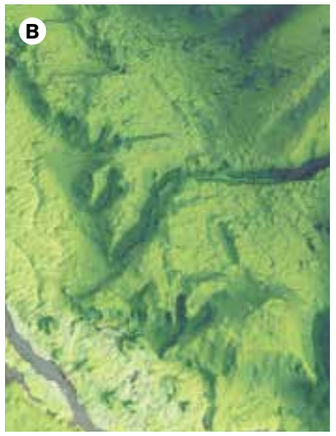
Covering 20,000 square miles in Honduras and Nicaragua, Mosquitia contains the largest rain forest in Central America and some of the last areas on Earth that scientists have yet to explore. "The importance of this place can't be overestimated," says ethnobotanist Mark Plotkin.

Archaeology from above

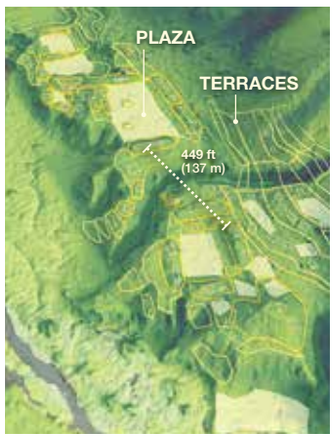
Technology called lidar is revolutionizing archaeology. By measuring the distance light travels to the ground and back, researchers can digitally strip away the canopy from forested areas like Mosquitia, in Honduras—revealing ancient settlements.



Canopy Researchers use sophisticated software to translate the reflected laser points in the point cloud to create a model of the forest canopy.



Ground By identifying the laser points that reach and reflect off the ground, researchers produce bare-earth topographic models.



Signs of Life? Experts then look for traces of man-made structures or human-induced changes to the landscape to identify promising sites for excavation.

MANUEL CANALES, NGM STAFF; AMANDA HOBBS. ART: GREG HARLIN. DIGITAL RENDERING: STEFAN FICHTEL
SOURCES: JUAN CARLOS FERNÁNDEZ-DIAZ, NCALM/UNIVERSITY OF HOUSTON;
CHRISTOPHER T. FISHER, COLORADO STATE UNIVERSITY; ALICIA M. GONZÁLEZ; UTL PRODUCTIONS

LOST CITY ILLUMINATED

An artist used lidar data to portray structures surveyed in the T1 valley in Mosquitia during the February 2015 expedition. Many more features remain to be mapped and explored.

BUILDINGS
Large thatched-roof structures likely had stone foundations; smaller ones were made of wood and earth.

TERRACES
Farmers cut terraces into the land, making it easier to grow and harvest crops.

PLAZA
Open areas flanked by mounds were probably used for large gatherings.

MOUNDS
Earthen mounds of different shapes and sizes are scattered throughout the site. They likely supported structures.

EARTHEN PYRAMID

CANALS
Evidence hints that canals were dug to irrigate agricultural areas.

CACHE
Fifty-two artifacts, including a stone seat decorated with the head of a jaguar, were found poking out of the ground at the base of an earthen pyramid.

THE MOSQUITIA REGION of Honduras and Nicaragua holds the largest rain forest in Central America, covering some 20,000 square miles of dense vegetation, swamps, and rivers. From above it may look inviting, but anyone venturing into it faces a host of dangers: deadly snakes, hungry jaguars, and noxious insects, some carrying potentially lethal diseases. The persistence of the myth of a hidden White City owes a great deal to the forbidding nature of this wilderness. But the origin of the legend is obscure. Explorers, prospectors, and early aviators spoke of glimpsing the white ramparts of a ruined city rising above the jungle; others repeated tales, first recorded by Hernán Cortés in 1526, of fabulously rich towns hidden in the Honduran interior. Anthropologists who spent time with the Miskito, Pech, and Tawahka Indians of Mosquitia heard stories of a "White House," a refuge where indigenous people retreated from the Spanish conquest, never to be seen again.

Mosquitia lies on the frontier of Mesoamerica, adjacent to the realm of the Maya. While the Maya are among the most studied of ancient cultures in the Americas, the people of Mosquitia are among the most mysterious—a question mark embodied by the legend of the White City. Over time the myth became a part of the Honduran national consciousness. By the 1930s Ciudad Blanca had also captured the imagination of the American public, and in many quarters it was taken seriously. Several expeditions were launched to find it, including three by the Museum of the American Indian in New York City financed by George Gustav Heye, an avid collector of Native American artifacts. The first two came back with rumors of a lost city containing a giant statue of a monkey god, waiting to be unearthed.

The museum's third expedition, led by an eccentric journalist named Theodore Morde, landed in Honduras in 1940. Morde emerged from the jungle five months later with crates of artifacts. "The City of the Monkey God was walled," Morde wrote. "We traced one wall until it vanished under mounds that have all the evidence of once being great buildings." Morde declined to reveal the location, for fear, he said, of looting, but he promised to return the following year to begin excavations. He never did, and in 1954 he hanged himself in a shower stall. His city, if there was one, remains unidentified.

In subsequent decades archaeology in Mosquitia was impeded not only by tough conditions but also by a generally accepted belief that the rain forest soils of Central and South America were too poor to support more than scattered hunter-gatherers, certainly too poor to maintain the intensive agriculture necessary to develop complex hierarchical societies. This was true despite the fact that when archaeologists first began to explore Mosquitia in the 1930s, they uncovered some settlements, suggesting that the area was once occupied by a widespread, sophisticated culture—not surprising, considering that the region lay at the crossroads of trade and travel between the Maya and other Mesoamericans to the north and west, and the powerful Chibcha-speaking cultures to the south.

The Mosquitia people took on aspects of Maya culture, laying out their cities in vaguely Maya fashion. They probably adopted the famous Mesoamerican ball game, a ritual contest sometimes involving human sacrifice. But their exact relationship to their imposing neighbors remains unknown. Some archaeologists have proposed that a group of Maya warriors from Copán may have taken control of Mosquitia, ruling as an elite over the local population. Others think that the local culture simply embraced the characteristics of an adjacent, impressive civilization.

Explorers, prospectors, and aviators spoke of glimpsing the ramparts of a ruined city rising above the jungle.

One important distinction between the two cultures was the Mosquitia people's choice of building materials. There is no evidence yet that they built with cut stone, constructing their public edifices instead out of river cobbles, earth, wood, and wattle and daub. When these buildings were decorated and painted, they may have been as remarkable as some of the great temples of the Maya. But once abandoned, they dissolved in the rain and rotted away, leaving unimpressive mounds of dirt and rubble that were quickly swallowed by vegetation. The disappearance of this splendid architecture could explain why this culture remains so "marginalized," according to Christopher Begley of Transylvania University in Lexington, Kentucky, who has carried out archaeological surveys in the Mosquitia region. The culture is still so under-studied that it has not been given a formal name.

"There is much we don't know about this great culture," Oscar Neil Cruz told me. Mexican by birth, Neil is chief of archaeology for the Honduran Institute of Anthropology and History (IHAH). "What we don't know, in fact, is almost everything."

WHEN SO LITTLE IS KNOWN, anything is possible. In the mid-1990s a documentary filmmaker named Steve Elkins became captivated by the legend of the White City, and embarked on an effort to find it. He spent years poring through reports from explorers, archaeologists, gold prospectors, drug smugglers, and geologists. He mapped out which areas of Mosquitia had been explored and which had not. He hired scientists at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California, to analyze reams of data from Landsat and radar images of Mosquitia, looking for signs of ancient settlements. The JPL report showed what might be "rectilinear and curvilinear" features in three valleys, which

Society Grant Your National Geographic Society membership is helping fund a Honduran-American expedition to excavate the artifacts in Mosquitia.

Lidar helped researchers uncover ancient settlements in three valleys in Honduras inhabited by a little-known culture to the east of Mesoamerica. The region surrounding the valleys was later designated the Mosquitia Patrimonial Heritage Preserve.

JEROME N. COOKSON, NGM STAFF; AMANDA HOBBS. SOURCES: CHRISTOPHER BEGLEY, TRANSYLVANIA UNIVERSITY; OSCAR NEIL CRUZ, HONDURAN INSTITUTE OF ANTHROPOLOGY AND HISTORY; JUAN CARLOS FERNÁNDEZ-DIAZ, NCALM/UNIVERSITY OF HOUSTON; CHRISTOPHER T. FISHER, COLORADO STATE UNIVERSITY; UTL PRODUCTIONS

Among the artifacts found is a carved face—part jaguar, part human—about the size of a fist. Excavation of the site could provide clues to an ancient culture so little known it has no name.

Elkins labeled T1, T2, and T3, the *T* standing for "target." The first was an unexplored river valley surrounded by ridges, forming a natural bowl. "I just thought," Elkins said, "that if I were a king, this would be the perfect place to hide my kingdom." But the images were inconclusive; he would need a better way to peer through the dense jungle canopy.

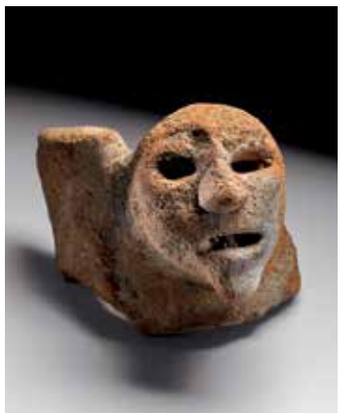
Then, in 2010, Elkins read an article in *Archaeology* magazine that described how a technique called lidar (short for light detection and ranging) had been used to map the Maya city of Caracol, in Belize. Lidar works by bouncing hundreds of thousands of pulses of infrared laser beams off the rain forest below, recording the point location of each reflection. The three-dimensional "point cloud" can be manipulated with software to remove the pulses that hit trees and undergrowth, leaving an image composed only of pulses reaching the underlying terrain—including the outlines of archaeological features. In just five days of scanning, lidar revealed that Caracol was seven times larger than had been thought from 25 years of on-the-ground surveying.

One downside of lidar is its expense. The Caracol survey had been carried out by the National Center for Airborne Laser Mapping (NCALM) at the University of Houston. For NCALM to scan just the 55 square miles of the three valleys would cost a quarter of a million dollars. Fortunately, by this time Elkins's unbounded eagerness to find the White City had infected Bill Benenson, another filmmaker, who was so taken with the project that he decided he would finance it himself.

The initial results were astonishing. There appeared to be ruins strung along several miles of the T1 valley. (I reported on this initial discovery in the *New Yorker* magazine in 2013.) A site twice the size was evident in T3. Although the larger structures were readily apparent, a finer analysis of the images would require the eye of an archaeologist skilled in the use of lidar. Elkins and Benenson turned to Chris Fisher, a specialist on Mesoamerica at Colorado State University.

Makings of a myth

The stone armadillo below from Mosquitia helped inspire collector George Gustav Heye to dispatch Theodore Morde and others in the 1930s and '40s to search for a legendary White City hidden in the jungle. Morde returned with artifacts including the ceramic figurines seen here—and news, never confirmed, that the city had been found.



PHOTOGRAPHED AT NATIONAL MUSEUM OF THE AMERICAN INDIAN, SMITHSONIAN INSTITUTION, BY (CLOCKWISE FROM RIGHT) ERNEST AMOROSO (7274); MARK THIESSEN, NGM STAFF (202824, 202823, 202825)

Which is how Fisher came to be standing on the bank of an unnamed river in T1 in February 2015, staring at the wall of jungle on the other side and eager to plunge in.

FROM THE MOMENT Fisher saw the lidar images, he was hooked. He had used the technology to map Angamuco, an ancient city of the fierce Purépecha (Tarascan) people, who rivaled the Aztec in central Mexico from around A.D. 1000 until the arrival of the Spanish in the early 1500s. While the communities of the Mexican highlands in pre-Columbian America were densely packed, those in the tropics tended to be spread out across the landscape—ancient Los Angeleses, as opposed to Manhattans. Nevertheless, the sites in T1 and T3 looked substantial—certainly the largest settlements mapped so far in Mosquitia. The core area in T3 was almost one and a half square miles—nearly the size of the central area of Copán, the Maya city to the west. T1's center was smaller but more concentrated, appearing to consist of ten large plazas, dozens of associated mounds, roads, farming terraces, irrigation canals, a reservoir, and a possible pyramid. Because of the evident ceremonial architecture, earthworks, and multiple plazas, Fisher had no doubt that both locations fit the archaeological definition of a city, a settlement showing complex social organization, with clear divisions of space, intimately connected to its hinterlands. "Cities have special ceremonial functions and are associated with intensive agriculture," he told me. "And they usually involved major, monumental reconstruction of the environment."

In their quixotic attempt to locate a (probably) mythical White City, Elkins and Benenson apparently had found two very real ancient cities. With the help of the Honduran government, they gathered a team capable of penetrating the jungle to "ground-truth" what the lidar images had identified. Besides Fisher, who had more experience than anyone else in using lidar imagery to know where to look and what to look for on the ground, the team had two other archaeologists, including the IHAH's Oscar Neil Cruz; an anthropologist; a lidar engineer; two ethnobotanists; a geochemist; and a geographer. Also along were Elkins's camera crew and a team from *National Geographic*.

The logistics were daunting—aside from having to contend with snakes, insects, mud, and incessant rain, we would risk contracting malaria, dengue fever, and a smorgasbord of other tropical diseases. (The Editor's Note in this issue recounts the impact on the expedition team of leishmaniasis, a potentially lethal parasitic disease transmitted by a tiny sand fly.)

To ease the way, Elkins and Benenson had hired three ex-British Special Air Service (SAS) officers who had formed a company specializing in shepherding film crews in dangerous areas. They were dropped first at the site to clear landing and camp areas with machetes and chain saws while the helicopter returned to Catacamas to shuttle in Fisher and the others. Andrew "Woody" Wood, leader of the support team, later told me that as they worked, animals—a tapir, jungle fowl, and spider monkeys—wandered about or gathered in the trees above, seemingly unafraid. "I've never seen anything like it," he said. "I don't think these animals have ever seen human beings."

Wood had chosen a raised terrace behind the landing zone as the site for the base camp, set up amid giant trees, accessible by crossing a bridge of logs laid over a mudhole, with a climb up an embankment. Because of the danger of snakes—the highly venomous fer-de-lance, often referred to as "the ultimate pit viper," are particularly worrisome; they sometimes flee when disturbed, but they can also turn around and chase down an intruder—he had forbidden anyone to leave the camp unescorted. But Fisher was impatient; accustomed to dangerous fieldwork at his Mexican site, he threatened to explore on his own. In late afternoon, Wood agreed to a quick reconnaissance of the ruins. The advance team assembled on the riverbank in full jungle kit, wearing snake gaiters and stinking of insect repellent. A Trimble GPS unit, in which Fisher had downloaded the lidar maps, showed his exact location in relation to the presumed ruins.

Archaeologist Oscar Neil Cruz (top) carefully brushes forest litter from a stone shortly after entering the ruins in Mosquitia. It proved to be one of some 50 flat stones (above) encircling a plaza—the first architectural elements discovered at the site. Their purpose is still unknown.

The unexcavated artifacts include carved stone seats called *metates.* Honduran President Juan Orlando Hernández has ordered a military presence at the site to protect it from looters.

Consulting the GPS, Fisher called directions to Wood, who whacked a trail through a thicket of false bird-of-paradise, showering the group with blossoms. The forest thrummed with the sounds of birds, frogs, toads, and insects. We forded two mudholes, one thigh-deep, climbed the bluffs above the floodplain, and arrived at the base of a steep, jungle-clad prominence—the edge of the presumed city. "Let's go to the top," Fisher said. The ground-truthing had begun.

Clinging to vines and roots, we ascended the slippery, leaf-strewn slope. At the summit, thick with vegetation, Fisher pointed out a subtle but unmistakable rectangular depression, which he believed to be the outline of a building. Kneeling down for a better look, Neil uncovered what appeared to be evidence of deliberate construction, supporting the interpretation of it as an earthen pyramid. Fisher was elated. "It's just as I thought," he said. "All this terrain has been modified by human hands."

Fisher and Wood led the team down from the pyramid into what Fisher hoped was one of the city's ten "plazas," or large public spaces. As we entered the area, we found a stretch of rain forest as artificially level as a soccer field. Linear mounds surrounded it on three sides, the remains of walls and buildings. A gully cut through the plaza, exposing a surface paved with stones. Crossing the plaza, we discovered on the far side a row of flat, altar-like stones perched on tripods of white boulders. The thick vegetation, however, continued to block any sense of the layout or scale of the ancient city. With the sun beginning to set, we returned to camp.

We awoke the next morning and set off to explore again, a thick fog reverberating with the calls of howler monkeys. Mats of vines and dripping flowers hung down in the green gloom. Surrounded by the immense trees and the silent mounds—remnants of another people, another time—I felt the connection to the present moment melt away. A clamor in the upper treetops announced the beginning of a downpour. Several minutes elapsed before the rain reached the ground. Soon we were soaked.

Fisher, wielding his machete, hiked north with Neil and Juan Carlos Fernández-Diaz, the team's lidar engineer, to map more plazas of the city. Anna Cohen, a doctoral candidate from the University of Washington, and Alicia González, the expedition's anthropologist, stayed behind to clear vegetation away from the row of stones. Toward afternoon Fisher and his group returned, having mapped three more plazas and many mounds. Everyone drank a round of hot, milky tea in the pouring rain. Wood ordered a return to camp, concerned that the river might be rising. The team departed in single file. Suddenly cameraman Lucian Read, near the end of the line, called out.

"Hey, there are some weird stones over here."

At the base of the pyramid, just poking out of the ground, were the tops of dozens of beautifully carved stone sculptures. The objects, glimpsed among leaves and vines, and covered with moss, took shape in the jungle twilight: the snarling head of a jaguar, a stone vessel decorated with a vulture's head, large jars carved with snakes, and a cluster of objects that looked like decorated thrones or tables, which archaeologists call *metates*. All the artifacts were in perfect condition, likely untouched since they'd been left behind centuries before.

There were shouts of astonishment. People crowded around, bumping into one another. Fisher quickly took charge, ordering everyone back and roping off the area with police tape.

The finds were in perfect condition, likely untouched since they'd been left behind centuries before.

But he was just as jazzed as the others, maybe more so. Although similar objects were well-known from other parts of Mosquitia, most were one-offs found long ago by Morde and others or dug up and carted off by local people or looters. Certainly no such cache had been recorded in the literature. There were 52 objects showing aboveground—and who knows how many more below the surface.

"This is a powerful ritual display," said Fisher, "taking wealth objects like this out of circulation and leaving them here, perhaps as an offering."

In the days that followed, the team of archaeologists recorded each object in situ. Using a tripod-mounted lidar device, Fernández scanned the artifacts as well, creating 3-D images of each. Nothing was touched, nothing removed: That would wait for another time, when the team could return with the proper equipment and time to do a careful excavation.

AT THE TIME OF THIS WRITING, another, more extensive expedition is indeed being planned, with the full support of the Honduran government. Plagued by narcotics trafficking and the accompanying violence, Honduras is a poor country in need of good news. Ciudad Blanca, the White City, may be a legend—but anything that brings that story closer to reality generates great excitement; it is a point of collective pride, an affirmation of the people's connection to their pre-Columbian past. Upon learning of the discovery of the cache, Juan Orlando Hernández, the president of Honduras, ordered a full-time military unit to the site to guard it against looters. Several weeks later he helicoptered in to see it firsthand, and pledged that his government would do "whatever it takes" to further not only the investigation and protection of the valley's cultural heritage but the ecological patrimony of the surrounding region as well.

The investigation has only begun. Most of the T1 valley remains to be surveyed, and the even more extensive ruins in T3 have not been approached. And who knows what lies beneath the jungle canopy veiling the rest of Mosquitia? In recent years there has been a fundamental change in the way archaeologists think pre-Columbian people inhabited tropical landscapes. In the old view, sparsely populated human settlements were dots on a mostly unoccupied terrain. In the new view, settlements were densely populated, with far less empty space between them.

"Even in this remote jungle environment," said Fisher, "where people wouldn't expect it, there were dense populations living in cities—thousands of people. That is profound."

What we still have to learn about the former inhabitants of Mosquitia is practically unlimited. But the time to learn it may not be. In February, as we flew out of T1 back to Catacamas, within just a few miles the unbroken rain forest gave way to slopes scarred by clearings for cattle ranching—ugly, threadbare patches on an otherwise luxurious coat. Virgilio Paredes, the director of the Honduran Institute of Anthropology and History, under whose auspices the expedition operated, calculated that at the present rate, clear-cutting will reach the T1 valley in eight years or less, destroying possible cultural treasures and leaving others open to rampant looting. President Hernández has pledged to protect the region from deforestation as well as looting, in part by establishing the Mosquitia Patrimonial Heritage Preserve, an area of about 785 square miles surrounding the valleys surveyed by lidar. But the issue is delicate. Though the cutting is illegal—the area is supposedly protected within the Tawahka Asangni and Río Plátano Biosphere Reserves—cattle ranching is an economic boon and a cherished tradition in this part of Honduras.

If the discoveries in T1 tip the scale toward preservation, then it doesn't matter whether the White City is real or myth. The search for it has led to riches. ▯

Dave Yoder seems to have a thing for ancient cities—he also shot August's cover story on Pope Francis. "In many ways," he says, "the Vatican was more difficult to penetrate than the jungle."