INTRODUCTION

Holmberg's Mistake

I

A View from Above

IN THE BENI

The plane took off in weather that was surprisingly cool for central Bolivia and flew east, toward the Brazilian border. In a few minutes the roads and houses disappeared, and the only traces of human settlement were the cattle scattered over the savanna like sprinkles on ice cream. Then they, too,disappeared. By that time the archaeologists had their cameras out and were clicking away in delight.

Below us lay the Beni, a Bolivian province about the size of Illinois and Indiana put together, and nearly as flat. For almost half the year rain and snowmelt from the mountains to the south and west cover the land with an irregular, slowly moving skin of water that eventually ends up in the province's northern rivers, which are upper tributaries of the Amazon. The rest of the year the water dries up and the bright green vastness turns into something that resembles a desert. This peculiar, remote, often watery plain was what had drawn the researchers' attention, and not just because it was one of the few places on earth inhabited by some people who might never have seen Westerners with cameras.

Clark Erickson and William Balée, the archaeologists, sat up front. Erickson, based at the University of Pennsylvania, worked in concert with a Bolivian archaeologist, who that day was elsewhere, freeing up a seat in the plane for me. Balée, of Tulane, is actually an anthropologist, but as scientists have come to appreciate the ways in which past and present inform each other, the distinction between anthropologists and archaeologists has blurred. The two men differ in build, temperament, and scholarly proclivity, but they pressed their faces to the windows with identical enthusiasm.

Scattered across the landscape below were countless islands of forest, many of them almost-perfect circles—heaps of green in a sea of yellow

grass. Each island rose as much as sixty feet above the floodplain, allowing trees to grow that otherwise could not endure the water. The forests were bridged by raised berms, as straight as a rifle shot and up to three miles long. It is Erickson's belief that this entire landscape—thirty thousand square miles or more of forest islands and mounds linked by causeways—was constructed by a technologically advanced, populous society more than a thousand years ago. Balée, newer to the Beni, leaned toward this view but was not yet ready to commit himself.

Erickson and Balée belong to a cohort of scholars that in recent years has radically challenged conventional notions of what the Western Hemisphere was like before Columbus. When I went to high school, in the 1970s, I was taught that Indians came to the Americas across the Bering Strait about thirteen thousand years ago, that they lived for the most part in small, isolated groups, and that they had so little impact on their environment that even after millennia of habitation the continents remained mostly wilderness. Schools still impart the same ideas today. One way to summarize the views of people like Erickson and Balée would be to say that they regard this picture of Indian life as wrong in almost every aspect. Indians were here far longer than previously thought, these researchers believe, and in much greater numbers. And they were so successful at imposing their will on the landscape that in 1492 Columbus set foot in a hemisphere thoroughly marked by humankind.

Given the charged relations between white societies and native peoples, inquiry into Indian culture and history is inevitably contentious. But the recent scholarship is especially controversial. To begin with, some researchers—many but not all from an older generation—deride the new theories as fantasies arising from an almost willful misinterpretation of data and a perverse kind of political correctness. "I have seen no evidence that large numbers of people ever lived in the Beni," Betty J. Meggers, of the Smithsonian Institution, told me. "Claiming otherwise is just wishful thinking." Indeed, two Smithsonian-backed archaeologists from Argentina have argued that many of the larger mounds are natural floodplain deposits; a "small initial population" could have built the remaining causeways and raised fields in as little as a decade. Similar criticisms apply to many of the new scholarly claims about Indians, according to Dean R. Snow, an anthropologist at Pennsylvania State University. The problem is that "you can make the meager evidence from the ethnohistorical record tell you anything you want," he says. "It's really easy to kid yourself." And some have charged that the claims advance the political agenda of those who seek to discredit European culture, because the high numbers seem to inflate the scale of native loss.

Disputes also arise because the new theories have implications for today's ecological battles. Much of the environmental movement is animated, consciously or not, by what geographer William Denevan calls "the pristine myth"—the belief that the Americas in 1491 were an almost untouched, even Edenic land, "untrammeled by man," in the words of the Wilderness Act of 1964, a U.S. law that is one of the founding documents of the global environmental movement. To green activists, as the University of Wisconsin historian William Cronon has written, restoring this long-ago, putatively natural state is a task that society is morally bound to undertake. Yet if the new view is correct and the work of humankind was pervasive, where does that leave efforts to restore nature?

The Beni is a case in point. In addition to building roads, causeways, canals, dikes, reservoirs, mounds, raised agricultural fields, and possibly ball courts, Erickson has argued, the Indians who lived there before Columbus trapped fish in the seasonally flooded grassland. The trapping was not a matter of a few isolated natives with nets, but a society-wide effort in which hundreds or thousands of people fashioned dense, zigzagging networks of earthen fish weirs (fish-corralling fences) among the causeways. Much of the savanna is natural, the result of seasonal flooding. But the Indians maintained and expanded the grasslands by regularly setting huge areas on fire. Over the centuries the burning created an intricate ecosystem of fire-adapted plant species dependent on indigenous pyrophilia. The Beni's current inhabitants still burn, although now it is mostly to maintain the savanna for cattle. When we flew over the region, the dry season had just begun, but mile-long lines of flame were already on the march. Smoke rose into the sky in great, juddering pillars. In the charred areas behind the fires were the blackened spikes of trees, many of them of species that activists fight to save in other parts of Amazonia.

The future of the Beni is uncertain, especially its most thinly settled region, near the border with Brazil. Some outsiders want to develop the area for ranches, as has been done with many U.S. grasslands. Others want to keep this sparsely populated region as close to wilderness as possible. Local Indian groups regard this latter proposal with suspicion. If the Beni becomes a reserve for the "natural," they ask, what international organization would let them continue setting the plains afire? Could any outside group endorse large-scale burning in Amazonia? Instead, Indians propose placing control of the land into their hands. Activists, in turn, regard that idea without enthusiasm—some indigenous groups in the U.S. Southwest have promoted the use of their reservations as repositories for nuclear waste. And, of course, there is all that burning.

HOLMBERG'S MISTAKE

"Don't touch that tree," Balée said.

I froze. I was climbing a low, crumbly hill and had been about to support myself by grasping a scrawny, almost vine-like tree with splayed leaves. "*Triplaris americana,*" said Balée, an expert in forest botany. "You have to watch out for it." In an unusual arrangement, he said, *T. americana* plays host to colonies of tiny red ants—indeed, it has trouble surviving without them. The ants occupy minute tunnels just beneath the bark. In return for shelter, the ants attack anything that touches the tree—insect, bird, unwary writer. The venom-squirting ferocity of their attack gives rise to *T. americana*'s local nickname: devil tree.

At the base of the devil tree, exposing its roots, was a deserted animal burrow. Balée scraped out some dirt with a knife, then waved me over, along with Erickson and my son Newell, who were accompanying us. The depression was thick with busted pottery. We could see the rims of plates and what looked like the foot of a teakettle—it was shaped like a human foot, complete with painted toenails. Balée plucked out half a dozen pieces of ceramic: shards of pots and plates, a chipped length of cylindrical bar that may have been part of a pot's support leg. As much as an eighth of the hill, by volume, was composed of such fragments, he said. You could dig almost anywhere on it and see the like. We were clambering up an immense pile of broken crockery.

The pile is known as Ibibate, at fifty-nine feet one of the tallest known forested mounds in the Beni. Erickson explained to me that the pieces of ceramic were probably intended to help build up and aerate the muddy soil for settlement and agriculture. But though this explanation makes sense on engineering grounds, he said, it doesn't make the long-ago actions of the moundbuilders any less mysterious. The mounds cover such an enormous area that they seem unlikely to be the byproduct of waste. Monte Testaccio, the hill of broken pots southeast of Rome, was a garbage dump for the entire imperial city. Ibibate is larger than Monte Testaccio and but one of hundreds of similar mounds. Surely the Beni did not generate more waste than Rome—the ceramics in Ibibate, Erickson argues, indicate that large numbers of people, many of them skilled laborers, lived for a long time on these mounds, feasting and drinking exuberantly all the while. The number of potters necessary to make the heaps of crockery, the time required for labor, the number of people needed to provide food and shelter for the potters, the organization of large-scale destruction and burial—all of it is evidence, to

Erickson's way of thinking, that a thousand years ago the Beni was the site of a highly structured society, one that through archaeological investigation was just beginning to come into view.

Accompanying us that day were two Sirionó Indians, Chiro Cuéllar and his son-in-law Rafael. The two men were wiry, dark, and nearly beardless; walking beside them on the trail, I had noticed small nicks in their earlobes. Rafael, cheerful almost to bumptiousness, peppered the afternoon with comments; Chiro, a local figure of authority, smoked locally made "Marlboro" cigarettes and observed our progress with an expression of amused tolerance. They lived about a mile away, in a little village at the end of a long, rutted dirt road. We had driven there earlier in the day, parking in the shade of a tumbledown school and some old missionary buildings. The structures were clustered near the top of a small hill—another ancient mound. While Newell and I waited by the truck, Erickson and Balée went inside the school to obtain permission from Chiro and the other members of the village council to tramp around. Noticing that we were idle, a couple of Sirionó kids tried to persuade Newell and me to look at a young jaguar in a pen, and to give them money for this thrill. After a few minutes, Erickson and Balée emerged with the requisite permission—and two chaperones, Chiro and Rafael. Now, climbing up Ibibate, Chiro observed that I was standing by the devil tree. Keeping his expression deadpan, he suggested that I climb it. Up top, he said, I would find some delicious jungle fruit. "It will be like nothing you have experienced before," he promised.

From the top of Ibibate we were able to see the surrounding savanna. Perhaps a quarter mile away, across a stretch of yellow, waist-high grass, was a straight line of trees—an ancient raised causeway, Erickson said. Otherwise the countryside was so flat that we could see for miles in every direction—or, rather, we could have seen for miles, if the air in some directions had not been filled with smoke.

Afterward I wondered about the relationship of our escorts to this place. Were the Sirionó like contemporary Italians living among the monuments of the Roman Empire? I asked Erickson and Balée that question during the drive back.

Their answer continued sporadically through the rest of the evening, as we rode to our lodgings in an unseasonable cold rain and then had dinner. In the 1970s, they said, most authorities would have answered my question about the Sirionó in one way. Today most would answer it in another, different way. The difference involves what I came to think of, rather unfairly, as Holmberg's Mistake.

Although the Sirionó are but one of a score of Native American groups in

the Beni, they are the best known. Between 1940 and 1942 a young doctoral student named Allan R. Holmberg lived among them. He published his account of their lives, *Nomads of the Longbow,* in 1950. (The title refers to the six-foot bows the Sirionó use for hunting.) Quickly recognized as a classic, *Nomads* remains an iconic and influential text; as filtered through countless other scholarly articles and the popular press, it became one of the main sources for the outside world's image of South American Indians.

The Sirionó, Holmberg reported, were "among the most culturally backward peoples of the world." Living in constant want and hunger, he said, they had no clothes, no domestic animals, no musical instruments (not even rattles and drums), no art or design (except necklaces of animal teeth), and almost no religion (the Sirionó "conception of the cosmos" was "almost completely uncrystallized"). Incredibly, they could not count beyond three or make fire (they carried it, he wrote, "from camp to camp in a [burning] brand"). Their poor lean-tos, made of haphazardly heaped palm fronds, were so ineffective against rain and insects that the typical band member "undergoes many a sleepless night during the year." Crouched over meager campfires during the wet, buggy nights, the Sirionó were living exemplars of primitive humankind—the "quintessence" of "man in the raw state of nature," as Holmberg put it. For millennia, he thought, they had existed almost without change in a landscape unmarked by their presence. Then they encountered European society and for the first time their history acquired a narrative flow.

Holmberg was a careful and compassionate researcher whose detailed observations of Sirionó life remain valuable today. And he bravely surmounted trials in Bolivia that would have caused many others to give up. During his months in the field he was always uncomfortable, usually hungry, and often sick. Blinded by an infection in both eyes, he walked for days through the forest to a clinic, holding the hand of a Sirionó guide. He never fully recovered his health. After his return, he became head of the anthropology department at Cornell University, from which position he led its celebrated efforts to alleviate poverty in the Andes.

Nonetheless, he was wrong about the Sirionó. And he was wrong about the Beni, the place they inhabited—wrong in a way that is instructive, even exemplary.

Before Columbus, Holmberg believed, both the people and the land had no real history. Stated so baldly, this notion—that the indigenous peoples of the Americas floated changelessly through the millennia until 1492—may seem ludicrous. But flaws in perspective often appear obvious only after they are pointed out. In this case they took decades to rectify.

The Bolivian government's instability and fits of anti-American and anti-European rhetoric ensured that few foreign anthropologists and archaeologists followed Holmberg into the Beni. Not only was the government hostile, the region, a center of the cocaine trade in the 1970s and 1980s, was dangerous. Today there is less drug trafficking, but smugglers' runways can still be seen, cut into remote patches of forest. The wreck of a crashed drug plane sits not far from the airport in Trinidad, the biggest town in the province. During the drug wars "the Beni was neglected, even by Bolivian standards," according to Robert Langstroth, a geographer and range ecologist in Wisconsin who did his dissertation fieldwork there. "It was a backwater of a backwater." Gradually a small number of scientists ventured into the region. What they learned transformed their understanding of the place and its people.

Just as Holmberg believed, the Sirionó were among the most culturally impoverished people on earth. But this was not because they were unchanged holdovers from humankind's ancient past but because smallpox and influenza laid waste to their villages in the 1920s. Before the epidemics at least three thousand Sirionó, and probably many more, lived in eastern Bolivia. By Holmberg's time fewer than 150 remained—a loss of more than 95 percent in less than a generation. So catastrophic was the decline that the Sirionó passed through a genetic bottleneck. (A genetic bottleneck occurs when a population becomes so small that individuals are forced to mate with relatives, which can produce deleterious hereditary effects.) The effects of the bottleneck were described in 1982, when Allyn Stearman of the University of Central Florida became the first anthropologist to visit the Sirionó since Holmberg. Stearman discovered that the Sirionó were thirty times more likely to be born with clubfeet than typical human populations. And almost all the Sirionó had unusual nicks in their earlobes, the traits I had noticed on the two men accompanying us.

Even as the epidemics hit, Stearman learned, the group was fighting the white cattle ranchers who were taking over the region. The Bolivian military aided the incursion by hunting down the Sirionó and throwing them into what were, in effect, prison camps. Those released from confinement were forced into servitude on the ranches. The wandering people Holmberg traveled with in the forest had been hiding from their abusers. At some risk to himself, Holmberg tried to help them, but he never fully grasped that the people he saw as remnants from the Paleolithic Age were actually the persecuted survivors of a recently shattered culture. It was as if he had come across refugees from a Nazi concentration camp, and concluded that they belonged to a culture that had always been barefoot and starving.

Far from being leftovers from the Stone Age, in fact, the Sirionó are probably relative newcomers to the Beni. They speak a language in the Tupí-Guaraní group, one of the most important Indian language families in South America but one not common in Bolivia. Linguistic evidence, first weighed by anthropologists in the 1970s, suggests that they arrived from the north as late as the seventeenth century, about the time of the first Spanish settlers and missionaries. Other evidence suggests they may have come a few centuries earlier; Tupí-Guaraní–speaking groups, possibly including the Sirionó, attacked the Inka empire in the early sixteenth century. No one knows why the Sirionó moved in, but one reason may be simply that the Beni then was little populated. Not long before, the previous inhabitants' society had disintegrated.

To judge by *Nomads of the Longbow,* Holmberg did not know of this earlier culture—the culture that built the causeways and mounds and fish weirs. He didn't see that the Sirionó were walking through a landscape that had been shaped by somebody else. A few European observers before Holmberg had remarked upon the earthworks' existence, though some doubted that the causeways and forest islands were of human origin. But they did not draw systematic scholarly attention until 1961, when William Denevan came to Bolivia. Then a doctoral student, he had learned of the region's peculiar landscape during an earlier stint as a cub reporter in Peru and thought it might make an interesting topic for his thesis. Upon arrival he discovered that oil-company geologists, the only scientists in the area, believed the Beni was thick with the remains of an unknown civilization.

Convincing a local pilot to push his usual route westward, Denevan examined the Beni from above. He observed exactly what I saw four decades later: isolated hillocks of forest; long raised berms; canals; raised agricultural fields; circular, moat-like ditches; and odd, zigzagging ridges. "I'm looking out of one of these DC-3 windows, and I'm going berserk in this little airplane," Denevan said to me. "I *knew* these things were not natural. You just don't have that kind of straight line in nature." As Denevan learned more about the landscape, his amazement grew. "It's a completely humanized landscape," he said. "To me, it was clearly the most exciting thing going on in the Amazon and adjacent areas. It may be the most important thing in all of South America, I think. Yet it was practically untouched" by scientists. It is *still* almost untouched—there aren't even any detailed maps of the earthworks and canals.

Beginning as much as three thousand years ago, this long-ago society—Erickson believes it was probably founded by the ancestors of an Arawak-speaking people now called the Mojo and the Bauré—created one of the largest, strangest, and most ecologically rich artificial environments on the

Flying over eastern Bolivia in the early 1960s, the young geographer William Denevan was amazed to see that the landscape (above)—home to nothing but cattle ranches for generations—still bore evidence that it had once been inhabited by a large, prosperous society, one whose very existence had been forgotten. Incredibly, such discoveries are still being made. In 2003, a team of Finnish researchers discovered the remains of dozens of geometrical earthworks (top) in the western Brazilian state of Acre where the forest had just been cleared for cattle ranches.

planet. These people built up the mounds for homes and farms, constructed the causeways and canals for transportation and communication, created the fish weirs to feed themselves, and burned the savannas to keep them clear of invading trees. A thousand years ago their society was at its height. Their villages and towns were spacious, formal, and guarded by moats and palisades. In Erickson's hypothetical reconstruction, as many as a million people may have walked the causeways of eastern Bolivia in their long cotton tunics, heavy ornaments dangling from their wrists and necks.

Today, hundreds of years after this Arawak culture passed from the scene, the forest on and around Ibibate mound looks like the classic Amazon of conservationists' dreams: lianas thick as a human arm, dangling blade-like leaves more than six feet long, smooth-boled Brazil nut trees, thick-bodied flowers that smell like warm meat. In terms of species richness, Balée told me, the forest islands of Bolivia are comparable to any place in South America. The same is true of the Beni savanna, it seems, with its different complement of species. Ecologically, the region is a treasure, but one designed and executed by human beings. Erickson regards the landscape of the Beni as one of humankind's greatest works of art, a masterpiece that until recently was almost completely unknown, a masterpiece in a place with a name that few people outside Bolivia would recognize.

"EMPTY OF MANKIND AND ITS WORKS"

The Beni was no anomaly. For almost five centuries, Holmberg's Mistake—the supposition that Native Americans lived in an eternal, unhistoried state—held sway in scholarly work, and from there fanned out to high school textbooks, Hollywood movies, newspaper articles, environmental campaigns, romantic adventure books, and silk-screened T-shirts. It existed in many forms and was embraced both by those who hated Indians and those who admired them. Holmberg's Mistake explained the colonists' view of most Indians as incurably vicious barbarians; its mirror image was the dreamy stereotype of the Indian as a Noble Savage. Positive or negative, in both images Indians lacked what social scientists call *agency*—they were not actors in their own right, but passive recipients of whatever windfalls or disasters happenstance put in their way.

The Noble Savage dates back as far as the first full-blown ethnography of American indigenous peoples, Bartolomé de Las Casas's *Apologética Historia Sumaria,* written mainly in the 1530s. Las Casas, a conquistador who repented of his actions and became a priest, spent the second half of his long life

opposing European cruelty in the Americas. To his way of thinking, Indians were natural creatures who dwelt, gentle as cows, in the "terrestrial paradise." In their prelapsarian innocence, he believed, they had been quietly waiting—waiting for millennia—for Christian instruction. Las Casas's contemporary, the Italian commentator Pietro Martire d'Anghiera, shared these views. Indians, he wrote (I quote the English translation from 1556), "lyve in that goulden world of whiche owlde writers speake so much," existing "simplye and innocentlye without inforcement of lawes."

In our day, beliefs about Indians' inherent simplicity and innocence refer mainly to their putative lack of impact on the environment. This notion dates back at least to Henry David Thoreau, who spent much time seeking "Indian wisdom," an indigenous way of thought that supposedly did not encompass measuring or categorizing, which he viewed as the evils that allowed human beings to change Nature. Thoreau's ideas continue to be influential. In the wake of the first Earth Day in 1970, a group named Keep America Beautiful, Inc., put up billboards that portrayed a Cherokee actor named Iron Eyes Cody quietly weeping over polluted land. The campaign was enormously successful. For almost a decade the image of the crying Indian appeared around the world. Yet though Indians here were playing a heroic role, the advertisement still embodied Holmberg's Mistake, for it implicitly depicted Indians as people who never changed their environment from its original wild state. Because history is change, they were people without history.

Las Casas's anti-Spanish views met with such harsh attacks that he instructed his executors to publish the *Apologética Historia* forty years after his death (he died in 1566). In fact, the book did not appear in complete form until 1909. As the delay suggests, polemics for the Noble Savage tended to meet with little sympathy in the eighteenth and nineteenth centuries. Emblematic was the U.S. historian George Bancroft, dean of his profession, who argued in 1834 that before Europeans arrived North America was "an unproductive waste . . . Its only inhabitants were a few scattered tribes of feeble barbarians, destitute of commerce and of political connection." Like Las Casas, Bancroft believed that Indians had existed in societies without change—except that Bancroft regarded this timelessness as an indication of sloth, not innocence.

In different forms Bancroft's characterization was carried into the next century. Writing in 1934, Alfred L. Kroeber, one of the founders of American anthropology, theorized that the Indians in eastern North America could not develop—could have no history—because their lives consisted of "warfare that was insane, unending, continuously attritional." Escaping the cycle of

conflict was "well-nigh impossible," he believed. "The group that tried to shift its values from war to peace was almost certainly doomed to early extinction."* Kroeber conceded that Indians took time out from fighting to grow crops, but insisted that agriculture "was not basic to life in the East; it was an auxiliary, in a sense a luxury." As a result, "Ninety-nine per cent or more of what [land] might have been developed remained virgin."

Four decades later, Samuel Eliot Morison, twice a Pulitzer Prize winner, closed his two-volume *European Discovery of America* with the succinct claim that Indians had created no lasting monuments or institutions. Imprisoned in changeless wilderness, they were "pagans expecting short and brutish lives, void of any hope for the future." Native people's "chief function in history," the British historian Hugh Trevor-Roper, Baron Dacre of Glanton, proclaimed in 1965, "is to show to the present an image of the past from which by history it has escaped."

Textbooks reflected academic beliefs faithfully. In a survey of U.S. history schoolbooks, the writer Frances Fitzgerald concluded that the characterization of Indians had moved, "if anything, resolutely backward" between the 1840s and the 1940s. Earlier writers thought of Indians as important, though uncivilized, but later books froze them into a formula: "lazy, childlike, and cruel." A main textbook of the 1940s devoted only a "few paragraphs" to Indians, she wrote, "of which the last is headed 'The Indians Were Backward.' "

These views, though less common today, continue to appear. The 1987 edition of *American History: A Survey,* a standard high school textbook by three well-known historians, summed up Indian history thusly: "For thousands of centuries—centuries in which human races were evolving, forming communities, and building the beginnings of national civilizations in Africa, Asia, and Europe—the continents we know as the Americas stood empty of mankind and its works." The story of Europeans in the New World, the book informed students, "is the story of the creation of a civilization where none existed."

It is always easy for those living in the present to feel superior to those who lived in the past. Alfred W. Crosby, a University of Texas historian, noted that many of the researchers who embraced Holmberg's Mistake lived in an era when the driving force of events seemed to be great leaders of European descent and when white societies appeared to be overwhelming nonwhite

*According to Joseph Conrad, the violence was of culinary origin. "The Noble Red Man was a mighty hunter," explained the great novelist, "but his wives had not mastered the art of conscientious cookery—and the consequences were deplorable. The Seven Nations around the Great Lakes and the Horse tribes of the plains were but one vast prey to raging dyspepsia." Because their lives were blighted by "the morose irritability which follows the consumption of ill-cooked food," they were continually prone to quarrels.

societies everywhere. Throughout all of the nineteenth and much of the twentieth century, nationalism was ascendant, and historians identified history with nations, rather than with cultures, religions, or ways of life. But the Second World War taught the West that non-Westerners—the Japanese, in this instance—were capable of swift societal change. The rapid disintegration of European colonial empires further adumbrated the point. Crosby likened the effects of these events on social scientists to those on astronomers from "the discovery that the faint smudges seen between stars on the Milky Way were really distant galaxies."

Meanwhile, new disciplines and new technologies were creating new ways to examine the past. Demography, climatology, epidemiology, economics, botany, and palynology (pollen analysis); molecular and evolutionary biology; carbon-14 dating, ice-core sampling, satellite photography, and soil assays; genetic microsatellite analysis and virtual 3-D fly-throughs—a torrent of novel perspectives and techniques cascaded into use. And when these were employed, the idea that the only human occupants of one-third of the earth's surface had changed little for thousands of years began to seem implausible. To be sure, some researchers have vigorously attacked the new findings as wild exaggerations. ("We have simply replaced the old myth [of untouched wilderness] with a new one," scoffed geographer Thomas Vale, "the myth of the humanized landscape.") But after several decades of discovery and debate, a new picture of the Americas and their original inhabitants is emerging.

Advertisements still celebrate nomadic, ecologically pure Indians on horseback chasing bison in the Great Plains of North America, but at the time of Columbus the great majority of Native Americans could be found south of the Río Grande. They were not nomadic, but built up and lived in some of the world's biggest and most opulent cities. Far from being dependent on big-game hunting, most Indians lived on farms. Others subsisted on fish and shellfish. As for the horses, they were from Europe; except for llamas in the Andes, the Western Hemisphere had no beasts of burden. In other words, the Americas were immeasurably busier, more diverse, and more populous than researchers had previously imagined.

And older, too.

THE OTHER NEOLITHIC REVOLUTIONS

For much of the last century archaeologists believed that Indians came to the Americas through the Bering Strait about thirteen thousand years ago at the

tail end of the last Ice Age. Because the sheets of polar ice locked up huge amounts of water, sea levels around the world fell about three hundred feet. The shallow Bering Strait became a wide land bridge between Siberia and Alaska. In theory, paleo-Indians, as they are called, simply walked across the fifty-five miles that now separate the continents. C. Vance Haynes, an archaeologist at the University of Arizona, put the crowning touches on the scheme in 1964, when he noted evidence that at just the right time—that is, about thirteen thousand years ago—two great glacial sheets in northwest Canada parted, leaving a comparatively warm, ice-free corridor between them. Down this channel paleo-Indians could have passed from Alaska to the more habitable regions in the south without having to hike over the ice pack. At the time, the ice pack extended two thousand miles south of the Bering Strait and was almost devoid of life. Without Haynes's ice-free corridor, it is hard to imagine how humans could have made it to the south. The combination of land bridge and ice-free corridor occurred only once in the last twenty thousand years, and lasted for just a few hundred years. And it happened just before the emergence of what was then the earliest known culture in the Americas, the Clovis culture, so named for the town in New Mexico where its remains were first definitely observed. Haynes's exposition made the theory seem so ironclad that it fairly flew into the textbooks. I learned it when I attended high school. So did my son, thirty years later.

In 1997 the theory abruptly came unglued. Some of its most ardent partisans, Haynes among them, publicly conceded that an archaeological dig in southern Chile had turned up compelling evidence of human habitation more than twelve thousand years ago. And because these people lived seven thousand miles south of the Bering Strait, a distance that presumably would have taken a long time to traverse, they almost certainly arrived before the ice-free corridor opened up. (In any case, new research had cast doubt on the existence of that corridor.) Given the near impossibility of surpassing the glaciers without the corridor, some archaeologists suggested that the first Americans must have arrived twenty thousand years ago, when the ice pack was smaller. Or even earlier than that—the Chilean site had suggestive evidence of artifacts more than thirty thousand years old. Or perhaps the first Indians traveled by boat, and didn't need the land bridge. Or maybe they arrived via Australia, passing the South Pole. "We're in a state of turmoil," the consulting archaeologist Stuart Fiedel told me. "Everything we knew is now supposed to be wrong," he added, exaggerating a little for effect.

No consensus has emerged, but a growing number of researchers believe that the New World was occupied by a single small group that crossed the Bering Strait, got stuck on the Alaska side, and straggled to the rest of the

Americas in two or three separate groups, with the ancestors of most modern Indians making up the second group. Researchers differ on the details; some scientists have theorized that the Americas may have been hit with as many as five waves of settlement before Columbus, with the earliest occurring as much as fifty thousand years ago. In most versions, though, today's Indians are seen as relative latecomers.

Indian activists dislike this line of reasoning. "I can't tell you how many white people have told me that 'science' shows that Indians were just a bunch of interlopers," Vine Deloria Jr., a political scientist at the University of Colorado at Boulder, said to me. Deloria is the author of many books, including *Red Earth, White Lies,* a critique of mainstream archaeology. The book's general tenor is signaled by its index; under "science," the entries include "corruption and fraud and," "Indian explanations ignored by," "lack of proof for theories of," "myth of objectivity of," and "racism of." In Deloria's opinion, archaeology is mainly about easing white guilt. Determining that Indians superseded other people fits neatly into this plan. "If we're only thieves who stole our land from someone else," Deloria said, "then they can say, 'Well, we're just the same. We're all immigrants here, aren't we?' "

The moral logic of the we're-all-immigrants argument that Deloria cites is difficult to parse; it seems to be claiming that two wrongs make a right. Moreover, there's no evidence that the first "wrong" was a wrong—nothing is known about the contacts among the various waves of paleo-Indian migration. But in any case whether most of today's Native Americans actually arrived first or second is irrelevant to an assessment of their cultural achievements. In every imaginable scenario, they left Eurasia before the first whisper of the Neolithic Revolution.

The Neolithic Revolution is the invention of farming, an event whose significance can hardly be overstated. "The human career," wrote the historian Ronald Wright, "divides in two: everything before the Neolithic Revolution and everything after it." It began in the Middle East about eleven thousand years ago. In the next few millennia the wheel and the metal tool sprang up in the same area. The Sumerians put these inventions together, added writing, and in the third millennium B.C. created the first great civilization. Every European and Asian culture since, no matter how disparate in appearance, stands in Sumer's shadow. Native Americans, who left Asia long before agriculture, missed out on the bounty. "They had to do everything on their own," Crosby said to me. Remarkably, they succeeded.

Researchers have long known that a second, independent Neolithic Revolution occurred in Mesoamerica. The exact timing is uncertain—archaeologists keep pushing back the date—but it is now thought to have occurred

about ten thousand years ago, not long after the Middle East's Neolithic Revolution. In 2003, though, archaeologists discovered ancient seeds from cultivated squashes in coastal Ecuador, at the foot of the Andes, which may be older than any agricultural remains in Mesoamerica—a *third* Neolithic Revolution. This Neolithic Revolution probably led, among many other things, to the cultures in the Beni. The two American Neolithics spread more slowly than their counterpart in Eurasia, possibly because Indians in many places had not had the time to build up the requisite population density, and possibly because of the extraordinary nature of the most prominent Indian crop, maize.*

The ancestors of wheat, rice, millet, and barley look like their domesticated descendants; because they are both edible and highly productive, one can easily imagine how the idea of planting them for food came up. Maize can't reproduce itself, because its kernels are securely wrapped in the husk, so Indians must have developed it from some other species. But there are no wild species that resemble maize. Its closest genetic relative is a mountain grass called teosinte that looks strikingly different—for one thing, its "ears" are smaller than the baby corn served in Chinese restaurants. No one eats teosinte, because it produces too little grain to be worth harvesting. In creating modern maize from this unpromising plant, Indians performed a feat so improbable that archaeologists and biologists have argued for decades over how it was achieved. Coupled with squash, beans, and avocados, maize provided Mesoamerica with a balanced diet, one arguably more nutritious than its Middle Eastern or Asian equivalent. (Andean agriculture, based on potatoes and beans, and Amazonian agriculture, based on manioc [cassava], had wide impact but on a global level were less important than maize.)

About seven thousand years elapsed between the dawn of the Middle Eastern Neolithic and the establishment of Sumer. Indians navigated the same path in somewhat less time (the data are too sketchy to be more precise). Pride of place must go to the Olmec, the first technologically complex culture in the hemisphere. Appearing in the narrow "waist" of Mexico about 1800 B.C., they lived in cities and towns centered on temple mounds. Strewn among them were colossal male heads of stone, many six feet tall or more, with helmet-like headgear, perpetual frowns, and somewhat African fea-

*In the United States and parts of Europe the name is "corn." I use "maize" because Indian maize—multicolored and mainly eaten after drying and grinding—is strikingly unlike the sweet, yellow, uniform kernels usually evoked in North America by the name "corn." In Britain, "corn" can mean the principal cereal crop in a region—oats in Scotland, for example, are sometimes referred to by the term.

tures, the last of which has given rise to speculation that Olmec culture was inspired by voyagers from Africa. The Olmec were but the first of many societies that arose in Mesoamerica in this epoch. Most had religions that focused on human sacrifice, dark by contemporary standards, but their economic and scientific accomplishments were bright. They invented a dozen different systems of writing, established widespread trade networks, tracked the orbits of the planets, created a 365-day calendar (more accurate than its contemporaries in Europe), and recorded their histories in accordion-folded "books" of fig tree bark paper.

Arguably their greatest intellectual feat was the invention of zero. In his classic account *Number: The Language of Science,* the mathematician Tobias Dantzig called the discovery of zero "one of the greatest single accomplishments of the human race," a "turning point" in mathematics, science, and technology. The first whisper of zero in the Middle East occurred about 600 B.C. When tallying numbers, the Babylonians arranged them into columns, as children learn to do today. To distinguish between their equivalents to 11 and 101, they placed two triangular marks between the digits: 1△△1, so to speak. (Because Babylonian mathematics was based on 60, rather than 10, the example is correct only in principle.) Curiously, though, they did not use the symbol to distinguish among their versions of 1, 10, and 100. Nor could the Babylonians add or subtract with zero, let alone use zero to enter the realm of negative numbers. Sanskrit mathematicians first used zero in its contemporary sense—a number, not a placeholder—sometime in the first few centuries A.D. It didn't appear in Europe until the twelfth century. Even then European governments and the Vatican resisted zero—a something that stood for nothing—as foreign and un-Christian. Meanwhile, the first recorded zero in the Americas occurred in a Maya carving from 357 A.D., possibly before the Sanskrit. And there are monuments from before the birth of Christ that do not bear zeroes themselves but are inscribed with dates in a calendrical system based on the existence of zero.

Does this mean that the Maya were then more advanced than their counterparts in, say, Europe? Social scientists flinch at this question, and with good reason. The Olmec, Maya, and other Mesoamerican societies were world pioneers in mathematics and astronomy—but they did not use the wheel. Amazingly, they had invented the wheel but did not employ it for any purpose other than children's toys. Those looking for a tale of cultural superiority can find it in zero; those looking for failure can find it in the wheel. Neither line of argument is useful, though. What is most important is that by 1000 A.D. Indians had expanded their Neolithic revolutions to create a panoply of diverse civilizations across the hemisphere.

Five hundred years later, when Columbus sailed into the Caribbean, the descendants of the world's Neolithic Revolutions collided, with overwhelming consequences for all.

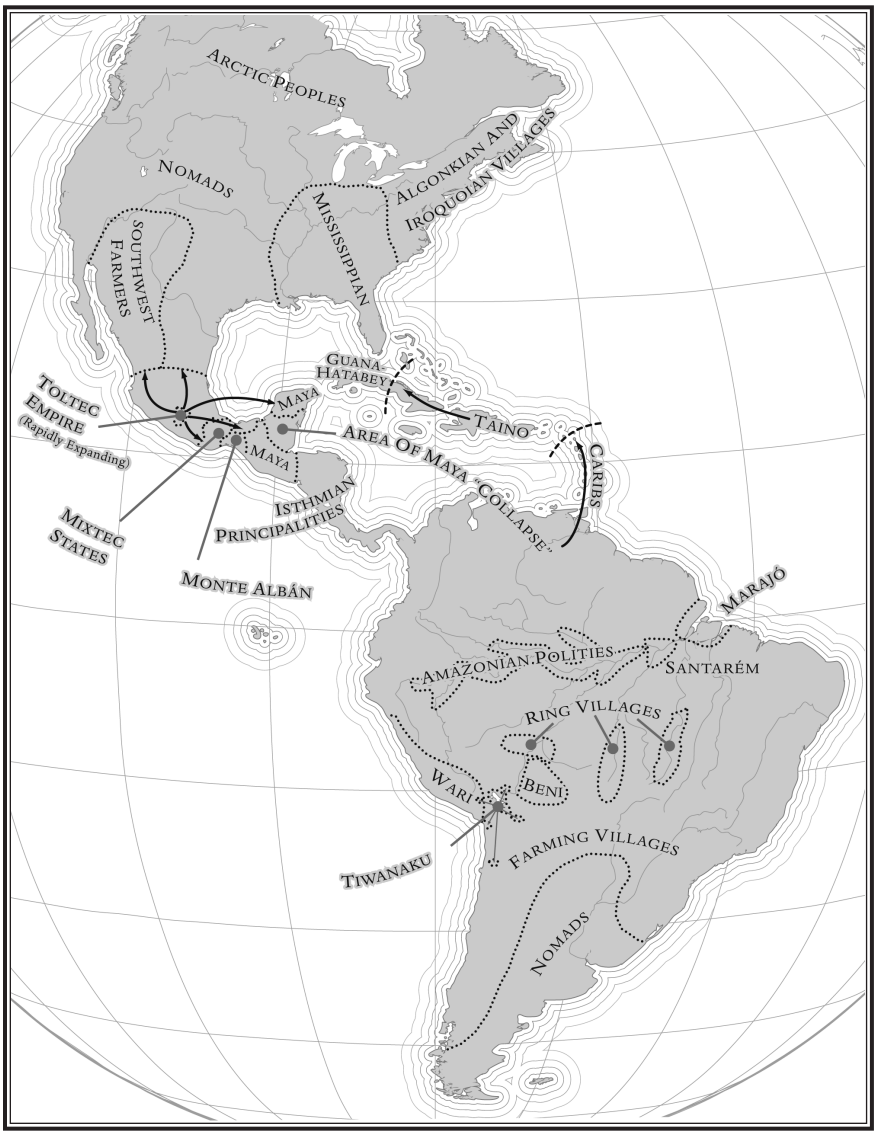
A GUIDED TOUR

Imagine, for a moment, an impossible journey: taking off in a plane from eastern Bolivia as I did, but doing so in 1000 A.D. and flying a surveillance mission over the rest of the Western Hemisphere. What would be visible from the windows? Fifty years ago, most historians would have given a simple answer to this question: two continents of wilderness, populated by scattered bands whose ways of life had changed little since the Ice Age. The sole exceptions would have been Mexico and Peru, where the Maya and the ancestors of the Inka were crawling toward the foothills of Civilization.

Today our understanding is different in almost every perspective. Picture the millennial plane flying west, from the lowlands of the Beni to the heights of the Andes. On the ground beneath as the journey begins are the causeways and canals one sees today, except that they are now in good repair and full of people. (Fifty years ago, the earthworks were almost completely unknown, even to those living nearby.) After a few hundred miles the plane ascends to the mountains—and again the historical picture has changed. Until recently, researchers would have said the highlands in 1000 A.D. were occupied by scattered small villages and one or two big towns with some nice stonework. But recent archaeological investigations have revealed that at this time the Andes housed two mountain states, each much larger than previously appreciated.

The state closest to the Beni was based around Lake Titicaca, the 120-mile-long alpine lake that crosses the Peru-Bolivia border. Most of this region has an altitude of twelve thousand feet or more. Summers are short; winters are correspondingly long. This "bleak, frigid land," wrote the adventurer Victor von Hagen, "seemingly was the last place from which one might expect a culture to develop." But in fact the lake is comparatively warm, and so the land surrounding it is less beaten by frost than the surrounding highlands. Taking advantage of the better climate, the village of Tiwanaku, one of many settlements around the lake, began after about 800 B.C. to drain the wetlands around the rivers that flowed into the lake from the south. A thousand years later the village had grown to become the center of a large polity, also known as Tiwanaku.

Less a centralized state than a clutch of municipalities under the com-



NATIVE AMERICA, 1000 A.D.

mon religio-cultural sway of the center, Tiwanaku took advantage of the extreme ecological differences among the Pacific coast, the rugged mountains, and the altiplano (the high plains) to create a dense web of exchange: fish from the sea; llamas from the altiplano; fruits, vegetables, and grains from the fields around the lake. Flush with wealth, Tiwanaku city swelled into a marvel of terraced pyramids and grand monuments. Stone breakwa-

ters extended far out into Lake Titicaca, thronged with long-prowed boats made of reeds. With its running water, closed sewers, and gaudily painted walls, Tiwanaku was among the world's most impressive cities.

University of Chicago archaeologist Alan L. Kolata excavated at Tiwanaku during the 1980s and early 1990s. He has written that by 1000 A.D. the city had a population of as much as 115,000, with another quarter million in the surrounding countryside—numbers that Paris would not reach for another five centuries. The comparison seems fitting; at the time, the realm of Tiwanaku was about the size of modern France. Other researchers believe this population estimate is too high. Twenty or thirty thousand in the central city is more likely, according to Nicole Couture, a University of Chicago archaeologist who helped edit the definitive publication of Kolata's work in 2003. An equal number, she said, occupied the surrounding countryside.

Which view is right? Although Couture was confident of her ideas, she thought it would be "another decade" before the matter was settled. And in any case the exact number does not affect what she regards as the key point. "Building this enormous place up here is really remarkable," she said. "I realize that again every time I come back."

North and west of Tiwanaku, in what is now southern Peru, was the rival state of Wari, which then ran for almost a thousand miles along the spine of the Andes. More tightly organized and military minded than Tiwanaku, the rulers of Wari stamped out cookie-cutter fortresses and stationed them all along their borders. The capital city—called, eponymously, Wari—was in the heights, near the modern city of Ayacucho. Housing perhaps seventy thousand souls, Wari was a dense, alley-packed craze of walled-off temples, hidden courtyards, royal tombs, and apartments up to six stories tall. Most of the buildings were sheathed in white plaster, making the city sparkle in the mountain sun.

In 1000 A.D., at the time of our imaginary overflight, both societies were reeling from a succession of terrible droughts. Perhaps eighty years earlier, dust storms had engulfed the high plains, blackening the glaciers in the peaks above. (Ice samples, dug out in the 1990s, suggest the assault.) Then came a run of punishing dry spells, many more than a decade in duration, interrupted by gigantic floods. (Sediment and tree-ring records depict the sequence.) The disaster's cause is still in dispute, but some climatologists believe that the Pacific is subject to "mega-Niño events," murderously strong versions of the well-known El Niño patterns that play havoc with American weather today. Mega-Niños occurred every few centuries between 200 and 1600 A.D. In 1925 and 1926, a strong El Niño—not a mega-Niño, but one that was bigger than usual—blasted Amazonia with so much dry heat that sud-

den fires killed hundreds, perhaps thousands, of people in the forest. Rivers dried up, their bottoms carpeted with dead fish. A mega-Niño in the eleventh century may well have caused the droughts of those years. But whatever the cause of the climatic upheaval, it severely tested Wari and Tiwanaku society.

Here, though, one must be careful. Europe was racked by a "little ice age" of extreme cold between the fourteenth and nineteenth centuries, yet historians rarely attribute the rise and fall of European states in that period to climate change. Fierce winters helped drive the Vikings from Greenland and led to bad harvests that exacerbated social tensions in continental Europe, but few would claim that the little ice age caused the Reformation. Similarly, the mega-Niños were but one of many stresses on Andean civilizations at the time, stresses that in their totality neither Wari nor Tiwanaku had the political resources to survive. Soon after 1000 A.D. Tiwanaku split into flinders that would not be united for another four centuries, when the Inka swept them up. Wari also fell. It was succeeded and perhaps taken over by a state called Chimor, which oversaw an empire that sprawled over central Peru until it, too, was absorbed by the Inka.

Such newly discovered histories appear everywhere in the Americas. Take the plane north, toward Central America and southern Mexico, into the bulge of the Yucatán Peninsula, homeland of the Maya. Maya ruins were well known forty years ago, to be sure, but among them, too, many new things have been discovered. Consider Calakmul, the ruin that Peter Menzel and I visited in the early 1980s. Almost wholly unexcavated since its discovery, the Calakmul we came to lay swathed in dry, scrubby vegetation that crawled like a swarm of thorns up its two huge pyramids. When Peter and I spoke to William J. Folan of the Universidad Autónoma de Campeche, who was just beginning to work at the city, he recommended that we not try going to the ruin unless we could rent a heavy truck, and not even to try with the truck if it had rained. Our visit to Calakmul did nothing to suggest that Folan's advice was wrong. Trees enveloped the great buildings, their roots slowly ripping apart the soft limestone walls. Peter photographed a monument with roots coiled around it, boa constrictor style, five or six feet high. So overwhelming was the tropical forest that I thought Calakmul's history would remain forever unknown.

Happily, I was wrong. By the early 1990s Folan's team had learned that this long-ignored place covered as much as twenty-five square miles and had thousands of buildings and dozens of reservoirs and canals. It was the biggest-ever Maya polity. Researchers cleaned and photographed its hundred-plus monuments—and just in time, for epigraphers (scholars of ancient writing) had in the meantime deciphered Maya hieroglyphics. In 1994 they

identified the city-state's ancient name: Kaan, the Kingdom of the Snake. Six years later they discovered that Kaan was the focus of a devastating war that convulsed the Maya city-state for more than a century. And Kaan is just one of the dozen or more Maya cities that in the last few decades have been investigated for the first time.

A collection of about five dozen kingdoms and city-states in a network of alliances and feuds as convoluted as those of seventeenth-century Germany, the Maya realm was home to one of the world's most intellectually sophisticated cultures. About a century before our imaginary surveillance tour, though, the Maya heartland entered a kind of Dark Ages. Many of the greatest cities emptied, as did much of the countryside around them. Incredibly, some of the last inscriptions are gibberish, as if scribes had lost the knowledge of writing and were reduced to meaningless imitation of their ancestors. By the time of our overflight, half or more of what once had been the flourishing land of the Maya was abandoned.

Some natural scientists attribute this collapse, close in time to that of Wari and Tiwanaku, to a massive drought. The Maya, packed by the millions into land poorly suited to intensive farming, were dangerously close to surpassing the capacity of their ecosystems. The drought, possibly caused by a mega-Niño, pushed the society, already so close to the edge, over the cliff.

Such scenarios resonate with contemporary ecological fears, helping to make them popular outside the academy. Within the academy skepticism is more common. The archaeological record shows that southern Yucatán was abandoned, while Maya cities in the northern part of the peninsula soldiered on or even grew. Peculiarly, the abandoned land was the wettest—with its rivers, lakes, and rainforest, it should have been the best place to wait out a drought. Conversely, northern Yucatán was dry and rocky. The question is why people would have fled from drought to lands that would have been even more badly affected.

And what of the rest of Mesoamerica? As the flight continues north, look west, at the hills of what are now the Mexican states of Oaxaca and Guerrero. Here are the quarrelsome, splintered city-states of the Mixtec, finally overwhelming the Zapotec, their ancient rivals based in the valley city of Monte Albán. Further north, expanding their empire in a hot-brained hurry, are the Toltec, sweeping in every direction from the mile-high basin that today houses Mexico City. As is often the case, the Toltec's rapid military success led to political strife. A Shakespearian struggle at the top, complete with accusations of drunkenness and incest, forced out the long-ruling king, Topiltzin Quetzalcoatl, in (probably) 987 A.D. He fled with boatloads of loyalists to the Yucatán Peninsula, promising to return. By the time of our plane trip,

Quetzalcoatl had apparently conquered the Maya city of Chichén Itzá and was rebuilding it in his own Toltec image. (Prominent archaeologists disagree with each other about these events, but the murals and embossed plates at Chichén Itzá that depict a Toltec army bloodily destroying a Maya force are hard to dismiss.)

Continue the flight to what is now the U.S. Southwest, past desert farms and cliff dwellings, to the Mississippian societies in the Midwest. Not long age archaeologists with new techniques unraveled the tragedy of Cahokia, near modern St. Louis, which was once the greatest population center north of the Río Grande. Construction began in about 1000 A.D. on an earthen structure that would eventually cover fifteen acres and rise to a height of about a hundred feet, higher than anything around it for miles. Atop the mound was the temple for the divine kings, who arranged for the weather to favor agriculture. As if to lend them support, fields of maize rippled out from the mound almost as far as the eye could see. Despite this apparent evidence of their power, Cahokia's rulers were setting themselves up for future trouble. By mining the forests upstream for firewood and floating the logs downriver to the city, they were removing ground cover and increasing the likelihood of catastrophic floods. When these came, as they later did, kings who gained their legitimacy from their claims to control the weather would face angry questioning from their subjects.

Continue north, to the least settled land, the realm of hunters and gatherers. Portrayed in countless U.S. history books and Hollywood westerns, the Indians of the Great Plains are the most familiar to nonscholars. Demographically speaking, they lived in the hinterlands, remote and thinly settled; their lives were as far from Wari or Toltec lords as the nomads of Siberia were from the grandees of Beijing. Their material cultures were simpler, too—no writing, no stone plazas, no massive temples—though Plains groups did leave behind about fifty rings of rock that are reminiscent of Stonehenge. The relative lack of material goods has led some to regard these groups as exemplifying an ethic of living lightly on the land. Perhaps, but North America was a busy, talkative place. By 1000 A.D., trade relationships had covered the continent for more than a thousand years; mother-of-pearl from the Gulf of Mexico has been found in Manitoba, and Lake Superior copper in Louisiana.

Or forgo the northern route altogether and fly the imaginary plane east from the Beni, toward the mouth of the Amazon. Immediately after the Beni, one encounters, in what is now the western Brazilian state of Acre, another society: a network of small villages associated with circular and square earthworks in patterns quite unlike those found in the Beni. Even

less is known about these people; the remains of their villages were discovered only in 2003, after ranchers clearing the tropical forest uncovered them. According to the Finnish archaeologists who first described them, "it is obvious" that "relatively high population densities" were "quite common everywhere in the Amazonian lowlands." The Finns here are summing up the belief of a new generation of researchers into the Amazon: the river was much more crowded in 1000 A.D. than it is now, especially in its lower half. Dense collections of villages thronged the bluffs that line the shore, with their people fishing in the river and farming the floodplains and sections of the uplands. Most important were the village orchards that marched back from the bluffs for miles. Amazonians practiced a kind of agro-forestry, farming with trees, unlike any kind of agriculture in Europe, Africa, or Asia.

Not all the towns were small. Near the Atlantic was the chiefdom of Marajó, based on an enormous island at the mouth of the river. Marajó's population, recently estimated at 100,000, may have been equaled or even surpassed by a still-nameless agglomeration of people six hundred miles upstream, at Santarém, a pleasant town that today is sleeping off the effects of Amazonia's past rubber and gold booms. The ancient inhabitation beneath and around the modern town has barely been investigated. Almost all that we know is that it was ideally located on a high bluff overlooking the mouth of the Tapajós, one of the Amazon's biggest tributaries. On this bluff geographers and archaeologists in the 1990s found an area more than three miles long that was thickly covered with broken ceramics, much like Ibibate. According to William I. Woods, an archaeologist and geographer at the University of Kansas, the region could have supported as many as 400,000 inhabitants, at least in theory, making it one of the bigger population centers in the world.

And so on. Western scholars have written histories of the world since at least the twelfth century. As children of their own societies, these early historians naturally emphasized the culture they knew best, the culture their readership most wanted to hear about. But over time they added the stories of other places in the world: chapters about China, India, Persia, Japan, and other places. Researchers tipped their hats to non-Western accomplishments in the sciences and arts. Sometimes the effort was grudging or minimal, but the vacant reaches in the human tale slowly contracted.

One way to sum up the new scholarship is to say that it has begun, at last, to fill in one of the biggest blanks in history: the Western Hemisphere before 1492. It was, in the current view, a thriving, stunningly diverse place, a tumult of languages, trade, and culture, a region where tens of millions of people

loved and hated and worshipped as people do everywhere. Much of this world vanished after Columbus, swept away by disease and subjugation. So thorough was the erasure that within a few generations neither conqueror nor conquered knew that this world had existed. Now, though, it is returning to view. It seems incumbent on us to take a look.