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 Rio 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 trickled to the rest of the Americas in several separate groups, very possibly in boats along the Pacific coast. 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 many 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 in a conversation before his death in 2005. Deloria was 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 was mainly about easing white guilt. Determining that Indians superseded other people fit 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 western half of the Fertile Crescent, which arcs between southern Iraq and Israel, reaching into southern Turkey along the way. Foraging societies there grouped into permanent villages and learned to cultivate and breed the area's wild wheat and barley. 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 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.)

*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.

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 features, 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. Mathematicians in India 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, when it came in with the Arabic numerals we use today (fearing fraud, some European governments banned the new numbers). 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