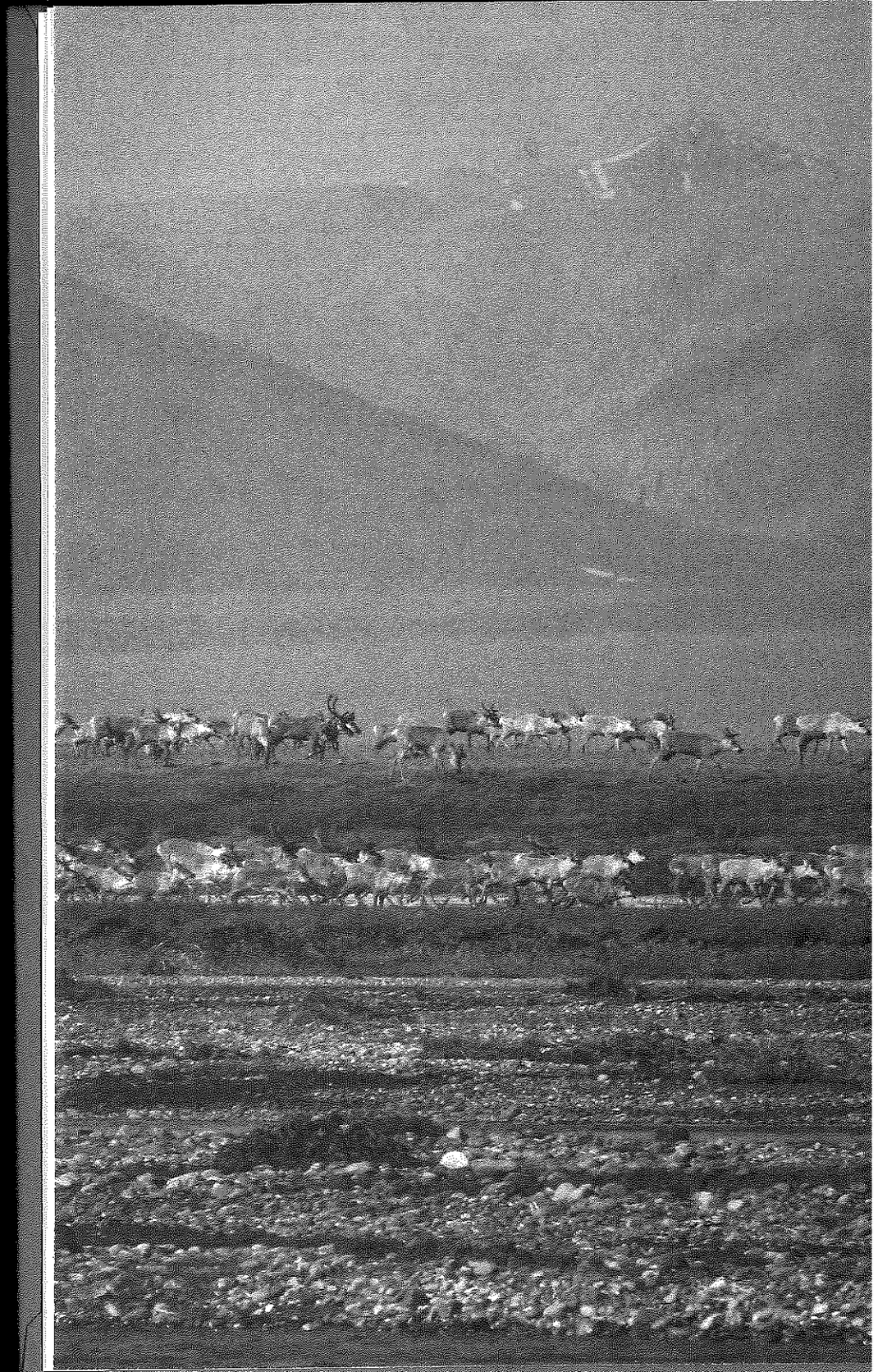

WILD NEW WORLD

THE EPIC STORY OF ANIMALS AND PEOPLE IN AMERICA

DAN FLORES

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CHAPTER 3

RAVEN'S AND COYOTE'S AMERICA

I am walking the edge of a sharp-rimmed cliff in outback Montana before sunrise, moving through a twilight of grays and blacks and outlines. Large, graceful birds, sandhill cranes, are fluting their strange Pleistocene cries in the pastel sky overhead, but I am focused on the lines of the topography in front of me, especially the way the mesa I'm walking narrows up ahead. Seeing that narrowing, my walking pace quickens.

This is a historic piece of ground. Starting some two thousand years in the past and continuing down to two hundred years ago, it was the scene of frenzied, albeit sporadic, human activity. Like most historic places there is something maddeningly mute about the spot now. It is why we often stand and gawk numbly in such places, unable to connect to the events we're supposed to marvel over. But this morning I'm not going to be stymied by my usual lack of imagination. I'm here with a purpose, my intent to experience at least some part of what a buffalo-jump drive was all about.

It was fully dark when I arrived here an hour earlier, parked my car at an interpretive sign, finished a cup of coffee, then slowly worked through the boulders to the top of this mesa. While I walked eastward to the luxuriant grassland of a high meadow, the sky had gradually lightened. Now, turning back toward the car and the cliff I climbed in the dark, I'm

becoming caught up in what I tell myself are echoes of the place. Pointing myself down the contracting mesa toward the far rimrock, I start to jog.

I am running a track that men and other animals have run many times in the past, but in contrast to my lope beneath the fluting cranes, then there would have been the pounding thunder of sharp black hooves cutting through the grass and the alarmed grunting of animals, their huge forms wrapped in billowing clouds of dust that must have made for a ghostly stampede. Now I hear only my footfalls and my breathing, but in the real thing the air would have been rent by the exultant shouts of the drivers, urging on runners wearing the skins of both wolves and red-coated bison calves and leading the herd to its destiny, their costuming a ruse to fool buffalo cows into thinking that wolves were selecting out defenseless young ones. Listening to the rhythm of my feet, I wonder if the herd's noise wouldn't have been so overwhelming it would have morphed into silence, becoming dreamlike.

The whole affair would have commenced days earlier with a religious ceremony, and careful maneuvering of a bison herd in that high meadow into position for a stampede. Then if all went well—and it went well enough times in the past to accumulate a bone layer five feet deep at the base of the cliff I climbed—the runners who led the herd to the cliff edge would escape, if they could, by darting aside at the last moment, dodging the relentless brown river of animals hurtling into space in a dream of wild, frozen action.

Where I've begun my run is a half mile back from the cliff, and soon enough I cross to descending benches and realize I am at the point of no return in this bison jump. Get the animals here, and have them running, and the downhill pitch steepens so quickly there would be no way for the herd leaders to either stop or turn aside.

I am running harder now, pulled faster by the angling slope, and I register that out in the valley dawn color has arrived. Chrome-yellow light cast by the rising sun is lighting the white cliffs on the far side of the river, a scene of great beauty—one last soothing sight of Earth, perhaps, as the lip of the plunge is scarcely 120 feet away now. Beyond that is windmilling motion and the silence of 40 feet of free space, then the jarring stop among the boulders.

I slide to a stop a few feet from the cliff edge and stand panting for a few minutes, looking down on the slope below. By modern standards the

scene would not have been pretty. In 1797 the British trader Peter Fidler described such a concluding set piece: "The young men kill the [crippled animals] with arrows, bayonets tied upon the end of a pole &c. The hatchet is frequently used & it is shocking to see the poor animals thus pent up without any way of escaping." However pod-like their behavior as classic herd animals, all these bison were individuals, of course, and that is the way they died.

Slanting sunlight, throwing morning shadows hundreds of feet long across the Madison Valley of Montana, lights my face. Over the mountains I see a jet glinting silver, a mobile diamond slicing through the blue, its motion fetching me back to my climb down to the car, back to my commitments. But before I start I stand for a moment thinking of the bison that died among the boulders below. Humans drove buffalo off cliffs in America for twelve thousand years, and despite knowing something about it, I find it a shock to be in this space where it happened, this close to how it worked. I have visited Head-Smashed-In Jump in Alberta, and absorbed archaeologist friends' accounts of Bonfire Shelter Jump in the gray limestone canyons of the Pecos River in Texas, hearing at the visitors' center in Canada that Indians carefully utilized every part of the animals, yet knowing that in Texas the cliff at Bonfire Shelter is scorched hundreds of feet high from the spontaneous combustion of an enormous, mangled heap of unutilized bison Native hunters drove off the rim above.

Those two sites beg a big question. Putting aside whatever fantasies of the past we have, what kind of relationship did humans and animals fashion over the one hundred centuries of Native America that followed the Pleistocene? And if it *was* different—more ecologically benign or balanced than what came before and what came after—then why?

CLOVISIA THE BEAUTIFUL ended with the demise of elephants and the majority of America's big animals. The Paleolithic economy then devolved into one final form, the Folsom and the similar Plano, Cody, and handful of other cultures pursuing the last of the giant bison, a hunt that persisted for about 2,500 years. But by 10,000 years ago, a new reality had settled across North America. People were here, but most of the original animals—now even including *Bison antiquus*—were not. How

many generations did it take for the great Pleistocene fauna to fade from human memory? The haunting stories of endings must have lasted far down the timeline, because the trauma of having so many charismatic creatures disappear seems to have shifted human behavior. A phase of history in America lasting millennia now ensued that implies a more careful, thoughtful use of nature. The span wasn't entirely extinction-free, but thousands of years later many arriving Old Worlders would describe the Wild New World that greeted them as a paradise of animals. The image of a continent existing into the modern age as an Animal Eden out of prehistory has shaped colonial America's sense of itself ever since. But was that truly the reality of Native America?

When nineteenth-century ethnographers began to assemble a linguistic map of Native America and mulled the seemingly chaotic distribution of languages, the conclusion anyone would draw is that over the preceding ten thousand years there had been a tremendous movement of peoples around the continent. Athabaskan speakers lived in interior Alaska and also way down in the Southwest. There were pools of Algonquian speakers in New England, in the Ohio Valley, and in the foothills of the Rocky Mountains. All this was in contrast to Australia, for example, where Aboriginal populations have stayed in place for fifty thousand years. The American story implies significant experimentation with different locales and ways of life.

In most of history the spur to migration has been a search for something better. Some of those human migrations may have been related to the reshuffling of American nature that took place in the echoes of the Pleistocene extinctions. The biology of the continent was reinventing itself. The vegetation was changing. Without ground sloths to disperse their seeds, the range of Joshua trees began to contract. And without mammoths to curb them, honey mesquite began to spread. There were so many missing animals that a remarkable number of ecological niches were either vacant or newly filling. Reinvention was not so dramatic in the woodlands east of the Mississippi, where members of the deer family like moose and elk and whitetail deer continued as the primary ungulates, with new browse possibilities available to them with the demise of mastodons. When the last short-faced bears disappeared in Ohio, black bears emerged as the dominant ursines, and grizzlies and polar bears did the same farther west and north. With dire wolves now extinct, gray wolves

and the trio of ancient American wolves emerged as the primary canid predators. On streams east and west, smaller modern beavers replaced the extinct Pleistocene versions and fashioned marshy, wet landscapes. A watery interior is not an image of the past we hold in our heads, but beavers created exactly that.

The ecological rebirth was most dramatic in the western half of America. The loss of mammoths, giant bison, horses, camels, ground sloths, dire wolves, short-faced bears, scavenging birds, and a range of cat predators opened niches at every level. In cases like wolves and bears there were ready replacement species. But with nearly 70 percent of America's ancient grazers gone, niches for replacements were wide open. So with almost no competition, a new, smaller bison supplanted horses, mammoths, and its huge bison ancestors. Within a few centuries this new "dwarf" bison grew into a biomass of animals that had almost no analogue anywhere else on Earth. Seals, sea otters, and sea lions excepted, along with the one pronghorn species that survived to browse the forbs camels once ate, most of the large animals left west of the Mississippi—bison, elk, mule deer, moose, bighorn sheep, musk ox, caribou—were Asian immigrants.

On some parts of the planet the warmer climate that marked the end of the Ice Ages allowed hard-pressed humans to try out some new things. For more than half a million years the migrations out of Africa into new parts of the Earth had let humans continue a focus on hunting. But Eurasia ten thousand years ago was becoming old and picked over. Earth as humanity had known it for so long was now changed. Millennia of human pursuit had used up once-teeming populations of big creatures. Horses, camels, aurochs, sheep, and goats survived because Old World humans figured out how to tame them into domestication before they entirely disappeared. Domesticating and herding animals was an enormous alteration in human economies, but it was only one step to the actual new order. The warming world grew more plants, and with wild animals ever scarcer, a whole new human adaptation in the form of herding and agriculture—with cleared ground, settlements, eventually cities and empires—was at hand.

In the Old World many human cultures in the Middle East, Southeast Asia, and Europe took that step either side of ten thousand years ago. But since humans extensively settled America only thirteen thousand years ago rather than fifty-five thousand, North America didn't force the issue the way the Old World did. The giant animals of the Pleistocene might be gone, but America's replacement fauna remained for a very long time a rich and diverse food base for a human population still growing into the continent. With plant life also flourishing in a warming climate, America's human cultures segued to a stage where animals were still of primary importance economically, culturally, religiously, but plants were taking on a much more significant role. "Archaics" is the term anthropologists and archaeologists have long used for humans living this way, by which they mean people existing as hunter-gatherers.

So while the Old World experimented with agriculture and domestication, in North America the hunting-gathering lifestyle continued over vast spans of time and diverse geographies. In the Great Lakes country, Northern New England, the High Plains, the Great Basin, and almost all of the West Coast, hunting-gathering continued as the primary human economy all the way into modern history. We ancient hunters of animals surrendered our oldest lifeway with extreme reluctance.

It wasn't that America's post-Pleistocene hunter-gatherers had inherited an Eden. The linguistic map argues for a great deal of movement and experimentation. And America wasn't just in the throes of biological re-creation. Around 8,500 years ago there was another potent change, in some parts of the continent serious enough to be an emergency that demanded an extreme response. The warming cycle that ended the last ice age didn't relent, and America's climate swung into a hot, dry phase that stayed in place for a mind-blowing 3,700 years. This was the depths of the last interglacial, the long slide out of the frozen Wisconsin Ice Age. Now the Earth's rotational wobble had the Northern Hemisphere slightly closer to the sun and for almost forty centuries some parts of America cooked. The Altithermal, as it is called, came close to turning large parts of the continent into a true desert, and a vacant one. Many species of animals left for wetter settings. So did many human groups. As animal populations shifted eastward and westward, the country off the southern end of the Rocky Mountains, which had drawn humans twenty-three thousand years ago and where Clovis and Folsom people had thrived, nearly emptied of humans.

In other parts of America, and in the West, too, once the Altithermal

subsided and animals and humans returned, generations of some hunter-gatherers occupied the same landscapes for centuries, even returning to the same camps again and again. That kind of close familiarity gave them bodies of handed-down ecological insights about how to live in particular places. The feedback they read from place-based living enabled them to come up with a striking epiphany, one allowing them to live well without using up their world.

The breakthrough—what seems to have been the real key to success in Native America—sprang from generations of acknowledgment of America's new circumstances. No matter how far you migrated or which direction you traveled, there was no longer a Wild New World, empty of other people, out there. Clovis-like expansion across a virtually uninhabited continent was over. But adapting to local conditions and accumulating ecological knowledge about places led to a universal conclusion. Humans now had to learn to deliberately, carefully, manage their own numbers to avoid overshooting local resources when times turned bad. In a variable world, good times inevitably give way to bad times. That was an ancient lesson. Basing your numbers on the good times set you up for disaster.

Given our modern difficulties regulating human population growth, how did these ancient Americans manage to pull off controlling their populations so they could live well on locally regenerating resources? Birth-spacing was one common strategy. Breastfeeding the young for a span of years suppresses ovulation during a mother's fertile years, preventing a rapid succession of pregnancies. Child mortality was high among ancient humans anyway, ensuring that only a fraction of new additions to a population factored into its ecological fit. But most hunter-gatherers also freely practiced forms of abortion, to which they sometimes added infanticide for excess or unwanted newborns. The idea is draconian enough to shock us, although the evidence is that as an ecological strategy it worked, and worked well. But particularly for the women who carried babies to term, infanticide was a psychological burden. Ultimately many hunter-gatherers sought to escape it.

But the larger equation was relentless. The hunting-gathering economy was still the predator's economy, and predators of whatever kind are always few compared to prey. Hunting and gathering required space to roam, habitats for birds and mammals. Living the good life meant you could not overburden the world with people.

Populations in Native America in 1500. From *Fire, Native Peoples, and the Natural Landscape*, edited by Thomas R. Dale. Copyright 2002 Island Press. Reproduced by permission of Island Press, Washington, DC.

THERE WAS ONE possibility to increase human numbers, but it meant giving up much of humanity's ancient life and investing in an entirely new economy. Halfway through the ten thousand years of Native America, though, around the time the Altithermal ended, an agricultural revolution similar to the one that swept the Old World slowly began to spread into North America from the south. In the north this new approach focused almost exclusively on plants. The selection and training of wild plants first emerged where human populations were densest and animal populations lowest, namely crowded Mesoamerica: the Yucatán Peninsula, and the high valleys of Central Mexico. Unsung, unknown traders and travelers first carried ideas about domestication northward about four thousand years ago, and later the actual seed stocks of Mexican agriculture. Over the ensuing millennia crop fields and farming towns began to dot Native America from the South to southern New England, then along the river valleys of the Midwest, and even in scattered locations

in the desert Southwest. Once the agricultural transformation took root, populations began to grow and sometimes centralized governing bodies, usually religious ones, organized towns into regional empires we know as Cahokia, Spiro Mounds, and the Chacoan Empire. All of these were late experiments in the last thousand years before Old Worlders stumbled onto America.

Despite its regional successes, the move to agriculture was unhurried and spotty across much of what is now the United States. Agriculture's late arrival meant that hunting-gathering remained the sole economy across the entirety of America for the first six thousand years after the Pleistocene ended, and in vast regions agriculture never replaced it at all. So wedded were Native people to the hunt that even as agricultural towns emerged, many of the farmers continued to hunt, at least seasonally. Some returned exclusively to hunting when circumstances allowed. All this means that living off wild animals and gathering plants is the longest sustained economy our species has ever practiced in America. No other way of life gets close. New technologies did emerge, along with wonderfully rich cultural and religious traditions interweaving the lives of people and animals. But by and large, especially among Archaic hunter-gatherers, an ur-conservatism prevailed in Native America. Life among other animals was ancient, exciting, mythic. What human existence could be better?

FOR TEN MILLENNIA these first Americans experienced lives that don't much resemble classic Western clichés about humans in a state of nature. For one thing, some brilliant thinkers revolutionized the technology of the hunt and the ideas spread. Atlatls were predatory tools that doubled the length of the human arm in its throwing motion. Their launchers required more preparation than spear thrusting, but they propelled flint-tipped darts with twice the power and range of a thrown javelin. Later on, when the bow diffused southward out of the American Arctic, it produced a similar revolution. These technologies didn't just extend the reach of a human throw. They meant far fewer injuries from close-in grappling with big animals. Butchering and processing animals was still work, though, and as with plant gathering, women and children did much of it. Making clothing and skin lodges was a formidable job. A shirt and pants required

Hunter-gatherer rock art. Photograph by Dan Flores.

at least five deer hides that could take as many as eighty hours of effort to soften and tan. Making a skin lodge required thirty-five elk or caribou skins. It's no surprise that women in hunter-gatherer groups show the same pattern of tooth wear from clenching and working animal hides that Neanderthal females did.

Archaic America can seem like a runeless slate, difficult to fix in the mind. For one, it's a mistake to imagine everyone on the continent living in small bands of a hundred people. America was large. It was environmentally diverse. People then lived far differently, one group from the other, than we do today. Caribou hunters in Alaska and bison hunters on the Great Plains shared lifestyles, but hunter-gatherers who could exploit ocean coasts and inland resources, or could also tap the fishing possibilities of big rivers like the Columbia or Mississippi, fashioned different lives. The Haida and Tlingit were Pacific Northwest hunter-gatherers but they built and lived in fixed villages featuring wooden homes and elaborately carved poles bearing representations of sacred ravens, whales, elk, eagles. Other Archaic groups constructed a wide variety of built structures, like spoked rock circles known as medicine wheels that dotted the Northern Plains (a famous one sits atop the Bighorn Mountains in Wyoming). They

marked solstices and other events that attest to a sensory-based human integration with the skies, planets, and cosmos.

The most wondrous built structures American hunter-gatherers erected were their earthen mounds. Starting around 5,500 years ago, cultural groups along several rivers in the South and Midwest initiated a new lifestyle: urban life in the midst of built mound works that undoubtedly were religious in nature and often were effigies of special animals. In Louisiana I grew up around mounds, badly damaged ones, from the final phase of this 4,500-year-long phenomenon, Mississippian Culture farm villages from a thousand years ago, with raised, multilevel platforms. Two aspects of those remnant mounds always stood out to me as remarkable mysteries. First was that America's earliest earthen mounds pre-dated the oldest pyramids in Mesoamerica by thousands of years. Equally unexpected, it was hunter-gatherers who had initiated this mound-building phenomenon and bequeathed the practice to farmers down the timeline!

Since it became a UNESCO World Heritage Site in 2014, the best-known of the Archaic mound towns is Poverty Point in the Mississippi floodplain of northeastern Louisiana. Built 3,700 years ago, Poverty Point in that far-off time was a city laid out on precise, C-shaped residential terraces that were raised one above the other. Below the terraces was a plaza, nearby was a court for sporting events, and centrally located above the hemispheric terraces was a towering mound known as Bird Mound, possibly built to represent a totemic bird of prey. From an aerial view the town appears to have originally been a circle that lost half its size to a flood. Archaeological work suggests Poverty Point was a major trade hub moving goods from as far away as the Great Lakes.

The mound-building tradition diffused far up America's great central river drainages and endured the transition to agriculture. Cultural groups along the Ohio River we call the Fort Ancient, Adena, and Hopewell peoples—hunter-gatherers who eventually began domesticating weedy local forbs before adopting Mexican crops—built animal-effigy mounds that have captured the human imagination for 1,500 years. One called Serpent Mound winds in seven undulations along an Ohio ridgetop for 1,330 feet. It's the largest representation of a snake in the world.

There's a third mystery here. How did hunter-gatherers with a concentrated-enough population to build a mound city create a town that lasted a surprising five centuries? Almost none of Native America's agricultural cities lasted that long. In most circumstances hunter-gatherers require space and small populations to prevent overshooting resources. Human populations that exceeded available animals were the Achilles heel of hunting-gathering. That deflection point was why Eurasians became farmers and herders, and why many Native people in America eventually did adopt agriculture. Jared Diamond once observed of farming that it was "the worst mistake in the history of the human race." But except where there were truly remarkable numbers of animals like caribou or bison, hunter-gatherers were rarely able to aggregate in the kind of numbers Poverty Point's mound town implies.

The likely answer to Poverty Point enduring for five centuries is that bison and caribou herds weren't the only possibilities for an especially rich hunter-gatherer life in Native America. There were other unusually fecund places such as ecologically diverse California with all its microhabitats, a world so rich even hunter-gatherers were able to reside in fixed villages, specialize in various crafts, and produce inheritable wealth and status. The same was true of the sea-and-salmon-fecund Pacific Northwest. And in Poverty Point's case, along the Mississippi River, the North American version of the Amazon. That seemed yet another locale where human cultures that relied on the bounty of nature could live for hundreds or thousands of years without using up the world. Or at least not much of it.

ALL THE EVIDENCE indicates that America's Native people, whether hunters or farmers, lived immersed in art, stories, and observations designed around the grand theme of understanding themselves in a sometimes impenetrable world. A fundamental way to probe those kinds of understandings is through stories of gods.

The oldest named characters in North American history are deities. Heroes of origin narratives with many variations and nuances, these gods created the continent and its life and set in motion the stages of human life with all its victories and tragedies. Stories of these deities make up the continent's oldest literature. With few exceptions these ancient American gods were animals, although the stories describe some as anthropomorphic animals, perhaps descendants of those part-human, part-animal therianthropes from the Paleolithic. In western America, the deity who

Coyote, Beaver, and other deities in a rock-art scene from Native America. Photograph by Dan Flores.

acquired the universal epithet Coyote ("Coyotl" in the original Nahuatl, the language of the Aztecs), stood upright on its legs and brandished human hands, but had the fur, sharp nose, erect ears, and tail of a coyote. The deities who made it into modern English as Coyote, Raven, Spider Man, Skeleton Man, Master Rabbit—along with humanlike gods, Glooskap, Old Man, and Nanabozho—possessed a far more fundamental human quality than opposable thumbs. They shared a basic human nature with their followers, and not just our most benevolent, inspirational nature. Our vices, our lusts and our jealousies, our selfishness and our narcissism, resided in America's ancient gods, there to witness and there for good reason.

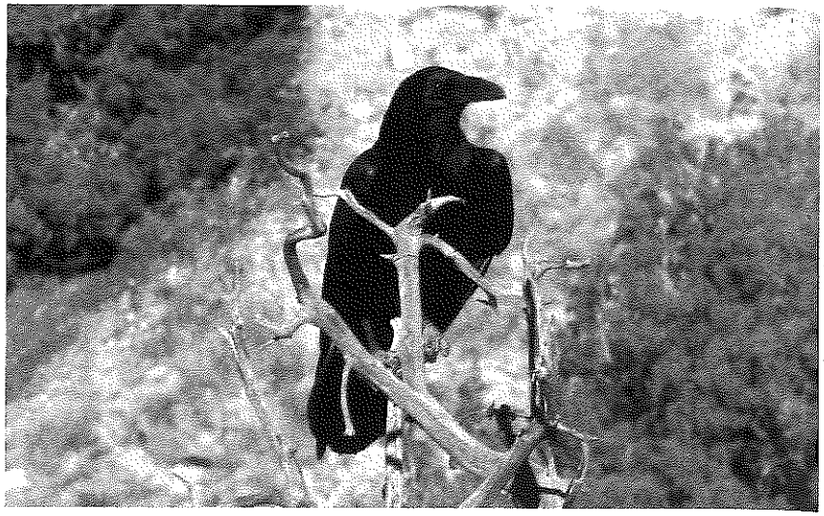
We've often referred to these gods as "trickster figures." I think we've been missing the point. While there are sometimes tricks in the ancient stories about them, the trick is more often misdirection. It's why the trick works that's important, and invariably the reason a trick works is because of who we are, because of the essence of human nature. These are stories that survived thousands of years because they're such penetrating exposés of all our foibles. The deities not only explained to listeners why North America was the kind of world it was, they were at their best when they taught lessons, often uncomfortable or funny ones, about human behavior and motives.

Despite all their varying details, the stories of Spider Man of the Siouan

speakers in the Midwest, and Master Rabbit of the Native farmers in the Southeast, are similar in their purpose. They set creation in motion, then hang around for adventures among us so they can teach us about the human animal. Algonquian-speaking people saw their deity/instructor as manlike, not an animal avatar, although in the case of Glooskap of northeastern America, he was formidable, at ten times the size of ordinary men. But Glooskap, Nanabozho of the Great Lakes country, and Napiwa (Old Man) of the Rocky Mountain Algonquians, were still lords of bird and beast. Skeleton Man of the Hopis in the Far Southwest took human form, too, but like the others he is instantly recognizable—"a god, a creator . . . a thief, a liar, and a lecher"—as a classic professor of human nature.

Coyote, who emerges from the stories as a kind of whirlwind biophysical force with an enormous appetite for pleasure and sensuality, is one of the most widely known gods out of ancient America. It was the actual canid, the jackal-like coyote who ranged across most of the western interior of Indian America, who inspired this celebrated figure. Regardless of cultural differences, all the people in its range regarded the deity version of these small wolves as an avatar, a stand-in for humans in the world. Among the Navajos of the Southwest, Athabaskan speakers who migrated south from the Arctic and picked up the Coyote figure ("Ma'ii") along the way, Coyote represented an ongoing chaotic force in the universe. In most Native traditions, Coyote's role in the supernatural realm is actually that of a *semi*-deity. He is the on-the-scene conductor of a master plan set in motion by an aloof "first cause." This more knowable, approachable kind of god was common in Native America. Another, known from the Tlingit and Haida of the Pacific Northwest northward to the Inuit and Alaskan Athabaskans (like Sarah James's Neest'all Gwich'in people from our Arctic river trip), is Raven.

If there are mysteries in the world you have wondered about, let Raven's adventures explain them. Raven knows things, like why there are tides, why crows (and ravens) are black, why people wear hats and hold feasts, why marmots have five toes, why mountains are white on top, why people should cremate the dead. Raven was yet another merged animal/human deity, who told the Tlingits, "I was born before this world was known." One of his tasks at the beginning of time was to bring light to the world. The Tlingit story of how that unfolds has Raven opening a



Raven. Photograph by Dan Flores.

bag to loose the sun, whose intense light causes some animals to jump into the sea, others to hide in the forest. Uttering his monosyllabic "*gaah*," Raven proceeds to shape each animal in a slightly different way and to name them all: Whale, Seal, Eagle, Bear, Caribou, Beaver, Salmon, Sea Otter, Land Otter, Wolf. The birds he paints in bright colors because he wants them to be pretty.

But lighting the world and creating and naming all its animals does not finish Raven's sacred tasks. America is still incomplete. The Inuits preserve this Raven story. Raven makes a pea pod that births the first human, and with clay produces a female companion. He then teaches them the use of fire and how to make food and clothing from animals. Walking a shoreline he sees objects scattered across the beach. Coming closer Raven sees they are human vaginas, scattered like shells on the sand. With a cocked eyebrow he gathers them up, continues on his way. Soon he comes to a village of humans whose women are despondent. "Why are you so sad?" Raven asks. "Because we have no genitals!" they cry. So Raven distributes the vaginas he's collected and now women can enjoy life more. And reproduce. *Gaah!*

It's good to remember to make prayers to the Raven.

There is one worrisome thread that runs through Raven and Coyote stories. In early times, the Inuit explained, Raven is concerned that humans are becoming too numerous. Human villages are growing too large and subsequently their residents are killing too many animals. The Inuit First Man agrees, and tells Raven: "If the people do not stop killing so many animals, they will kill everything you have made." In Coyote's case, as both the Yanas of California and the Navajos of the Southwest told the story, it is at this point the gods realize humans have to die, because if they do not, human overpopulation will result in the destruction of all the animals and of Earth itself.

WHEN I FIRST lived in Montana I had the opportunity to do a sweat-lodge ceremony led by two prominent Blackfeet men, named Woody Kipp and Gordon Bellecourt. The sweat took place on a November night in the Bitterroot Valley, on land owned by someone Woody kept referring to as "the old man." The lodge was gigantic, capable of swallowing the twenty of us, and stood only ten feet from where gurgling Kootenai Creek spilled out of the mountains. Away from the fire, where rocks were heating, bare cottonwood limbs and mountain ridges stood in silhouette under shrouded moonlight. Woody, lean and angular as a blade of grass, directed us into the lodge. His long, black hair hung in braids and his upper front teeth were on vacation, and he was at once the most likable person there. There among the hissing rounds of water splashed on glowing-hot lava rocks we sweaters spoke our prayers and hopes aloud, and a consistent theme from the group was that we were troubled. We had won the continent but lost our souls along the way. Surely there was some ancient way out of the environmental mess we had made of things.

At the end of the sweat we slipped quickly down the muddy bank and into the rock-bottomed river, a caress of opposites as steamy bodies crashed like calving lava globs into the glacial waters of the Bitterroots. I went full length into the astonishingly cold water, leading with face and chest, then gasped and clamored over the rocks and was out and up the bank in much less time than it takes to read this.

"Thank you, old man," Woody muttered in the direction of house lights on the ridge above us. The old man, it turned out, was a historian of religion named Joseph Eppes Brown, author of a famous book, *The*

Sacred Pipe. As a young scholar in the 1930s Brown had become fascinated by Native religions. He interviewed traditional Lakota elders, including the legendary Black Elk, and ultimately set down the ideas that made up part of hunter-gatherer knowledge about America's animals.

Brown's informants told him they had always perceived the essential nature of animal species as much through dreams and visions as through Native science. That combination of evidence led them to a clear ranking of animals in their taxonomy, with bears, bison, and eagles accorded highest ranking and respect. Bears ruled the underground, as bison did the surface and eagles the air. Certain animals illustrated particular traits useful to the human animal. Members of a wolf clan sought to invoke the wolf's cooperative skills in hunting and killing. If a young man on a vision quest heard a bull elk bugle for cows in the crisp air of autumn, he might then regard the elk as a totem animal whose potent sexual symbolism he could internalize.

These elders also recalled a connection, involving energy flow, among creatures. These were connections neither eighteenth-century Linnaean science nor twenty-first-century genetic science would ever think to link together. What the Lakotas called *Umi* or *Yum* was whirlwind power, the unrestrained residue of the energy of the four winds. They remembered whirlwind power as much-sought, in part because possessing it made one difficult to attack in battle. But only a small number of special animals—spiders, and also moths, dragonflies, and bears, elk, and bison—possessed the whirlwind secret.

As for bison, seasonal winds coming from the north or south seemed part of their mystery, bringing them or taking them away. A south wind might produce herds that blanketed the landscape from horizon to horizon. But they could entirely disappear, which led to a widespread belief in Native America that bison had their origins underground and sometimes returned there. The precise location of these regeneration places moved as people did. As tribes migrated onto the Great Plains in the 1700s, among the Kiowas the place where bison poured from the Earth was the Wichita Mountains. For the Comanches, bison regenerated in the canyons of a plateau, the Llano Estacado. The Lakotas believed this mysterious renewal happened in caves, like Ludlow Cave, in and near the Black Hills, which Native people surrounded with petroglyphs of buffalo tracks and human vaginas, enjoined symbols of fertility.

However incomplete a glimpse Brown got, his interviews give us some sense of a long span of time in America when Indian peoples possessed a philosophy with rich linkages between the human animal and the other animals surrounding them. As had been true of our first hunting ancestors in Africa, true of the Neanderthals, true of the Clovis people, these cultures' ceremonial lives centered on an ancient human desire to control nature. But they did so primarily as part of a religious philosophy, not a scientific one. Managing animals based on population modeling, carrying capacity, or selective/sustainable harvests as modern ecologists do would have been incomprehensible, and for a simple reason. Their cause-effect explanations for why things happened relied on different premises. Native people were never "the original ecologists," as many admirers have claimed, because the science of ecology didn't exist in human perception until the late 1800s.

The religions through which Native people understood animals in a larger context were superb at apprehending the kinship between animals and humans. The stories they told about their deities were equally superb at drawing insights about human nature, enabled by shrewd psychological observations both of human motives and of animal traits that mirrored ours. Those were augmented by a form of Native science—that is to say, a cultural knowledge of animal natural history—based on thousands of generations of handed-down observations about animal personalities, cultures, reactions, and migratory movements.

But crucial in Native America was knowledge about how to influence animals in a realm usually defined as the supernatural, an essential part of religion. Another friend from my years in Montana, the historian Rosalyn LaPier, has done the best insider account so far of the "invisible reality" that was central to this ten-thousand-year world. Rosalyn's own Blackfeet people, in her case the Algonquian-speaking Amskapi Pikuni, or Southern Piegans, were never secretive about what they believed, and their willingness to share imparts something profound about humanity's ancient belief systems. The Blackfeet never considered themselves living "in harmony and balance with nature." To the contrary, they attempted to control animals and to alter nature to their benefit. Rather than submitting to storms, they tried to change the weather. This "powerful worldview," as Rosalyn calls it, suggests that the Blackfeet desire to manipulate animals and nature is a deep-seated human impulse, and the strategies

they used to effect it reach equally far back in time. For the Blackfeet, accessing the animals they hunted, encouraging or discouraging weather they hoped for, was all available through the assistance of supernatural allies. The degree of power one possessed to call on those allies determined how much you could make happen.

Blackfeet control over the buffalo shows this worldview in action. For thousands of years the Blackfeet lived in the country where the great, arid prairies abut the Northern Rocky Mountains. That Raven was one of their supernatural helpers ties them to the Northwest, but as prairie people they faced eastward, toward country where water often came in the form of beaver ponds. They perceived a triple world of powerful beings. Some, like Raven, lived in the Above World. Others, like Beaver, resided in the Water World. Humans and normal animals existed in the Below World, where events or dreams were partial reflections of what was happening in the "invisible reality" of the realms above and below.

Human beings could become vectors of power from these supernatural realms if a sacred being sought them out, or through a vision quest or other effort to find a sympathetic animal ally, or even by purchasing power from someone who already had it. Power from a supernatural being like Beaver commonly took the form of a "bundle," a package of sacred objects. The Beaver Bundle resonated power, as its possessor could call on Beaver to control the behavior of the buffalo in the visible Below World. "Charming the Buffalo" was a ceremony including songs that invoked Beaver, Raven, Sun, Moon, and Morning Star to bring buffalo to Blackfeet camps—along with a weather change, a warm wind to ease the tasks of skinning and butchering to further control nature for the benefit of humans.

One other intriguing look at Native religious traditions with respect to animals comes from the work of an anthropologist who lived with the Athabaskan-speaking Koyukon peoples of Alaska. The Koyukons preserve an ideology with powerful echoes of how life in the ten-millennia span of Native America must have worked. Keen observational naturalists with a highly refined knowledge of animal behavior, the Koyukons traced their link with animals back to what they called Distant Time, when animals were human and spoke human languages. Once again the deity animal was ever-watching Raven. Raven rarely missed anything, and was always alert to violations of taboos about how to treat animals

and respect them. Many Raven stories were about the bad luck that befell people who transgressed against the animal world.

Stories from Distant Time defined the characteristics of particular animal species for the Koyukon people. Bears and porcupines, for example, were cousins in Distant Time, and that relatedness was evident in that they sometimes still shared a den. Animals remained cognizant of what humans were thinking and saying, and some of them—bears, lynx, wolves, wolverines—possessed dangerous spirits that could rob a human who offended them of skill, luck, even life. Shamans who visited animal towns in dreams could "call in" animals when they were scarce. For fear of insulting animals, Koyukon people did not point at them, and never boasted about hunting skill. There were animal-related rules about butchering, about how entrails were disposed of, meat was stored, about who could eat particular cuts of an animal. The latter was most commonly enforced against women because women had special power, especially when they were of childbearing age.

Animals were critical to a major life force—luck—that could make or break a person's life. Demonstrated luck in hunting or gathering was a very special power and easily lost. Luck could be transferred to someone else if the giver was of advanced years and less in need. But luck, the Koyukons believed, was an award from ever-watching Raven as a result of correct behavior toward animals. And the most correct behavior was treating them as kin.

HUNTER-GATHERER relations with animals were never exclusively philosophical. They also took place in the material world. One manifestation in Indian America proved truly significant. Beyond dogs and turkeys, across those vast spans of time Native people never attempted to domesticate the wild animals around them. Deer resisted domestication in both the Old World and America, so moose, elk, and whitetails were never real possibilities. America possessed no suitable wild cattle. Europeans domesticated aurochs but bison never wore the yoke there. America had lost its horses and camels at the end of the Pleistocene, while Europe's remnant wild horses survived just long enough to be saved by domestication 4,500 years ago. In North America bighorn sheep, caribou, and

pronghorns were probably the best candidates. But while humans in Eurasia were domesticating a wide variety of animals for various tasks, the idea never took hold the same way in North America. Groups that embraced agriculture, like the Pueblo peoples of the Southwest, did widely domesticate wild turkeys. But in America big mammals remained wild, preserving their magic down the centuries.

On the one hand, lacking domesticated animals America missed out on the development and possibilities of the wheel. On the other, it also meant that Indian peoples never indulged the hatred of predators that became such a feature of Old World herding. So in America, wolves, bears, mountain lions, and coyotes never stopped playing their ecological roles as keystone animals, and for humans predators never ceased serving as totem animals and inspirations for clans and even tribes. Predators remained animals worthy of respect, even sacred respect. An important result was that Native peoples' lack of interference with predators preserved the continent's ancient ecologies intact down to the very moment Old Worlders arrived.

One of the long-term consequences of the Pleistocene extinctions was animal survivors that benefited from the loss of competition. The primary benefactor was the new, smaller bison, whose numbers had exploded. Half the size of their Pleistocene ancestors, reaching reproductive maturity far faster, buffalo adapted perfectly to the grasslands of the interior of the continent. Their population was no doubt highly variable, but based on how many livestock eventually replaced them, their numbers in their core range likely ranged between about twenty and thirty million. Great climate swings like the Altithermal redistributed them and shrank or grew their populations, but never pushed them toward extinction. Buffalo herds grew so enormous, and were such a perfect fit to post-Pleistocene conditions, that no amount of predation from either gray wolves or humans seemed to diminish them. Biologists now believe modern bison are a classic example of anthropogenic selection, their size and rapid reproduction (a natural increase of 18 percent) selected by human and wolf predation. That made the modern bison one of the most perfectly adapted American species ever fashioned by natural selection for a continent where humans were present.

For more than eight thousand years a lengthy sequence of different human cultural groups—they go by fanciful names like Mummy Cave, Oxbow, McKean, Pelican Lake, Besant, Avonlea, and Old Women's—

lived on bison, drove rivers of bison over cliffs, corralled and stalked and built religions around bison. Two thousand years ago, when Rome was transitioning from a republic to an empire, Besant and Avonlea hunters were undergoing a transition of their own on America's bison plains. The Besant people still relied on atlatl technology invented by Folsom hunters. But the Avonlea had the newest hunt technology, the bow, introduced to America by the ancestors of the Inuit. Even so, the bow hardly dented the enormous bison herds.

Like many prey animals, bison evolved to be highly social herd creatures. Numbers mean lots of eyes on predators and enhanced chances you're not the target. The herds varied in size and makeup across the seasons. At the macrolevel, three massive groupings spread across the western landscapes of the continent. In timbered parts of Alberta, the Yukon, and Alaska there was a distinctive type we now call the wood bison. Out on the grassy sweeps east of the Rockies a northern herd of plains bison ranged from Alberta to Nebraska. From there to the yellow expanses of Texas another mass worked across the Southern Plains in search of rains and greening grasses. These big aggregations of animals, groupings really made up of thousands of smaller herds, drifted southward in winter, then reversed direction to shift northward in summer.

To human observers, these movements and the incomprehensible masses of animals must have existed in the sensory plane much like stars and planets, or the sun's progression across the horizon from Winter Solstice to Summer Solstice. Like those cosmic spectacles, the organic flow of animal life was on such a scale only the supernatural seemed capable of explaining it.

The way to imagine these immense herds is by understanding their seasonal rounds, and the proper beginning is in the scorching heat of late summer when bison cows became receptive to sex. Over the next chaotic few weeks the rumbling bellows of two-thousand-pound bulls created a din heard nowhere else on the planet, audible for miles across the boundless plains. The oddly front-weighted males jousted, head-butted, and hooked at one another in dust-shrouded battles for females. Half the size of the bulls, cows didn't always honor the winners of these contests, often rejecting both strivers for a higher-ranking bull elsewhere. Over the few weeks of rut some bulls bred as many as forty cows. Others completely struck out.

Once the rut was over, bison would begin their general seasonal drift southward, the small groupings led by high-ranking cows (until they were eight years of age, younger cows were subordinate to older females). Whether southward or somewhere more local, the destinations for these migrations were forested river valleys, where bison spent months of snow and cold protected from the winds that swept open-country snow into drifts. As winter wound down in April pregnant cows dropped their young, and while eagles waddled around among them picking at afterbirth, the cows urged their bright red calves to stand, pop their tails over their backs, and run. Gray wolves, knowing well when a bison herd was vulnerable, were certain to be trotting by, yellow eyes fixed, red tongues lolling. Following the spring green-up bison moved into open country, where the herds sorted themselves into gender groups through spring and early summer. Bachelor bulls worked their way across the upland plains in all-boy posses while cow-calf herds stayed separate and distant until the pheromones of late summer began to drift through the hot air once again.

While rituals that charmed and lured bison may have been under the sway of supernatural animal deities, all those bison hunters over all those thousands of years understood from observation that the animals' movements were predictable. They also understood that bison preferred green grasses from freshly burned country. Humans had been using fire to alter the world to their advantage for a million years. In the eastern woodlands, regular human firing produced patchy ecotones whose rebounding forest created browse for whitetail deer. In the West fires produced wildlife park savannas for bison, pronghorns, elk, and wolves. Those fires actually pushed the areal extent of the savannas and their animals nearly to the Mississippi.

Archaeologists have mapped out a predatory human pattern that mimicked the prey wherever bison herds ranged. In the fall the hunters set fire to specific upland grasslands they wanted to hunt in the spring, knowing this would draw the herds. In winter those same hunters moved into the forested river valleys to set up their camps, aware that bison, elk, and deer would congregate there, allowing local hunts to take place throughout the cold months. These hunters were pedestrians whose only beasts of burden were dogs, and preserving meat by air-drying was a huge undertaking. Nonetheless, in suitable topography like Head-Smashed-In

(Alberta) and First Peoples' and Madison buffalo jumps (Montana), under the supervision of hunt managers they ran bison off cliffs, a strategy they learned by observing wolves. They also knew buffalo were entirely capable of exchanging cultural information. At these jumps they attempted to kill every last animal to prevent buffalo survivors from passing on cultural knowledge about the strategy.

The Great Bison Belt of the savannas east of the Rockies was the modern animal's evolutionary home. But bison were not just of the interior. Archaeologists reconstructing past climates have mapped out a whole sequence of bison "presence/absence" periods across ancient America. The Altithermal, that 3,700-year heat wave, was one of the absence periods in much of the Great Plains. That huge drought, and another only a thousand years ago that cycled off and on for six centuries, shriveled the western grasslands. Bison numbers likely plunged as the herds sought out better-watered refuges both east and west of the Great Plains, then trickled back in when weather improved. Then, between 1500 and 1600, as Old Worlders were settling America, a climate change to wet and cool conditions grew bison into vast aggregations again, sending teeming herds in the West eastward beyond the Mississippi River, convincing Europeans that in America they had found the Eden of the Animals.

AS IN THE OLD WORLD, eventually agriculture became an economic choice that was hard to resist. For those groups that took up farming, the catalyst seems to have been a human population growth that made living by hunting ever more difficult. Successful farming meant it was possible to set aside birth control and expedite population growth. Attractive as that was, it meant that parts of North America were no longer sparsely populated wildlands.

Ten thousand years ago the entire human population of planet Earth numbered only about 4 million. Across all the Americas humans then likely made up only a quarter of that number. North America probably had barely 500,000 people then, fewer than a single large city in our time. Agriculture changed that, but because big parts of the continent were unsuited to farming, and because farming was a new development, America wasn't entirely remade the way Europe or Asia was. By five hun-

dred years ago the best guess is that America north of Mexico had grown its population to just under 4 million people. More than half of those, roughly 2.3 million, were farmers. One of the largest agricultural populations in America, an estimated 908,000 people, was in the desert Southwest. Indian farmers in the Northeast and Midwest regions combined had a population of a bit less than a million, while agriculturalists in the Southeast numbered slightly more than 400,000.

But five hundred years ago, on the eve of European arrival, there were still a million and a half hunter-gatherers in America. Many of them, more than 350,000, were in the Arctic and Subarctic, while others (roughly the same number, about 350,000) lived in the interior West. Another group of 350,000 or so people harvested the products of the sea, the coast, and the adjacent rainforests in the Pacific Northwest. California's more than 440,000 hunter-gatherers, living in a region with a mild climate and a remarkable number of microhabitats, outnumbered the hunter-gatherer population of every other region in America. With five hundred species of animals and plants in California, life was so easy no one was willing to do the work of farming.

Four million people spread across a landscape that in the twenty-first century supports four hundred million seems explanation enough for why humans and wild animals coexisted well for so long in Native America. But the simple numbers are misleading. As a consequence of the global economy, modern Americans and Canadians exist off the resources of the whole planet. In ancient times America did feature economic trade networks that funneled resources from region to region. And there were groups—bison hunters on the plains and farmers along the Rio Grande in New Mexico—that eventually engaged in mutualistic trade, exchanging protein from the hunters for plant-based carbs from the farmers. But most of the trade items that crossed long distances in Native America tended to be luxury goods, traded for fashion or status, not food to support larger populations. Copper ornaments from the Midwest, conch shells from both coasts, tanned bison robes from the plains, turquoise from southwestern mines, caged parrots from the jungles of Mexico, all were luxury trade items. Most Native groups depended on the resources of their regional ecosystems for food, so local places still defined the limits of human populations.

That might be an argument that for hunting-gathering and subsistence-

farming economies, four million people was just about the carrying capacity of the American landscape. The effects accumulated, though. Across the final 1,500 years of Native America before Old Worlders arrived, a cumulative total of 150 to 200 million people lived out their lives north of Mexico. America was no howling wilderness. It was a long-inhabited, lived-in world. As a consequence, surely there were stresses on wildlife populations, at least occasionally.

In fact, there's no doubt of it. Humans are biological and no species gets a free ride in nature. In some American archaeological sites animal remains show a significant decline over time. The massive Emeryville mound site on the shore of San Francisco Bay portrays a steady decline in the bones of sturgeon, salmon, deer, elk, and pronghorns, demonstrating a drawdown of local wildlife as human populations grew in Native California. Elk remains in many continental archaeological sites are so scarce that some scientists suggest that elk numbers must have been suppressed, and the almost-certain cause was human hunting.

There was also at least one human-caused wildlife extinction in Native America. As humans spread around the world, flightless birds were always particularly vulnerable, and the Pacific Coast of California and Oregon, along with the Channel Islands, held one, a flightless sea duck in the genus *Chendytes*. In the past decade researchers dating the remains of these goose-sized ducks from six coastal sites concluded that humans began killing them 10,000 years ago, just as the Pleistocene gave way to Native America. Wiping them out was hardly the three-century blitzkriegs that took out mammoths or passenger pigeons, but by 2,400 years ago West Coast Natives had hunted Pacific flightless sea ducks to extinction.

Judging from the stories people preserved of their culture heroes, the most common environmental overreach was what the Inuit Raven story feared: overhunting brought on by growing human numbers. Localized overhunting happened for reasons that reach deeply into human psychology. To explain it science employs a phrase from biology. "Optimal foraging strategy" describes a use of nature that makes immediate sense. To satisfy desires of all kinds, living organisms tend first to reach for low-hanging fruit. Only when resources within easy reach are exhausted do we exert more effort, going farther afield or turning to other possibilities. On a macroscale, optimal foraging strategy explains

why in the twenty-first century we're struggling to wean ourselves from fossil fuels. In America's past the principle is equally insightful about why wildlife around Native villages was soon hunted out. Anyone who has camped in the same spot and gathered firewood for several days grasps the basic idea.

In Indian country this phenomenon was well known from the 1600s through the 1800s. Wild animals grew rare in close proximity to Native villages. On Lewis and Clark's coast-to-coast journey across America in 1806, William Clark wrote that a consistent theme in their travels was that wildlife was always more abundant distant from Indian villages. A common feature of colonial America was the existence of "wildlife buffer zones" between villages or regular human camps, where unmolested populations of animals and birds built up in large numbers. In cases where adjoining Native groups happened to be unfriendly or in conflict, their hunters often avoided dangerous territory in between, which allowed wildlife populations to grow undisturbed. Peace agreements, truces, and new alliances often permitted the exploitation of these buffer zones stocked with animals, a pragmatic reason for seeking peace.

The biological impulse to engage optimal foraging strategy encouraged another cultural development that actually resembled an Indigenous endangered species policy. Indian religions commonly featured taboos against pursuing or killing certain creatures. As with the Blackfeet's historic refusal to trap beavers during the fur-trade period, explanations for taboos sometimes rested on an animal's critical position in religion or in nature. But more frequently than just chance, those taboos were on animals that were scarce, difficult to hunt, or nutritionally suspect. A taboo directed group energy away from animals less cost-effective in terms of effort, a classic calculation of optimal foraging. Once the Pleistocene extinctions had run their course, taboos must have played some role in the admirable paucity of human-caused extinctions across those ten millennia of Native America. Or at least we can guess as much.

Taboos provided protection for some American animals, and the passenger pigeon may be the best example. Native people in the East and South where passenger pigeons roosted and nested had long taken advantage of the birds' presence and numbers. The Senecas held that in ancient times the bird people had met in council and decided that the pigeons would furnish a tribute to humanity. Like other northeastern tribes, the Senecas strung nets to snag pigeon flocks that winged through the forests like arrows in flight. Midwestern peoples such as the Ojibwes, Shawnees, and Osages did the same. In the South, Cherokees and Creeks blinded the roosting birds with torches and swept long poles through the trees to topple them. So there was significant harvest, although as with bison, it's fairly certain that passenger pigeons were so well adapted and numerous that human numbers in Native America didn't threaten them. But there were restrictions Europeans never employed. A widespread taboo among Native people banned molesting the adult birds on their nests. That taboo guaranteed survival for birds with the responsibility to create new generations of pigeons.

COYOTE'S AND RAVEN'S America existed for seventy-five times longer than the United States has so far, so it shouldn't be a surprise that a history reaching beyond human memory would provoke a religious awe from its human inhabitants. Native people interviewed in the first centuries when European note-takers were on the scene appeared to conceive the continent as operating on a mysterious plane. Among their scores of different creation stories a common theme was that animals like salmon, buffalo, deer, beavers, and wolves joined the other great forces of the universe—the sun and moon, the sky overhead—as present from the beginning of time. Those stories also described the measures one should take when, because of some transgression, relationships with animals became strained and environmental disasters loomed. Bison might have their origins in the Earth and thus couldn't disappear permanently. But sometimes they seemed to abandon the world. Still, there were measures to resolve crises like this that revealed an ancient and crucial connection between animals and humans.

The village-dwelling peoples of the Midwest, the Siouan-speaking Mandans and Hidatsas, the Caddo-speaking Arikaras, and the Algonquian-speaking Cheyennes all joined the agricultural revolution and became farmers of corn, beans, and squash. But their need for protein and their older traditions as hunter-gatherers meant that like other Native farmers they never gave up hunting. Their stories offer us a window into

how the human-wildlife arrangement worked in Native America when the relationship grew troubled. Each had a culture hero or heroes who taught essential lessons for repairing those relationships. The great heroes for various subdivisions of the Cheyennes were Sweet Medicine, Erect Horns, Yellow-Haired Woman, and Coyote Man. Among the Mandans and the Hidatsas the most famous heroes were Lone Man, the first human, and Hoita, or Speckled Eagle. For the Arikaras the primary hero was Man-Who-Kills-Game-Easily.

The culture heroes taught that the key to the animal-human relationship was kinship. Animals *were* people. They had families and societies, opinions and cultural memories. Like people, they also possessed something essential to them, a breath or spirit that survived death. The nineteenth-century ethnographer James Mooney wrote of a common belief by groups such as the Crees and the Lakotas that, treated properly, animals could even reincarnate on the spot. He quoted a Native informant: "We came to a herd of buffalo. We killed one and took everything except the four feet, head, and tail and when we came a little ways from it there was the buffaloes come to life again and went off."

Centuries of living among America's wild animals convinced Native peoples that supernatural entities, like Beaver among the Blackfeet, controlled human access to animals. When animals yielded it was because humans respected them and honored taboos. Respect took several forms—Coyote Man and Yellow-Haired Woman advised the Cheyennes that they should never "express pity" for any animal. But primarily, respect came from honoring that humans and animals were kin and acknowledging that we and they could move between each other's cultures because we sprang from the same source. This became the key when, because of some human hubris that violated the arrangement, the animals retaliated by withdrawing from humans' presence. Pleading with bison, elk, and deer to return and rebalance the world became a focus of some of the grand ceremonies Native peoples developed in Native America, and it was the culture heroes, conferring with the animal supernaturals from Beginning Time, who established the rituals that corrected the world and reaffirmed proper reciprocity.

There's evidence that ceremonies to reestablish ties and regenerate animals were ancient. Erect Horns, a Cheyenne hero, supposedly learned a ritual for doing so during creation. Sweet Medicine also possessed such

knowledge, and whenever insufficient respect for him as special animal envoy caused the animals to withdraw, the Cheyennes apologized and repented and performed a ceremony called the Massaum that would call on the animals to reappear. The Mandans had a similar story about the first human, Lone Man, quarreling with Speckled Eagle, who controlled access to animals. As punishment Speckled Eagle withheld the animals inside a mountain called Dog Den Butte. Finally Speckled Eagle taught a properly penitent Lone Man the correct ceremony to arrange the animals' return.

In every case these ceremonies were about reaffirming kinship, dating back to their conjoined origins, between humans and other animals, about reassuring the supernatural entities that humans did see other creatures as real people and respected their willingness to die so humans could live. The way to renew this relationship was through ritualized erotic encounters, adoptions, and marriages between people and animals. Thanks in part to the artists George Catlin and Karl Bodmer, who traveled among these farming peoples in the 1830s and observed these ceremonies, we know they featured animal-costumed dancers re-creating repentance, and special lodges and altars representing the mountains or caves where the animal supernaturals hid their charges. The Cheyenne Massaum was a great animal dance that re-created Coyote Man's and Yellow-Haired Woman's release of the animals to spread across the world. The Mandans effected the return of the animals through the Snow Owl and Okipa ceremonies, while the Hidatsas did so with a ritual known as Red Stick.

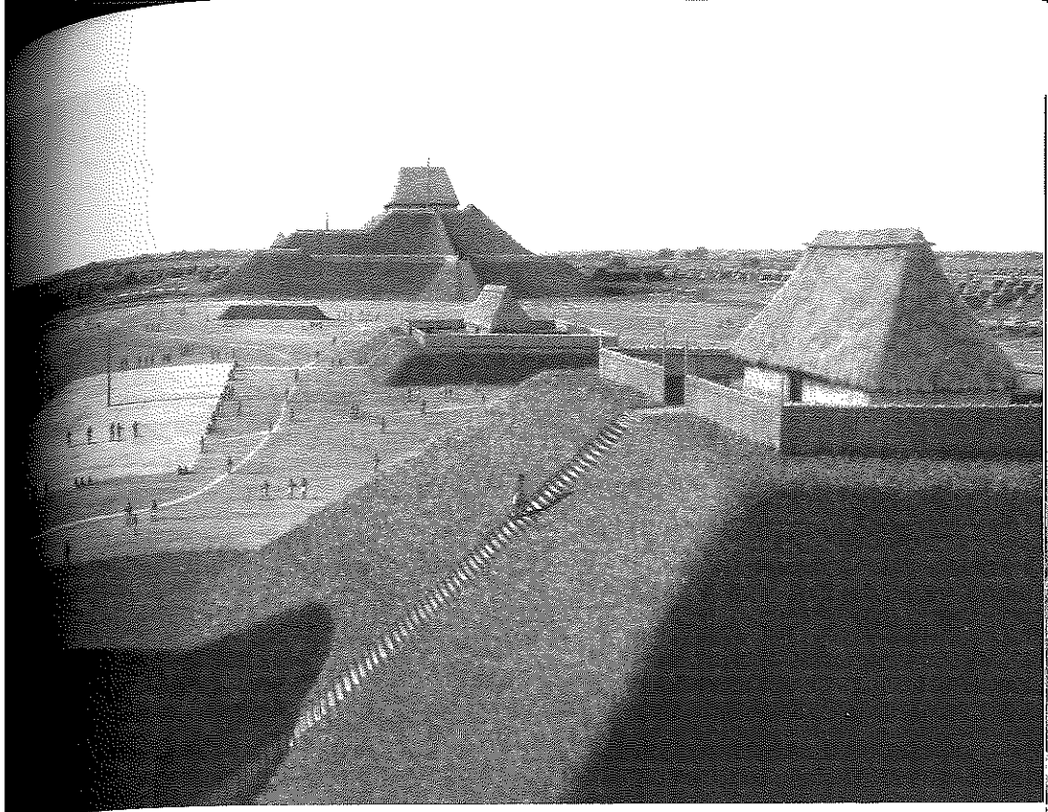
Many Native peoples across America likely had ceremonies like these, grand mythic re-creations of the ties that bound the human animal to the diversity of life. But the next human arrivals to North America, driving domesticated Old World creatures before them as they unloaded from seagoing wooden ships, would dismiss all these ceremonies out of hand as Satan-worshipping superstition.

ON A SUN-DRENCHED November afternoon I sit in T-shirt and shorts a few feet from the edge of a canyon rimrock, looking through four hundred feet of transparent desert air on a thousand-year-old city. My

Cahokia in its heyday. Mural by L. K. Townsend. Courtesy Cahokia Mounds State Historic Site.

wife, Sara, is pulling a water bottle from her pack a few feet away. Various friends are scattered along rock-cairn-marked trails through the uplands behind us, where the faint indentations of ancient highways, four hundred miles of them, extend to horizons miles distant. The whole country—sagebrush uplands, the canyon floor, the enclosing rimrocks, and the ruins with odd names that lie in every direction below—is a uniform tannish brown, the color of dust. Or perhaps the color of abandonment.

During the time of the Crusades in Europe this spot, and another on the east bank of the Mississippi River, just across from today's St. Louis, held the two largest cities in North America. Both, interestingly, were religious centers. With its ceremonial effigy mounds of lizards and serpents and a Stonehenge-like circle of upright timbers planted to mark out solstices and equinoxes, the city in the eastern woods—today we call it Cahokia—probably held a fairly permanent population of thirty thousand people, larger than London at the time. I first saw Cahokia in the early 1990s with



a girlfriend who had Missouri roots and insisted we visit the place. I'd seen mounds but never anything on the scale of Monks Mound, towering up out of the American Bottoms like an earthen Chichén Itzá pyramid. After three hundred years of urban life an earthquake mostly destroyed Cahokia city, but not before its population had gone through twenty thousand trees and almost all the wildlife for scores of miles around.

As for the city whose ruins lie below us now, either side of ten centuries ago (AD 800 to 1140) it was the Vatican of the American desert. We call it Chaco and it is another of our UNESCO World Heritage Sites. Chaco was the closest Native America ever got to an empire like those of the Aztecs, Mayans, or Incas. But this was not an empire of warrior armies and conquered provinces. It was an empire of priests, who organized many thousands of scattered farming hamlets across fifty thousand square miles of today's Four Corners Southwest into an economic and religious network. No European principality of the age matched it. What the priests promised was direct intervention with the deities who controlled rain, crops,

and animals, those grand imponderables whose presence made life good and whose absence ruined it.

The city of Chaco housed the priests, their families, and a resident population of thousands. It stored and distributed surplus crops. Then, at solstices and other special times of year, it hosted grand ceremonies to which the outlying residents made holy pilgrimages. At those times Chaco gathered a population of as many as forty thousand. Looking down now on its buildings and avenues, one suspects both the ceremonies and the nightlife must have been epic.

Chaco America almost seems foreign in the modern United States, as if lifted from the Middle East. The agricultural revolution arrived in this region 1,300 years before the city existed, and pollen studies indicate this development produced two immediate environmental effects. Human populations skyrocketed, and crops that needed to be boiled before you could eat them meant that daily cooking fires soon reduced a robust piñon-juniper woodland to desert. This became a world in need of priests who could intervene with the gods. Sitting and admiring the sprawling, hemispherical architecture of Chaco's largest structure, Pueblo Bonito, as its lines and shadows and religious kivas shimmer in the afternoon sun, I know this is a place that reveals much about humanity. Sara passes the water bottle over to me and, reading my mind, sums it up. "It wasn't until the 1880s that anyone built a larger building than that in America. In its time this city lasted longer than Washington, DC, has so far. But ultimately it just couldn't continue."

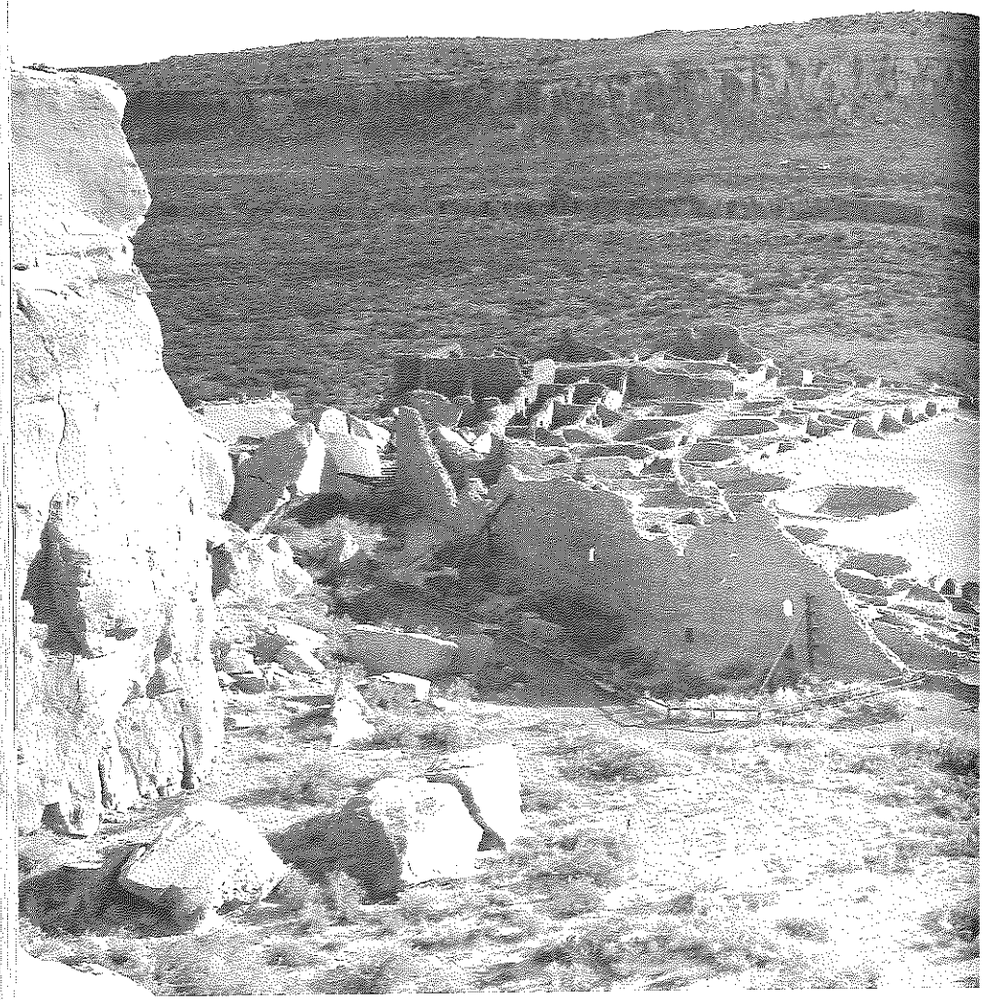
Chaco and its satellite hamlets survived for 340 years. The shorthand version of its collapse is that it all ended with a series of droughts across the Southwest, and that is true. But the many archaeologists who have interpreted Chaco know much more happened here. When the rains stopped coming, the farmers seemed to act abruptly, dropping their digging sticks in the fields, turning their backs on the grand religious gatherings at Chaco, and relocating across the Southwest. Some went north to what we now call Mesa Verde's Cliff Palace and long-since-abandoned towns like Sand Canyon and Castle Rock, in present Colorado. Most of the people who abandoned the Chacoan world congregated along the upper Rio Grande River, eventually founding towns still home to their descendants, the Pueblo peoples famous for their adobe apartment complexes, geometrically painted pottery, and turquoise jewelry.

Why did Chaco collapse in what sounds like a fit of pique? The evidence—and ultimately the response of the Pueblos afterward—points to a crisis we should recognize. Down there in Pueblo Bonito, a single room (out of 650) yielded the remains of fourteen people, whose funerary items indicated they represented Chaco's religious/political elites. In the room were flutes, ceremonial staffs, thousands of pieces of turquoise jewelry, conch-shell trumpets from America's West Coast, the remains of macaw parrots from the tropics. The oldest burial dated to AD 800 and the last from Chaco's abandonment, so those fourteen spanned the entire life of the city. And not just that. The genetics of nine of the fourteen showed them to be descended from the same matrilineal line, from a woman who evidently had been there at Chaco's founding. Most of them had an intriguing physical anomaly, a sixth toe on one foot.

Disparities in wealth and quality of life, along with the resentments they produce, are familiar to modern Americans. Isotope comparisons of the bones of the priestly class in Chaco's great houses with those of farmers from the villages indicates the elites consumed far more protein from the meat of deer and pronghorns. They were better fed, grew almost two inches taller, suffered less from disease, had three times the survival rate for children under five, and lived longer. They were also obviously conspicuous consumers of high-status goods. In the late 1800s an early archaeologist working in Chaco shipped more than seventy thousand high-status items just from Pueblo Bonito to the American Museum of Natural History.

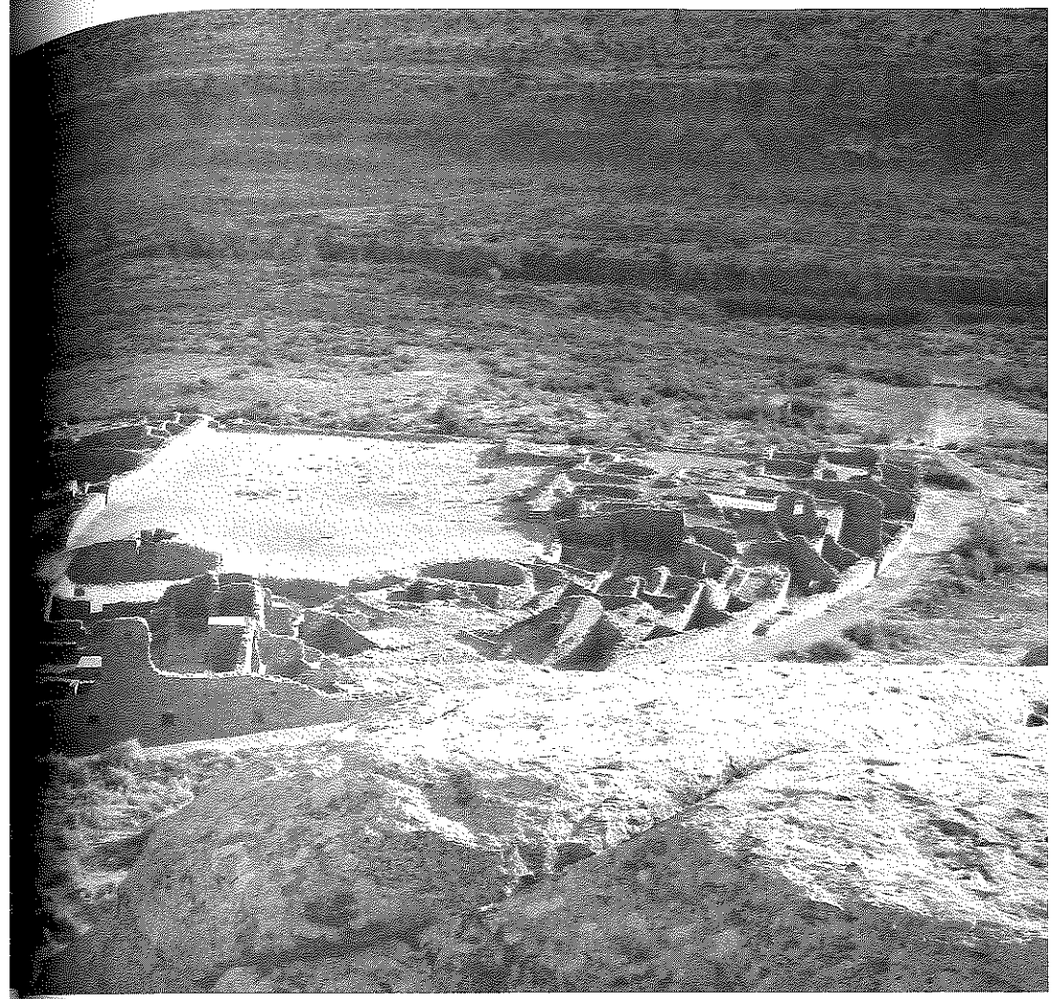
The farming class suffered this gap between rich and poor as long as the elites delivered on their promise to make it rain. But when drought came and the priests were powerless to stop it, the lower classes attacked and killed many in the upper class. They also embraced a new belief, the Kachina religion. Diet studies in the collapse's aftermath imply that by then rabbits and rodents were almost the only huntable animals left. The need for protein perhaps explains why some of the new villages were founded close to bison plains. At the most easterly of them, called Pecos, the diet and health of ordinary farmers soon approached that of the former Chacoan elites.

Those weren't the only changes the Pueblos made post-Chaco. The new communities they established were far more egalitarian, almost to the point of being collections of conformists. And a population that



Ruins of the Chacoan Empire, Chaco National Park. Photograph by Dan Flores.

had been growing for a thousand years now shrank and stabilized. An initial Spanish expedition among them in the early 1580s thought there might be 130,000 people in all their towns, but the founder of colonial New Mexico, Juan de Oñate, estimated only 60,000 in 1598. Chaco was in their memories, and it was disaster enough for them to change how they lived.



TEN THOUSAND YEARS after the Pleistocene ended, the human wooing of the Americas had produced large farming populations and empires in numerous places in Mesoamerica and South America. In what would become the United States there were echoes of those: Chaco, the Hohokam villages of present Arizona, the Hopewell tradition and Cahokia in the Midwest, and a version known as Spiro Mounds across the South. Agriculture meant dramatic population growth, so on the eve of European arrival, considering all the Americas as a whole—from the Arctic to

Tierra del Fuego—we think there were then sixty million people living out their lives, 20 percent of the global human population.

But north of the Rio Grande River, in what is now the United States and Canada, hunting/gathering cultures still prevailed across vast stretches of North America, and here the human population had not yet reached five million. Even with human numbers seemingly so slight, five hundred generations of humans had physically transformed North America. To the Native peoples the continent was occupied, settled, its birds, reptiles, and mammals all intimately known, considered kin. Even with fewer than five million inhabitants, parts of America held large enough numbers of people that wild animals weren't always abundant, as the earliest of the Old Worlders would discover. But, except for that extinct Pacific Coast flightless duck, all the species that had survived the Pleistocene still existed. Beavers continued to engineer a watery landscape, shorebirds and ducks filled the skies, and bears, wolves, and other predators still played their crucial role in American ecologies. Even with thousands of years of human harvest, bison and passenger pigeons were among the most numerous species on Earth.

But the change that was coming was on a scale no one could possibly fathom. Since the ice age ebbed and northern seas flooded Beringia, America's animals and humans had lived in near total isolation from the rest of Earth. No one on either side of the Atlantic had any inkling the other existed, or that such biological isolation sat ready to deliver one of the most profound tragedies in all history. When the planet's human populations finally rejoined after parting thousands of generations earlier, the America of Clovis and Folsom, Poverty Point and Chaco, bison and passenger pigeons, confronted a devastating transformation.

Raven and Coyote, Beaver and Speckled Eagle would never be able to turn things back to the way they had been.

CHAPTER 4

TO KNOW AN ENTIRE HEAVEN AND AN ENTIRE EARTH

After ten thousand years, how would you intuit that the world as you've known it is about to change forever?

Maybe you dream it, which at some insightful moment in the 1500s is how a group of Native people, located far inland on today's Lake Superior, first understood that everything was on the verge of shifting. In this band of Ojibwes, a prophet had a dream that disturbed him, and after taking a long time analyzing and thinking, eventually he shared it. In his dream strange people with baffling customs had crossed the big waters in canoes of giant size and landed on the distant coast, he said. They had pale skins and bushy hair on their faces, and knives that were frightfully sharp.

What else? his listeners asked. The strangers also possessed long, black tubes, the dreamer related, which they pointed at animals and birds, and from which smoke and a noise so terrific emanated that he was startled even in his dream.

In the version that has come down to us, the dreamer did not say what had befallen those animals and birds when the smoke cleared and the din faded.

THERE'S A GOOD CHANCE that by the time the Ojibwes sensed this impending alteration in their world, the unprecedented newcomers were already probing at various parts of North America. Fishermen and whalers from ports hundreds of miles across the great eastern ocean, which for so many centuries had isolated America from the human history unfolding on Earth's largest landmass, had been sailing west to exploit Outer Banks whaling and fisheries. Already by the 1520s, but far to the south of the Ojibwes, there had been shipwrecks of the giant canoes on North American coasts. By the 1580s the strange people with hair on their faces and black tubes that spewed thunder and smoke were coming ashore up and down the coasts, wearing bizarre garments and speaking languages no one had ever heard before. The natives tried to make themselves understood: Do you come for firewood to warm yourselves? some of them asked.

There is a theory of how first contact between cultures unfamiliar with each other unfolds and it bears a resemblance to biological first contact. The theory argues that making sense of new beings proceeds in two stages. In the initial stage you can interpret someone standing before you only through the history or knowledge already in your head. They may be in strange (or no) garb, vocalizing unintelligibly, gesticulating or making expressions and body-language signals you cannot decipher, but your reading of them rests on how your culture has prepared you to see. As a result, misses at this stage can be epic. In the science-fiction classic *The Sparrow*, written during the five hundredth anniversary of Europeans arriving in America, first contact with a civilization among the stars happens when a scientific and religious order on Earth receives a marvelous and beautiful auditory signal from space. Interpreting it as a musical tribute to the deity, Earth dispatches a ship that includes a religious ambassador entrusted to make first contact. He discovers that the gorgeous music that lured Earthlings across vast distances is indeed poems sung into space by a planet's beings, who are joyous he has come and expect joy from him.

In first contact's second stage, both sides produce a more realistic assessment of each other. In *The Sparrow* Earth's ambassador realizes the songs that drew him across space are not in fact celebrations of God but tributes to lurid sexual encounters with the alien species attracted by the songs' aural splendor. The singers discover that a celibate Jesuit from

Earth doesn't react so joyously as expected. Similarly, five centuries ago American natives and Old Worlders widely misinterpreted one another and their motives at the outset. Over time they came to see each other with more discerning eyes.

In the next thousand years we Earthlings may have a chance to see first-contact theory in action if we encounter some new form of intelligence. For now, the confrontations that took place in America and on Pacific islands in the 1500s and 1600s are the most instructive examples we have. In the Caribbean, and on Atlantic, Gulf, and Pacific shores, natives isolated from the rest of humanity for fifteen thousand years now stood face-to-face with Europeans and Africans on missions of discovery, exploitation, colonization, and survival. The stakes for accurate mutual understanding could not have been higher.

But every encounter was filtered and mediated by the information already in peoples' heads. The most famous instance in colonial history was the conviction on the part of the Aztec king, Moctezuma Xocoyotzin, that the shocking appearance and technological wizardry of the Spaniard, Hernán Cortés, was a fulfillment of a prophecy that their culture hero, Quetzalcoatl, would one day return from the sky. There are other remembrances from North America. On first encountering Europeans, the New England Abenakis believed they were seeing the cannibal giants of their ancient stories. Witnessing strange newcomers apparently unharmed by bewildering new afflictions devastating their own villages, Native peoples in Virginia concluded that Europeans were the spirits of their dead come back to life. Cabeza de Vaca, a shipwrecked Spaniard who would lead a small group of survivors on a trans-Southwest overland crossing in the 1530s, said the local tribes allowed them safe passage because the Europeans were wizards who could cure the sick and bring the dead back to life. Cabeza de Vaca didn't argue against that interpretation.

The misses were far from a one-way street. Encountering American natives, Europeans also struggled. Once they figured out America was not Asia but a new, unsuspected continent, they had to decode their religious and cultural beliefs that neither the continent nor its inhabitants were supposed to exist. As did these peoples they called "Indians," Europeans of the age interpreted the world through religion, in their case a religion that had spread during the Roman Empire's colonization efforts throughout Europe a thousand years earlier. The Judeo-Christian tradition sprang

from Middle Eastern agricultural and herding origins. Its first-cause deity resembled a human and he presided over Earth from somewhere in space. Springing from a highly localized beginning, this religion had nothing to say about the wider world Europeans now confronted. America, its peoples, its often bizarre new wild animals were entire mysteries.

Ransacking their religious stories for clues, Europeans could come up with only one, a reference in the first volume of their sacred text (the Old Testament, 2 Kings 17:6) to "ten lost tribes" that had left the Middle East, were never heard of in the known world again, and never returned. It was well into the 1800s before the idea that Indians must be descendants of Old World Hebrew speakers crashed on the rocks of reality, but reality didn't prevent the American-born religion of Mormonism from emerging out of the puzzlement of first contact.

With so little to go on, Europeans, seeing tattooed Americans wearing odd hairstyles, clothing fashioned from the skins of strange animals, and feathers from unfamiliar birds, drew on the memories of their religious traditions and history. This was how European pagans whose nature religions Christianity had long ago defeated once looked and acted. On the southern shores of the new continent, the shipwrecked sailor Cabeza de Vaca wondered if these Indians were in fact rational beings. The Gulf Coast peoples he was among regarded their dreams as more real than waking reality. The Spaniards discovered that if the natives dreamed you had committed some offense, the dream itself was sufficient evidence of guilt.

The conclusion came readily. These were people who had never heard of the deity Old Worlders called "Jesus." They apparently regarded animals as sacred and godlike and believed dreams could convict someone of a crime. They believed in sexual freedom for both men *and* women, and readily acceded women's right to divorce. Therefore, the newcomers concluded, these Indians must be disciples of the supernatural force the colonists believed a source of evil. Almost no Native peoples, with the exception of a northeastern group Europeans called Iroquois (Haudenosaunee), believed there was "an evil force" in the world. But if Indians embraced animal deities and knew nothing of Jesus then they must worship Satan. The European conviction that people holding nature sacred worshipped the dark forces of the world led to tragedy on numerous occasions. It also produced violent backlash by Native peo-

ple, like the Pueblo Revolt in the Spanish Southwest, when persecuted Native shamans led an uprising that banished all Europeans for more than a decade.

First-contact theory predicts these kinds of wide misses, cultural misconstructions based on the idea that "truth" is found in one's own belief system. But with more experience with each other, evidence-based conclusions eventually replaced most predetermined reactions. Spending time among Europeans, Native people determined the newcomers were not a realization of their storied traditions and prophecies. They were merely a group of ordinary humans, previously unknown, who for some reason possessed interesting and effective tools that possibly could provide new ways of controlling the world. By the 1620s and 1630s, as Native people watched the newcomers struggle to learn Native languages and saw them appear helpless living off the land, savvy observers formed an even more unflattering impression. The highly intelligent Huron (or Wendat) headman named Kandiaronk, who debated the Jesuits who were attempting to convert his people to Christianity, apparently traveled to Europe and appeared as Native antagonist in a widely read 1703 book about the relative merits of Native and European worldviews. He concluded that while Europeans possessed many remarkable technologies, as a group they seemed generally dim-witted, greedy, and ignoble.

In this second stage, European conclusions about the Natives soon enough settled on a new assessment as well. Native religions might matter to members of the European clergy, who would stubbornly continue efforts at converting tribal people to Christianity for centuries. But in the larger game that was now afoot in North America, the worldview of the Natives wasn't nearly as important as their obvious interest in the Old World technological marvels Europeans were unloading on American shores. The more experiences Europeans had with Native peoples, the more they concluded that, like themselves, Indians were self-interested and therefore rational. First contact, stage two, now revolved around a new question: Exactly what were these Indigenous Americans willing to trade for a transformative technology? Looking around themselves at this wild new world, the newcomers thought they saw an answer to that question.

WHEN HE LEFT his hometown in southern Spain in 1527, Álvar Núñez Cabeza de Vaca never imagined himself the future author of a North American first-contact chronicle. A young man who curiously bore his mother's last name ("Cow's Head"), he had somewhere acquired a well-rounded education. He also had good contacts. The king himself had made him treasurer of a major expedition to the southern coast of North America, no small thing. It turned out a good head for figures was wasted on the Narváez expedition to colonize Florida, which ended up a running disaster of Shakespearean proportions. Six hundred settlers aboard five sailing ships set out from Mexico. Four years later three Spaniards and an African remained.

History's revered first impression of North America, handed down by French, English, and Dutch observers in the century to come, would be of a "virgin" continent, with exotic animal and bird life in staggering abundance. But Spaniards like Cabeza de Vaca were in America earlier, and for both Native people and wildlife those few decades between the 1520s and 1620s were more critical than anyone knew. The dwindling cadre of shipwrecked Spaniards who struggled in sodden horsehide rafts along the Gulf Coast from Tampa Bay to Galveston Island in the late 1520s, then pitched up on the Texas coast, experienced a different America than later Europeans would. A century before the Pilgrims and Puritans, this version of the "New World" seemed less like a virginal Eden-of-the-Animals than a place long lived in and a bit used.

Cabeza de Vaca and his companions experienced a combination adventure/ordeal that stretched out to eight years, from 1528 to 1536. Initially, as their ships wrecked and their expedition collapsed between Tampa and Apalachicola Bays, the Spaniards found themselves under attack by the natives as the strangers rummaged the coast for cornfields, fan palms, and whatever wildlife they could find. There wasn't much, and it largely consisted of animals the Spaniards recognized from Europe. There were deer, bears, and lions, along with rabbits, hares, and "civet-martens." An "animal with a pocket on its belly" dismayed Europeans, who had never seen a marsupial before, but then the American opossum would puzzle colonists for the next 150 years. The coastal lagoons did hold vast numbers of birds. They saw geese, ducks, herons, flycatchers, and quail in great numbers, along with many different birds of prey soaring above the waters. But the wild creatures they saw

weren't numerous enough to feed them. They ended up killing and eating all their horses to keep themselves alive.

Eventually storm-wrecked on the sandy islands of the Texas shore, Cabeza de Vaca and a shrinking number of companions by turns were rescued, enslaved, and sometimes executed by the various tribes that found them, likely bands of coastal hunter-gatherers known as the Karankawas. In their first several years in America the few Spaniards who survived lived among peoples who seemed regularly short of food. "For three months of the year" everyone ate nothing but oysters. Deer and other wildlife were so scarce that it seemed an accident that anyone possessed a deerskin. Many times, Cabeza de Vaca wrote, "I was three days without eating." The fat season was when the tunas of the prickly-pear cactus were ripe, but that season lasted only three months. This seemed a long way from a New World Eden.

Two developments allowed the final four surviving castaways to escape their lives of privation. First, "I set to trafficking," Cabeza de Vaca said, by which he meant that he became a trader, which exposed him to a larger world inland. And as a result of a classic first-contact misunderstanding—and tragic circumstances early Europeans unwittingly were about to release across America—all four Old Worlders discovered that in the eyes of the natives they had become sacred beings.

It happened this way. In Florida, some of the Spanish colonists had been ill. Not long after the final shipwreck, the Indians surrounding them began to die from mysterious afflictions. Half the members of a band that took in the castaways died suddenly of a "disease of the bowels." This group blamed the Spaniards for their plight. But as Indians died and the castaways didn't, word of that strange circumstance began to spread. The Native conclusion was that the Spaniards must be wizards and healers. As Cabeza de Vaca would later write it, "They wished to make us physicians without examination or inquiring for diplomas."

This saved them. Hearing from inland groups that there were Christians like them far to the west and the south, the four still alive—Cabeza de Vaca, Andrés Dorantes, Alonso Maldonado (whose father in Spain actually was a doctor), and the African, Esteban—were able to launch a transcontinental crossing of what is now the American Southwest. A common passage in the account reads this way: "We left there, and traveled through so many sorts of people, of such diverse languages, the

memory fails to recall them." Cabeza de Vaca did recall that on their entering Native towns the residents rejoiced over the famous healers, hoisting them like heroes and carrying them "without letting us put our feet to the ground." The next day everyone in the towns would line up to be touched and cured. Word spread that they were "children of the Sun." (The tribes they traveled through were "all very fond of romance," Cabeza de Vaca wrote.) Eventually they moved through an increasingly desert landscape accompanied by a retinue of four thousand or more attentive to their every need.

What Cabeza de Vaca conveys in his remarkable first-contact account is the state of a Native America that had been lived in for at least fifteen thousand years. It's the story of a truly historic moment in time. In it America is not a "virgin" of any sort. The part of the continent Spaniards traveled through was brimming with people. As a result it was not always brimming with animal life.

As the healers and their followers moved westward they left the America most like Europe and entered the more Asia-like part of the continent. Here three kinds of "deer" (mule deer and elk now joined whitetails) appeared and became more numerous. One evening locals brought the healers five dressed deer each. There were also burly creatures the Spaniards called wild cattle, which their informants said sometimes migrated from a northerly direction all the way to Florida. Cabeza de Vaca saw these new and unfamiliar creatures only three times. They had small horns and "flocky" coats, he said. Some were tawny in coloring, others black. (The next Spaniard to write a description of buffalo, Pedro de Castañeda of the Coronado expedition, added intriguing additional details about this new animal: they had manes like lions, carried their tails over their backs "like scorpions," and were as numerous "as fishes in the sea.")

So populated was the America these Spaniards moved through that they stayed in "towns" virtually every night of their journey. But of the villages they visited, only among the "cattle" hunters—the most southerly peoples who lived among buffalo—did the Spaniards get a sense of American Natives who lived very well off a great surplus of wild animals. This "Cow Nation" seemed rich, with many skins to gift. "They had nothing they did not bestow." One of the Spaniards, Dorantes, traveled farther north and found himself among the farming masters of the Southwest, the Pueblo descendants of the Chacoan Empire. These, he said, lived in

"the fixed dwellings of civilization." That line in Cabeza de Vaca's account would spin off events ultimately leading to the founding of the Spanish Southwest and luring a steady stream of incoming Old World settlers.

Eventually the Spaniards reached Mexico, where frontier troops rescued them. They had lived through one of the Contact period's most harrowing experiences. With the advantage of our perspective, though, what might appear a grand adventure was a tragedy on an operatic scale. At the heart of Cabeza de Vaca's account are stories of Native people growing sick and dying of contagions the Europeans unleashed among them. Yet everywhere these agents of the Old World traveled they were among Native people who treated them—the source of those very maladies—not as pariahs. Instead they were holy men.

THE NEW PEOPLE began appearing in this ancient world in the 1500s. By the early 1600s, when Bartholomew Gosnold visited Cape Cod and (in the wake of Cabeza de Vaca's and Francisco de Coronado's travels) Juan de Oñate arrived to colonize New Mexico, the Old Worlders were coming in such numbers it was clear this was not a momentary thing. Native America had hardly remained static, but change had been slow. Now the pace of history began to accelerate.

Half a century after Cabeza de Vaca's rescue—the year was now 1584—a thirty-four-year-old English adventurer named Arthur Barlowe became one of the first Old Worlders to witness the Atlantic shore and write about what he saw. Barlowe was along on the first voyage to Roanoke Island, off the North Carolina mainland. The report he made to Sir Walter Raleigh on the natural bounty their party experienced became the initial template for a powerful idea that resonated down the centuries: Virgin America.

Barlowe's own first contact began on a bright morning in early July. As the white sails of their ships filled with a gentle west wind, America announced her presence before a single British eye ever registered land: "We smelt so sweet, and so strong a smel, as if we had bene in the midst of some delicate garden," Barlowe wrote. That smell was the very first sensory impression in the English version of the Wild New World.

The next day, as they tacked off the islands fronting the mainland, the explorers had vast flocks of white cranes rise beneath their ships with

a sound like an army shouting all at once. The woodlands they sailed past brimmed with deer, hares, and birds "in incredible abundance." An Indian they watched fish offshore filled his canoe almost to the point of sinking in half an hour. The Natives they met called the country "Wingandacoa" and related that years before, a large vessel similar to the ones now before them had wrecked on their coast. Their fathers had combed the wreckage for every metal nail and spike, which became some of their most treasured "instruments." Might these ships before them hold similar items? they inquired.

Indeed, they might. And what did the residents of Wingandacoa have in exchange for nails and other metal? the Englishmen asked. "Chamoys, Buffe, and Deere skinnes" was the answer, Barlowe said. A copper kettle brought fifty such skins. Hatchets, axes, and knives brought even more, and once the newcomers did a demonstration of sharpness and an ability to hold an edge, the Natives "would have given any thing for swordes." To the English the trade possibilities seemed limitless as the sky. As a wide-eyed Arthur Barlowe wrote, "I thinke in all the world the like abundance is not to be found."

The following year, 1585, a mathematician and astronomer named Thomas Hariot spent even more time in the land the British were now calling "Virginia." Only twenty-five, Hariot brought the excitement of youth and never-dreamed wonder to his effusive account of America's wildlife abundance. Yet from the start he had his eye on what this ecological diversity might mean for him. "All along the Sea coast," he wrote, "there are great store of Otters" that could not help but "yeelde good profite." America also appeared home to quite unbelievable numbers of whitetail deer. He marveled that "dressed after the manner of Chamoes or undressed [they] are to be had of the naturall inhabitants thousands yeerely by way of trafficke for trifles." There also were bears, wolves, lions, turkeys, and parrots. And (Hariot wrote), "I haue the names of eight & twenty seuerall sortes of beasts which I haue heard of to be here and there dispersed in the countrie." Who knows what animals he meant—bison? wolves? jaguars?—but bizarre creatures no one had ever heard of before, in either the Bible or any classical texts, hinted at the enormity of the exotic continent.

Without realizing it Hariot also left the beginnings of an explanation for why the wildlife of 1580s America appeared far more abundant than when Cabeza de Vaca had traveled the Gulf Coast sixty years before.

In every Native town the newcomers visited, he wrote, "within a few dayes after our departure . . . the people began to die very fast, and in short space." He went on: "This happened in no place that wee coulde learne but where wee had bene." To the English, this depopulation of potential adversaries was God's work. To the Native people it was a horrifying and inexplicable mystery. The affliction that killed them was "so strange, that they neither knew what it was, nor how to cure it; the like by report of the oldest men in the countrey neuer happened before, time out of minde." All anyone among either Natives or newcomers could tell for certain was that everywhere Europeans set foot in America, the local Natives died en masse almost within days.

While Virginia's Indigenous peoples marveled at new trade possibilities but saw their health collapse in the presence of Europeans, another momentous encounter unfolded even farther north. This one featured a classic, firsthand description of American wildlife in post-Contact times that further refines the view of America's transformation in the 1600s. Bostonian William Wood was fifty-four and the Puritan colony in Massachusetts only a decade old when his *New Englands Prospect* appeared in 1634. By this time the new arrivals were scattering across North America. Between 1565 and 1610 Europeans made settlements at St. Augustine in Florida, Jamestown in Virginia, Quebec on the St. Lawrence, and Santa Fe in New Mexico. As had happened in the Near Southwest and Virginia previously, everywhere they went a diverse Old World suite of diseases arrived with them to exploit what epidemiologists call "virgin soil" populations. Biologically isolated from the rest of humanity for many thousands of years, America's human population was now confronting diseases entirely new to them, to which they had almost no natural immunities. All the prerequisites were in place for a cataclysmic human population crash.

There was not only tragedy but irony in this incomprehensible loss of human life. As Native people died, America's wildlife underwent an explosive ecological release, the very phenomenon that produced the "Virgin America" mythology. By the time he was writing *New Englands Prospect* William Wood was documenting this old continent's new face as the Eden of Animals. The distilled source for John Locke's famous line, "In the beginning all the World was America," was at hand. But the true irony was that *this* America was not a survival of the primeval world, as

Locke and other Europeans assumed, but a place created by their own arrival and the biology that accompanied them.

In Wood's account, the English colonizers saw both the familiar and the inexplicable differences in many of the wild creatures they were seeing in America. As in England there were deer, but these were much larger than English deer and more brightly colored. Bears in America were "a great blacke kind of Beare." There were squirrels of three kinds, one of which actually "flew" from tree to tree. The hares were familiar. Not so "a beast called a Moose . . . as bigge as an Oxe," which put some overly optimistic settlers in mind of domestication. America's waterways held otters, martens, muskrats, and beavers. Of the latter, Wood wrote that "the wisedome and understanding of this Beast, will almost conclude him a reasonable creature." There were "terrible roarings" in the deep woods, which the English judged to be "either Devills or Lyons." Wood thought lions the better possibility. There were many, many birds, ranging in size from "one of the wonders of the Countrey," a minuscule bird "no bigger than a Hornet" yet as "glorious as the Raine-bow." These were called "Hum-birds," he told his readers, because the humming sound they made even when they hovered was a common music in America.

At the opposite end of avian size were very impressive eagles. One eagle seemed familiar, but the other "is something bigger with a great white head, and white tayle." There were wild turkeys of prodigious size, "much bigger than our English Turky." And the sensory impression these animals made on the European mind? Wood's words convey his main point: (deer) "there be a great many," (bears) "they be common," (squirrels) "there be the greatest plenty," (moose) "so fruitful . . . a great store of them," (wild turkeys) "forty, threescore, and a hundred of a flocke," (ducks, geese, and partridges) "in great abundance."

Then there were the pigeons, "something different from our Dove-house Pigeons in England." Wood knew that Old Worlders, who had devastated so much of their wildlife centuries before, would scarcely believe what he was about to say, but no better example of America's stupendous wildlife existed. In the "beginning of our Spring," he wrote, "I have seene them fly as if the Ayerie regiment had beene Pigeons; seeing neyther beginning nor ending, length, or breadth of these Millions of Millions." Nothing—the shouting of onlookers, the rattle of gunshots, nothing—could deter their flights, which sometimes continued without break for

Black bear. Photograph by Dan Flores.

five hours or more. Where they nested, so dense were their gatherings that "the Sunne never sees the ground in that place."

In case any of his readers were especially slow-witted Old Worlders, Wood laid out in plain language what the possibilities might be. All this vast number of creatures could without asking permission of anyone be killed and harvested and turned to entertainment and profit. Passages like that fell like manna from heaven to Europeans, whose feudal system had reserved wildlife exclusively for the nobility. Many of the Native people lay dead "like rotten sheep" in their towns, he said, but to procure the skins of America's furbearers Europeans could turn to the Indians who survived, "whose time and experience fits them for that imployment."

Wood made one additional comment about a very specific animal that would have caught the attention of every European, for the abundance of this one in America gave all potential settlers pause. This was the wolf, which struck Old Worlders as a very special problem. True enough, these seemed somewhat different from wolves in Europe's fairy tales and memories. In America "it was never knowne yet that a Woolfe ever set upon a man or woman." Neither did wolves seem interested in English horses or cattle, although they did sometimes attack pigs, goats, and calves.

American beaver. Photograph courtesy Ben Goldfarb.

But wolves in such numbers were unexpected. From the very beginning Europeans fantasized about the volume of deer, moose, and bears they could exploit if only something could be done about the wolf. Wood may have been the first to express the sentiment: "It is not to be thought into what great multitudes" all these animals might increase "were it not for the common devourer." Innocent of future notions like coevolution, ecology, or keystone predators, Wood was just the first of many to imagine how wonderfully splendid a wolf-free America might be. But in 1630s New England he despaired. When it came to wolves, there just was "little hope of their utter destruction."

Wood's judgment about his fellow settlers' and their descendants' ability to deal with wolves turned out to be a spectacular miss.

THE WOLF, then, from the start of colonization became a special animal for Europeans. Colonists who came from France or Spain still knew wolves firsthand, but England's last wolves hadn't endured beyond the 1400s. Virginians and New Englanders were living among wolves for the

first time in their lives and as William Wood implied, they didn't like it in the least.

Eastern wolves (*Canis lycaon*), found in northern New England, and red wolves (*Canis rufus*), which ranged from Texas to southern New England, were the "common devourers" Wood warned about. Animals in the sixty-to-one-hundred-pound range, these Gulf/Atlantic wolves were ancient American canids distinct from the gray wolves farther west. Some were grayish, others cinnamon-buff, and others black. According to recent genomic science, black coats in America's wolves sprang from a hybridization event between wolves and domestic dogs in the northwest of the continent approximately thirteen thousand years ago, during Clovis times. That mutation had also conferred a fitness advantage, perhaps in disease resistance, that other wolves sensed. The visual clue of blackness then affected mating choice, allowing black wolves to greet Europeans on Atlantic shores thousands of years later.

For a people who at one time lived among wolves, Old World settlers seemed to know precious little about them. Their knowledge of predators came from their herding-culture religion, but handed-down folk knowledge also shaped their understanding. While Abenakis and Narragansetts admired wolves for their bravery, hunting skills, and devotion to mates and packs, Europeans saw the same wolves as degenerate cowards, the very definition of evil in nature. Folk stories of werewolves, memories of the human–wild animal therianthropes from the Paleolithic, still circulated in colonial times and may have fed a suspicion that wolves were avatars of a bestial nature in humans. All the folk stories, all the biblical passages about "ravening" wolves must have been confusing when America's wolves showed no aggression toward people. That didn't matter. Fresh encounters with wolves in America lent the canids a reputation for "cowardliness" but didn't quell the hatred. That hatred matters now, because it's difficult to look back on this history without feeling moral outrage about how the unsuspecting animals must have experienced colonialism.

Real wolves bore little resemblance to the animals in the stories Old Worlders brought to America. Devoted to social life, wolves spent their lives in family packs of related animals led by high-status breeders, or alphas. Wolves avoided breeding with close kin, so a pack's grown pups eventually moved on in search of mating opportunities. While they had

individualistic personalities, like young humans wolf pups learned from their elders and were much influenced by pack culture. Wolves are emotional animals, strongly attached to one another. After absences they greeted by standing on their hind legs and "rallying," and they interacted with a remarkable range of body language and facial expressions. When they howled, with heads thrown back and muzzles elevated, they sang a timeless symphony of the continent. For wolves, howling was a way to express emotional states. Howling was also contagious and enabled them to recognize other wolves from the harmonic structure of their songs.

Wolf natural history and human natural history readily explain why tamed wolves became our first companion animals. Our social lives and ecological niches were similar. Wolf societies were configured much like hunter-gatherer bands. In both instances the leadership tended matriarchal. While the alpha female wolf directed the pack's movements, the larger males—especially those between about two and five years old—were the primary hunters. Wolves mated in February and bore four to five pups in April, and the pack, often including experienced wolves as old as eleven or twelve, raised and educated the alpha female's pups, plus any born to lower-ranking females. The population of wolves in a given region rested on food availability. That didn't just determine pup survival, it also meant that packs competed with one another for prime prey territories. Before Old Worlders arrived, in fact, the main mortality in wolves came from other wolves.

Europeans imagined America's wolves as vicious, efficient monsters of the kill, routinely murdering prey merely for fun. In the real world a very different process was playing out. Although they have strong jaw muscles, the geometry of wolves' long muzzles actually inhibits their bite force. And chasing down and neck-wrestling big animals armed with hooves and antlers is dangerous in the extreme. So wolves, like us, went for low-hanging fruit. They scavenged animals already dead when possible. Highly perceptive about cost-benefit, on the hunt they tried for fawns and young animals, or injured or old ones. Their strategy was to test prey in search of those least dangerous, the ones that offered the least resistance. Even then, among the whitetail deer wolves were primarily hunting in the eastern and southern forests of colonial America, their chase success could dip as low as 10 percent.

As for murdering for fun, sometimes wolves caught deer yarded up

Black color-phase wolf. Courtesy Shutterstock.

in winter snows or caribou on their calving grounds and killed several in a flurry. But their practice was to return and feed until the remains were gone. Nonetheless, stories of sport or surplus killing circulated about wolves as something common and criminal enough for punishment. What the new settlers really wanted was for America's wolves to disappear. Even before William Wood fantasized about a wolf-free America, the Massachusetts colony passed the first wildlife law in American history. It was a one-penny bounty on wolves, the first extermination attempt of a great many to come.

The aspiring naturalist John James Audubon left the future a chilling account of how wolves experienced the new war Europeans were about to level at them. This was in 1814, when the attitudes of Americans toward wolves had hardened into a rare viciousness. Spending the night with a farmer on the Vincennes Trace, Audubon accompanied his host to a capture pit that held three wolves. The wolves' sin? They had attacked the farmer's loose stock in a country by then bled of almost all its deer, bison, and elk. From his colonial forebears this farmer had learned exactly how to respond. Climbing into the pit, he one by one severed the wolves' hamstrings with a knife, "exhibiting as little fear as if he

had been marking lambs," Audubon wrote. Then he dragged the wolves out so his dogs could tear them to pieces.

Audubon helped him pull up the largest, a black male wolf in the prime of life. Audubon described this beast of Old World horror stories as "motionless with fright, as if dead, its disabled legs swinging to and fro, its jaws wide open, and the gurgle in its throat alone indicating that it was alive."

Petrified and in shock, the black wolf offered no resistance. It took the dogs less than a minute to stop the gurgling and extinguish his life.

IN 1683 the Dutch scientist Anton van Leeuwenhoek looked through the lens of a microscope and beheld a teeming world of bacteria and viruses no human had ever suspected before. Two hundred years earlier, when the first Europeans saw America, the mystery of disease had helped make their arrival a success they could only attribute to God. The truth was that a biology of unseen forms became the architects of colonial disaster for one people and triumph for the other.

Today we know that the human genome preserves snippets of genetic material from hundreds of viral and bacterial contagions from across our evolutionary history. Brucellosis infected Neanderthals butchering wildlife kills and that surely was not the first. The sources of most human diseases come not just from our ancient ties with the animals we hunted, and later those we domesticated, but from our evolutionary kinship with them as fellow creatures ourselves, which is what makes us susceptible to "spillover." So five centuries ago, unseen and unimagined viruses and other pathogens, evolved in the Old World and entirely novel to the New, were about to lay waste to humanity in the Americas.

Neither Europeans nor Native Americans had a clue that invisible agents transferred through plumes of breath or simple touch could be death sentences. The new colonists from Europe represented thousands of generations winnowed by Old World diseases, herd immunities, and selection for survivors. Eurasia is the largest interconnected landmass on the planet. Any animal disease that someone in the Middle East, Southeast Asia, China, India, or Europe contracted eventually diffused to almost everyone else on that giant landmass. That connectivity was the same

factor that had enabled the spread of cultural and technological ideas in the Old World. The Bronze Age, the Iron Age, the invention of gunpowder in China, sophisticated instruments of navigation from the deserts of the Middle East—all these breakthroughs rested on millions of minds sharing ideas that eventually spread across Eurasia. That's how Europeans arrived in America with iron and guns and all manner of new goods. Old Worlders also brought with them to America the original sources of many of Eurasia's pathogens. Their ships carried once-wild animal species their agricultural revolution had turned into domesticates. Sheep, goats, cattle, horses, hogs, chickens—all were now coming to America, too, bringing germs and viruses that were long ago spillovers from domestic animals to humans and long since mutated to transmit between humans. Now this invisible cargo was exploding among human populations with no immunities to any of it.

Almost nothing confirms our animal origins like our susceptibility to contagions from other species. In the twenty-first century COVID-19 is forcefully reminding us that 60 to 75 percent of our infectious diseases entered humans from other animals. Modern plagues like H1N1 influenzas come largely from hogs and chickens. HIV entered the human population from chimps. The coronavirus diseases—SARS, MERS, and COVID—jumped into us from bats, camels, and civets via (perhaps) pangolins. But four and five centuries ago horrifying disease epidemics were still indecipherable. You appealed to whatever god or gods you believed in and hoped against hope to survive.

Few accounts of infection in colonial America offer clear diagnoses of which disease or cluster of them was responsible. There were simply too many potential illnesses. The diseases Europeans inherited from animals charted out a domestication timeline. Humans carry twenty-seven diseases that originated in dogs, among them, worms of various kinds, salmonella, scabies, rabies. Those particular diseases would not have been novel to Native Americans, who'd brought dogs with them to America. And Native people had syphilis, which Europeans caught and took home. But cattle had infected Old Worlders with at least thirty-one diseases, including smallpox and tuberculosis, and those were brand-new to Native people. So were diseases from horses (thirty-one), from sheep (thirty), from goats (twenty-two), and from hogs (thirty-one). Domestic chickens and ducks contributed many of the crossover influenza viruses, which

along with smallpox apparently were major killers of Native people in America. Diphtheria, typhoid, malaria, and eventually cholera were also in the mix.

All these were as novel to Native people in the Americas as COVID is to twenty-first-century humans. If our modern projections are accurate the mortality rate for America's Natives reached 90 percent across the first century after Europeans arrived. Up and down the Americas a death rate that high, according to the latest estimates, means as many as fifty-six million people perished in the "Great Dying." They died badly, and bewildered. Deaths on that scale represented a shocking 10 percent of the human population of the planet. In North America a Native population approaching five million shrank in a century to about nine hundred thousand. Every demographic group was susceptible, but in many cases it was the young and healthy—exactly those who drove Indian economies and reproduction—who were struck down. Overwhelmed, their immune systems were thrown into the shock epidemiologists today call a cytokine storm. Under assault by an invasion of viruses and pathogens exotic to them, their own immunity likely overreacted and destroyed them.

With so many people suddenly gone, along with the fire ecologies they practiced and the immense hunting pressure they exerted, the colossal scale of the Great Dying disaster transformed the hemisphere. A mega-effect may have been an alteration in the climate. One of Earth's infamous climate anomalies in the past thousand years is the cold spell known as the Little Ice Age. Recent climate modelers have pointed out that the timing of this odd climatic alteration—1550 to 1850—suspiciously times up with the American disease holocaust. They've speculated that a sudden drawdown in hemispheric airborne carbon when fifty-plus million people reliant on fire died within a century may have precipitated three centuries of cool, moist weather. Anthropogenic combustion ceased and villages and farms rapidly reverted to forest, potentially soaking up enough carbon dioxide to chill the climate.

Whatever caused the Little Ice Age, it helped usher in ecological alterations that exploded the ranges and numbers of many of America's wild animals. The rapid buildup in America's animal populations occurred in the years from 1600 to 1800, exactly during the heyday of European colonization. The legendary "Virgin America" mythology those settler colonists and early naturalists bequeathed to American history sprang from

an ecological chain reaction, launched by one of humanity's most tragic biological disasters.

The human deaths didn't end magically in the colonial period, either. As they had done in Eurasia for millennia, measles, influenzas, smallpox, later diseases like cholera, continued to sweep across America generation after generation. A smallpox epidemic that began in Central America in 1779 took five years to reach all the way to Hudson's Bay, killing more hundreds of thousands. The folk-medicine creation of a smallpox vaccine from cowpox in 1798, when an English doctor made a critical observation about the immunity of milkmaids, couldn't prevent another smallpox epidemic in western America in 1837. That one nearly wiped out several entire nations, among them nationally famous Indian leaders and their families.

You should understand this about colonial America. The loss of human life and rebound of animal life set up much of our subsequent story. As Native populations collapsed and struggled to rebuild, and wildlife numbers soared in response, new peoples from distant shores were replacing the ancient inhabitants and becoming Americans. They saw all this freshly released abundance of wild creatures in terms of the main chance. Here was money to be made.

JOINING THE OLD and poetic "invisible realities" of the continent's original peoples, Europeans brought their own understanding of animals to America. This understanding was ancient. Some elements of it may have originated in the Pleistocene, when Europeans were killing off their own great bestiary. Europe also possessed a human past three times older than America's. And humans in Eurasia had developed the art of transcribing human speech into writing, which increased by orders of magnitude a precision in the accumulation of human knowledge down the generations. By the time North America became a colonial target, writing had turned knowledge into an eruption of information reaching back to the Greeks. That gathered information went along with settlers to Jamestown, to Massachusetts Bay, to French settlements on the Mississippi, to Santa Fe, and to California on the Pacific.

I was introduced to one element of the European worldview about

animals sometime around the age of five. Perhaps I was only four, because this is my oldest memory, and child-development experts say earliest memories are often those of four-year-olds. Whatever age I was, the outline and details have stuck with me, likely encoded into my neural chemistry when so much else was lost because this experience was an emotional one.

My parents lived in a small town in Louisiana only three miles from where my grandparents had a farm. Rural life and family indulgence allowed me to grow up surrounded by animals. I had puppies by five, who turned into an unceasing string of dog companions. At six I had a pet goat who followed my every footstep. I had horses by ten (a family photo shows me at that age sitting on my horse, Star, with my dog, Frito, as passenger). I don't recall any time in childhood when I didn't have animal companions. The first of them, though, was a little yellow chicken I called Chicky.

I didn't just provide water and feed that Chicky pecked from my stubby fingers. This chicken and I were playmates. Our primary game was chase, the high excitement of pursuit through home obstacles of tables, couches, sewing machines, tricycles. One day our chase game ended tragically. Somehow I miscalculated speed and moves and stepped on Chicky.

The death of my pet chicken was my introduction to a core of Old World beliefs Europeans brought to America. My mother and I, both of us heartbroken, gave Chicky a funeral in the backyard. With Chicky in the earth, between sobs I turned to my mom with one last pleading hope: "I at least get to have Chicky again in heaven, don't I, Mom?"

Heartbroken though she may have been, my mother was from flinty Midwestern Methodist stock and had a reputation all her life for delivering the unpainted version of things. Whether you were fifty or five (or four) didn't matter. "Why, no, Honey. Chickens don't go to heaven. They're different from you and me. They don't have souls. You were made in the image of God and have an everlasting soul, so you'll have a life after death and go to heaven. Animals don't get to do that. They just die."

No matter (as I would discover decades later) that the founder of Methodism, John Wesley, sometimes preached that animals possibly did have souls. Or that Joseph Smith and Brigham Young, who launched the Mormon religion my dad's family had embraced, held a similar idea. Mom

was channeling the more traditional conviction in Judeo-Christian theology and Cartesian science that we are not animals, and animals are not us.

FOUR CENTURIES AGO religion was the ultimate explanation of all things for almost all humans. Like Native peoples, Europeans in America generally understood animals in supernatural terms. But for Europeans the terms were their own. They did believe in invisible realities, but their worldview didn't include supernatural animals, didn't accord animals the ability to reincarnate, and included no provision for ceremonies that could cause animals to emerge in renewed numbers from the Earth. Our colonial ancestors most certainly didn't regard animals as close kin. Only humans were godlike and exceptional. But European religions did feature a supernatural creation for animals and included a couple of ideas Native peoples didn't find strange at all. Europeans believed all animals had a divine origin, which meant they had existed unchanged, exactly as they were in the present, since their moment of creation. Europeans also believed that because it was a god who had given animals the spark of life, no animal species had ever disappeared in the past nor could any species ever disappear, now or in the future.

The Bible was the primary source for settler ideas about the animals they found in America, but European views about animals went more deeply into the Old World past than Judeo-Christian books and teachings. It's hard to say just how far back. The Greeks are an obvious reference for Europeans of the colonial age, but it's difficult not to suspect that much of Greek knowledge may have come from preliterate times five thousand to ten thousand years ago, when inhabitants of Eurasia were starting to domesticate animals and herd them. Plato and Aristotle likely were codifying into written form ideas that many generations of earlier Eurasians had thought first. Nonetheless, Aristotle's *Historia animalium* is still our best origin source for many of the essential ideas about animals that Christian Europe incorporated, adjusted, and brought to America two thousand years later.

Plato and Aristotle began with an essential premise. There must be a deity, an invisible reality now missing in action, who had created the

Earth and everything on it. Plato investigated a critical distinction in this idea: that humans were earthy and animallike but clearly separate from other animals. The explanation for that separation must lie in a difference between us and them, ergo, an invisible and individual spirit in humans that permits us a connection to the deity. Looking at the orderliness and beauty around him, Aristotle sketched out that order into one of the most important intellectual ideas in Western thought. He called it the Great Chain of Being. At its pinnacle was the deity, accompanied on the immediate "chain space" directly below by spiritual assistants Europeans called "angels." All other divinely created life occupied the descending links in the Great Chain, with humans below the angels and other known lifeforms arranged in descending order of "perfection." Perfection translated into how useful a particular species was to humans.

The Great Chain of Being was a model of the known world that struck Europeans as so self-evidently true, and so useful a blueprint, that it survived in books, conversation, and peoples' minds from three hundred years before Christ until the beginning of the 1800s. You can say that for two thousand years, in one part of the Earth, at least, this became a deeply internalized imagining of how the world worked. Thinkers and ordinary people alike embraced its ideas both of a hierarchy and a constant biology. A deity had created everything all at once, everything that existed had a proper place, and most things existed because they had a potential use for humans. The world was divine and perfect and everlasting. These were big, reassuring ideas.

The settlement of America coincided with an unquestioned acceptance of the Great Chain of Being as the world's design template. Primarily that was because of the success the religion of Christianity had in replacing the older pagan nature religions across the previous thousand years of Europe's history. The authors of Christianity's sacred books had folded Greek ideas about the world into their texts, which now reached an endless parade of generations through sermons and services. So the vast majority of Europeans who migrated to Virginia or New York in the 1600s brought with them a herding culture's book that answered any questions they had about their proper relationship with animals, wild or otherwise. At the beginning of the Old Testament (Genesis 1:28), God gives Adam, on behalf of humanity, dominion over everything that lives. Further along in the story, when Adam's "sin" produces his "Fall" from

grace, some animals turn against Adam and his progeny. But in Genesis 9:2–3, the sacred book goes on to say: "The fear of you and the dread of you shall be upon every beast of the earth, and upon every fowl of the air. . . . Into your hand are they delivered." The next line—"Every moving thing that liveth shall be meat for you"—was Christianity's stamp of approval on self-interested human use of other animals. Two million years of human carnivory had found its justification.

The prevailing religion among colonists from Spain, France, and England didn't stop there. In the Judeo-Christian tradition, humans occupied an exalted place removed from other mere animals. Genesis (1:27) once again clarified things. God had made humans alone, no other creatures on Earth, in his own image. While animals ceased to exist when they died, humans had something that set us apart from all the rest of creation. That something Christians pronounced the "immortal soul" that promised life after death, secured by the culture hero Jesus's crucifixion and resurrection.

Europeans settled on "the soul" as the boundary separating humans from animals in deference to the Bible (and perhaps Plato), but also because other efforts to distinguish humans were unconvincing. We had the same internal organs as almost all other mammals. Standing upright was a doubtful badge of distinction when animals like bears could do the same, if more briefly. Speech was perhaps dubious, too. Animals did appear to have some form of communication among themselves. We were self-aware and aware of death, and other animals struck us as largely unaware, so we had that going for us. But our best bet at distinction seemed to be the soul. Unfortunately, souls turned out to be another invisible reality, difficult to locate or demonstrate. If we *had* emerged from the animal world—as some heretical thinkers believed—then either all animals had souls, which meant we weren't special, or we, too, lacked this key to immortality, producing the same conclusion. Europeans looked at one another and in the mirror and concluded that being made in the image of a deity and possessing an everlasting soul were what made us exceptional.

Starting in the 1630s, exactly the moment when Europeans were settling America, the French writer René Descartes guided Europeans to one additional step with respect to nonhuman life. On behalf of the new scientific method that would undergird the Age of Reason and the

Enlightenment, Descartes and his followers argued that animals didn't just lack souls, they were biological machines. They didn't appear to reason and didn't seem to be self-aware. More importantly, animals had no emotions and probably even lacked sensations. It was a way of thinking about animals that didn't threaten everything humans believed about themselves, including the immortal soul, which Descartes never questioned, and that subjected animals to exploitation without guilt. That wasn't the new empirical science's best opening move for exploring human-animal relations. Even many Europeans couldn't accept it.

Western civilization's premise of a benevolent creation struggled most with predators, which were on such widespread display in America. The Puritan rebel Roger Williams thought the American wilderness stood as "a clear resemblance of the world, where greedy and furious men persecute and devour the harmless and innocent as the wild beasts pursue and devour the hinds and roes." Pretty perceptive, actually. Greek philosopher Plotinus had long before contributed the idea that "amongst animals and amongst men a perpetual war" raged. But it took Christianity, building on that idea, to explain wolves and other predators as by-products of "the Fall." To the Greeks, predators and their victims completed the wholeness of creation. But to Christians, unhelpful animals were a curse one had to endure because of Adam's ancient transgression. When you'd herded domesticated animals for eight thousand years and religion was your way of understanding things, it wasn't a big leap to see wolves as a supernatural malediction. Since they could be destructive of human endeavors, predators clearly were evil. Adam's Fall was a likely and appropriate origin for them. Didn't wolves share the yellow eyes medieval illustration often gave to Satan?

Keeping themselves elevated above "mere animals" would become an all-encompassing project for Europeans arriving in America. Religious leaders especially saw a "savage" continent and the lure of reverting to "an earlier state" as perpetual threats to a civilization whose veneer seemed uncomfortably thin. Prim townspeople in colonies like Massachusetts Bay particularly frowned on the old human stories about therianthropes. They even refused to portray animals in their entertainment. Bestiality (although not incest, interestingly) became a capital offense in most colonies. Puritanical fears extended to the human body, whose lust was especially animallike, and those fears colored how some settlers thought of

other peoples, even how men thought of women, since females of the species struck some as closer to the animal state. Accepting sex and giving birth both seemed untactfully bestial.

Despite all this, or maybe because of it, the lure of the wild in America became irresistible to many.

THEN THERE WAS the class issue. Ordinary people who settled the European colonies had resented the upper classes for generations over access to animals. That had spawned the legend of Robin Hood, a folk hero who became England's most famous deer poacher, chased unceasingly by the authorities (and nowadays in the movies). So in the colonies one of the first celebrated "freedoms" associated with America was the freedom to "take" wild animals. Some Native leaders attempted to persuade colonial authorities to recognize that wildlife was *their* property, that whitetail deer were "the Indian's cattle." But the vast majority of ordinary settlers resisted the idea that wildlife belonged to anyone, including the tribes. Their view was that without the Old World markings of property ownership such as fences and signage, or wardens like the Sheriff of Nottingham, the American landscape was open to roam and hunt and all animals were accessible to everyone, free for the taking. Killed or trapped, an animal became one's own property. For the middling and lower classes of colonists, for the French and the English particularly, this kind of unimaginable access to the wild world was downright euphoric. It reawakened old yearnings in human nature and produced a pattern of action that dominated the human-animal story in America for the next three hundred years.

That pattern began with a natural abundance that, from what we can determine now, truly was stunning to everyone who saw it. Europeans began their settlement of America at the very moment when the continent's creatures were at their fullest expression since the spread of agriculture grew Indian populations three thousand years before. Some animals were expanding their ranges into whole new habitats. Bison and elk, those ancient Asians from the West, migrated out of the Great Plains into parkland and canebrake country in the Midwest and sometimes beyond the Appalachians and Alleghenies. The Spanish exploring expedition led by

Hernando de Soto never saw live bison in the Deep South in the 1530s. A century later, Europeans were encountering bison herds from Louisiana to Georgia to Florida.

No one knows how many animals the settlers built their farms and towns among. The numbers would have been highly variable across time because of weather patterns, winter severity, and habitat changes. America was in a rapid state of change, with fewer Indian-set fires, and with forest clearing and new fences going up among settler private holdings. But a few brave ecologists have speculated. According to some of the most recent estimates, in the 1600s North America held as many as 62 million whitetail deer along with 5 to 13 million mule deer. Caribou existed in a hundred discrete herds that hovered around 3.5 million. Bison numbers were in the range of 22 to 30 million on the Great Plains, with another 5 million spilling eastward and westward. There were between 15 and 35 million pronghorn antelope on the plains in the 1600s and another 6 to 10 million west of the Rockies. Elk numbers, released and growing as a result of Indian depopulation, grew to 2 million from the Rockies westward and another 2 million from the plains eastward. Bighorn sheep numbered as many as 2 million. There were at least 50,000 grizzly bears in what would become the Lower 48. And wolf numbers—gray wolves in the West and eastern and red wolves in the East—exceeded 3 million animals across the same territory.

Those kinds of figures might be impressive, but standing alone they don't really convey a sense of what it must have felt like to be among numbers of animals like that. A century ago, though, one of America's pioneer ecologists, Victor Shelford, captured things considerably better with this estimate. He calculated that for settlers in Connecticut, New York, Virginia, or the Carolinas, in the early 1600s an average ten miles square of America harbored four hundred whitetail deer, fifty to two hundred wild turkeys, one to three wolves, three cougars, five black bears, and three hundred to six hundred beavers, the last depending on how well watered the ten-mile square happened to be.

How did people—the majority of them, at least—who had been cut off from nature and wildlife for generations, whose religion taught them that animals exist for human use, whose science told them animals have no emotions or sensations, and who started their whole trajectory as evolved carnivores, anyway, react to that kind of abundance and diversity? The answer to that is the spine of a story that defines humanity's encounter with America's animals for the next three hundred years.

As the newcomers settled in, some rules of thumb gradually formed. Rule one was that local wolves or beavers lasted only five years. Rule two was that whitetail deer survived at most for a decade. Rule three: kill as many of all these as you possibly could, get your share before everything was gone. From the Big History perspective, there's some clemency in the fact that this was simply another example of what self-interested hominin carnivores had been doing to wild animals all over the world for two million years. Some of the colonies tried to regulate the hunt. They couldn't. The Massachusetts Bay Colony attempted to shut down the deer hunt as early as 1694 but didn't hire a game warden until forty-five years later. In 1698 Connecticut tried to stop the common practice of killing deer in the spring and summer when does were gravid or raising fawns. The colony of New York issued closed-season orders on several birds—wild turkeys, grouse, heath hens, and quail—in 1708. A decade later, alarmed by the disappearance of whitetail deer, Massachusetts tried to end hunting for those once wildly numerous animals for three years. These laws failed to produce a deer recovery.

The colonial wildlife crisis became so dire by the onset of the Revolution that in 1776 the British Crown actually moved to ban all further deer hunting in all the colonies except for Georgia. This was the first time in American history for a national government to try to effect a wildlife edict. Predictably, Americans despised it as an overreach and an attempt to rein in their freedom. Across most of the colonies it was too late for the whitetail herds, anyway. There would not be another federal try at a general wildlife law for more than a century.

In the mid-1700s a ninety-year-old American colonist lamented to a visiting European about the orgy-like slaughter of Atlantic Seaboard wildlife he'd witnessed in his lifetime. No one would even accept blame. When the animals disappeared, everyone pointed fingers at someone else. It was the Indians' fault, the colonists claimed. Or the fault of the French, or the Spaniards. As for the Native peoples, they blamed the whites. Or other tribes. Why have none of your governments passed laws against such a thing? the European asked. The answer was the summation of an emerging and enduring American sensibility. The "spirit of freedom" in America, the old colonist told the visitor, would never brook such an

infringement of individual action. Governments could pass all the animal laws they wanted, but his fellow citizens "would not suffer them to be obeyed."

JAMES FENIMORE COOPER'S 1823 novel about the settling of upstate New York, *The Pioneers*, looked back on this settler destruction of wildlife from the distance of the nineteenth century and found it appalling. Describing something like a colonial Burning Man rave around the massacre of a passenger pigeon flock that "the eye cannot see the end of," Cooper's literary version had pioneers firing guns into the sky without bothering to aim, striking birds out of the air with poles, even blasting into the frightened, wheeling flocks with cannon fire. No one pretended to collect the thousands of downed, fluttering birds until the shooters finally paid young boys to crush the skulls of the wounded birds and pick up a few. Cooper has his famed literary hero from better breeding, Natty Bumppo—who for his own use had downed a single flying pigeon with a single rifle shot—supply a condemnation of the pioneers' almost bizarre commitment to destroy: "It's wicked to be shooting into the flocks in this wasty manner." But another pigeon hunter, Judge Temple, expressed what by Cooper's time was becoming a national remorse: the hunters just "purchased pleasure at the price of misery to others."

There are historians who argue that the pioneers had good reasons for laying waste to America's wildlife. In the initial years the settlers felt truly threatened by wolves and bears, even by pigeons or parakeets that could destroy their hard-won harvests, or so the argument goes. Some of the most outrageous of their massacres of animals thus were "moments of perverse but joyous revenge" spawned by the hellish effort it had taken to create farms out of eastern forests filled with wild creatures. The stories that subsequent generations heard from families that had endured this period perpetuated a settler animosity toward the wilderness and its creatures. And they had a religion that gave them every rationale for taking revenge on a natural world whose vexations were born of Adam's curse.

The reality was that fashioning a privatized replica of Europe, trying to create farms and introduce domesticated animals and an orderly environment, ran head-on into the presence of America's wild animals,

Shooting Wild Pigeons, *in* Illustrated Sporting and Dramatic News. North Wind Picture Archives/Alamy Stock Photo.

which ignored Old World–style property boundaries and saw livestock with caution bred out of them as hapless sitting ducks. The diversity and abundance of America's animals undermined the colonization enterprise in another way, too. Teeming colonial-era animal populations not only drew many surviving Indian groups away from farming back to the hunt, they also sparked a kind of social de-evolution among the settlers themselves. Cooper's Natty Bumppo himself was an example. America seemed to afford such people one last chance at living the life hominins had forever known.

The woodsman types became America's first folk heroes. The most widely handed-down settler stories tended to be tales about those who had slain the fiercest, most dangerous wolves, bears, and lions, or killed the largest number of deer, pigeons, or beavers. These were the people, always masculine, who became the local avatars of the colonial enterprise, the Daniel Boones and Davy Crocketts, of whom there were untold thousands. Into the 1800s dozens of them left memoirs of their lives, which if nothing else demonstrate today that they were very good at the stoic assassination of animals. One hunter in New York claimed a lifetime

tally of 2,550 whitetail deer, 219 black bears, 214 wolves, and 77 cougars. Meshach Browning, a counterpart in Virginia and Maryland who liked to refer to his kills as "fights," estimated 1,800 to 2,000 whitetails, 300 to 400 black bears, 50 cougars, and "scores" of wolves. French writer Michel de Montaigne once wrote that hunting without killing was like having sex without an orgasm. Colonial America was his proof.

With the imprimatur of their religion and no restriction beyond Indian outrage and personal conscience about how far to push such a life, a vast number of young men from rural colonial towns did not deny the lure of it. The result across the English colonies from Georgia to New England, and among French settlers up and down the Mississippi, was inevitable. By the mid-1700s, as one pioneer wrote about the upper Hudson River Valley, "no deer, or other useful animal or next to none exist; and scarce a living creature is to be seen." Eastern forests that had swarmed with animals of every kind a century earlier were now "as still as death."

LIKE JAMES FENIMORE COOPER, Henry David Thoreau looked back on colonial history and felt personally injured. By the nineteenth century the list of creatures that had disappeared or drastically declined in Massachusetts since colonial times was shocking to anyone who paid attention. The Atlantic world's original penguins, the great auks, were entirely gone, driven to extinction. Whooping cranes and sandhill cranes were rarely if ever seen. The local inhabitants had pushed deer to scarcity and exterminated both wolves and wild turkeys. Heath hens, passenger pigeons, trumpeter swans, even pileated woodpeckers and ravens were rare and endangered. Reading accounts like William Wood's of the New England they both shared, but two centuries apart in time, Thoreau sat down to his journal one morning in March of 1857 and, as thought followed thought, not only compiled his own expanded list but realized his relationship to those losses with this stark line: "I am that citizen whom I pity."

"When I consider that the nobler animals have been exterminated here," he wrote, "the cougar, panther, lynx, wolverine, wolf, bear, moose, deer, the beaver, the turkey, I cannot but feel as if I lived in a tamed, and, as it were, emasculated country." He went on: "I take infinite pains to know all the phenomena of the spring, for instance, thinking that I have

here the entire poem, and then, to my chagrin, I hear that it is but an imperfect copy that I possess and have read, that my ancestors have torn out many of the first leaves and grandest passages, and mutilated it in many places."

No one else had put colonial history in quite this way, and no one since has said it so well: "I should not like to think some demigod had come before me and picked out some of the best of the stars," Thoreau wrote. "I wish to know an entire heaven and an entire earth."