

THE  
THIRD  
CHIMPANZEE

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*The Evolution and Future*  
OF THE  
*Human Animal*



J A R E D   D I A M O N D



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*Designed by Ruth Kolbert*

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## Blitzkrieg and Thanksgiving in the New World

THE UNITED STATES DEVOTES TWO NATIONAL HOLIDAYS, COLUMBUS Day and Thanksgiving Day, to celebrating dramatic moments in the European “discovery” of the New World. No holidays commemorate the much earlier discovery by Indians. Yet archaeological excavations suggest that, in drama, that earlier discovery dwarfs the adventures of Christopher Columbus and of the Plymouth Pilgrims. Within perhaps as little as a thousand years of finding a way through an Arctic ice sheet to cross the present Canada-U.S. border, Indians had swept down to the tip of Patagonia and populated two productive and unexplored continents. The Indians’ march southward was the greatest range expansion in the history of *Homo sapiens*. Nothing remotely like it can ever happen again on our planet.

The sweep southward was marked by another drama. When Indian hunters arrived, they found the Americas teeming with big mammals that are now extinct: elephantlike mammoths and mastodons, ground sloths weighing up to three tons, armadillo-like glyptodonts weighing up to one ton, bear-sized beavers, and sabertooth cats, plus American lions, cheetahs, camels, horses, and many others.

Had those beasts survived, today's tourists in Yellowstone National Park would be watching mammoths and lions along with the bears and bison. The question of what happened at that moment of hunters-meet-beasts is still highly controversial among archaeologists and paleontologists. According to the interpretation that seems most plausible to me, the outcome was a "blitzkrieg" in which the beasts were quickly exterminated—possibly within a mere ten years at any given site. If that view is correct, it would have been the most concentrated extinction of big animals since an asteroid collision knocked off the dinosaurs sixty-five million years ago. It would also have been the first of the series of blitzkriegs that marred our supposed Golden Age of environmental innocence, and that have remained a human hallmark ever since.

**T**HAT DRAMATIC CONFRONTATION came as the finale to a long epic in which humans, spreading out of their center of origins in Africa, occupied all the other habitable continents. Our African ancestors expanded to Asia and Europe around a million years ago, and from Asia to Australia around fifty thousand years ago, leaving North and South America as the last habitable continents still without *Homo sapiens*.

From Canada to Tierra del Fuego, American Indians today are physically more homogeneous than the inhabitants of any other continent, implying that they arrived too recently to have become very diverse genetically. Even before archaeology uncovered evidence of the first Indians, it was clear that they must have originated from Asia, because modern Indians look similar to Asiatic Mongoloids. Much recent evidence from genetics and anthropology has made that conclusion certain. A glance at a map shows that by far the easiest route from Asia to America is across the Bering Strait separating Siberia from Alaska. The last land bridge across the strait existed (with a few brief interruptions) from about twenty-five thousand to ten thousand years ago.

However, colonization of the New World required more than a land bridge: there had to be people living at the Siberian end of the bridge. Because of its harsh climate the Siberian Arctic, too, was not colonized until late in human history. Those colonists must have come from the cold temperate zones of Asia or eastern Europe, as

exemplified by Stone Age hunters who lived in what is now the Ukraine and who built their houses out of neatly stacked bones of mammoths. By at least twenty thousand years ago there were mammoth hunters in the Siberian Arctic as well, and by around twelve thousand years ago stone tools similar to those of the Siberian hunters appear in Alaska's archaeological record.

After traversing Siberia and the Bering Strait, the Ice Age hunters were still separated by one more barrier from their future hunting grounds in the U.S.: a broad ice cap like that covering Greenland today, but stretching coast-to-coast across Canada. At intervals during the Ice Ages a narrow, ice-free, north-south corridor opened through this ice cap, just east of the Rocky Mountains. One such corridor closed around twenty thousand years ago, but there had apparently as yet been no human in Alaska waiting to cross it. However, when the corridor next opened around twelve thousand years ago, the hunters must have been ready, for their telltale stone tools soon thereafter appear not only at the south end of the corridor near Edmonton (Alberta) but also elsewhere south of the ice cap. At that point, hunters met America's elephants and other great beasts, and the drama began.

Archaeologists term these pioneering ancestral Indians the Clovis people, since their stone tools were first recognized at an excavation near the town of Clovis, ten miles inside New Mexico from the Texas border. However, Clovis tools or ones similar to them have been found in all forty-eight contiguous states of the U.S., and from Edmonton in the north to Mexico. Vance Haynes, a University of Arizona archaeologist, has emphasized that the tools are much like those of the earlier eastern European and Siberian mammoth hunters, with one conspicuous exception: the flattish, two-faced stone spear points were "fluted" on each face as a result of a longitudinal groove having been chipped out to make it easier to bind the stone point to the shaft. It isn't clear whether the fluted points were mounted on spears to throw by hand, on darts to hurl by a throwing stick, or on lances to thrust. Somehow, though, the points were propelled into big mammals with enough force for the points sometimes to snap in half, or else to penetrate bone. Archaeologists have dug up skeletons of mammoths and bison with Clovis points inside the rib cages, including a mammoth from southern Arizona containing a total of eight points. At excavated Clovis sites, mammoths are

by far the commonest prey (to judge from their bones), but other victims include bison, mastodont, tapir, camel, horse, and bear.

Among the startling discoveries about Clovis people is the speed of their spread. All Clovis sites in the U.S. dated by the most advanced radiocarbon techniques were occupied for only a few centuries, in the period just before 11,000 years ago. A human site even at the southern tip of Patagonia is dated at about 10,500 years. Thus, within about a millennium of emerging from the ice-free corridor at Edmonton, humans had spread from coast to coast and over the entire length of the New World.

Equally startling is the rapid transformation of Clovis culture. Around 11,000 years ago Clovis points are abruptly replaced by a smaller, more finely made model now known as Folsom points (after a site near Folsom, New Mexico, where they were first identified). The Folsom points are often found associated with bones of an extinct wide-horned bison, never with the mammoths preferred by Clovis hunters.

There may be a simple reason why Folsom hunters switched from mammoths to bison: there weren't any mammoths left. There also weren't any more mastodonts, camels, horses, giant ground sloths, and several dozen other types of big mammals. In all, North America lost an astonishing 73 percent, South America 80 percent, of their genera of big mammals around this time. Many paleontologists don't blame this American extinction spasm on Clovis hunters, since there is no surviving evidence of mass slaughter—only the fossilized bones of a few butchered carcasses here and there. Instead, those paleontologists attribute the extinctions to changes of climate and habitats at the end of the Ice Ages, just around the time that Clovis hunters arrived. That reasoning puzzles me for several reasons: ice-free habitats for mammals expanded rather than contracted as glaciers yielded to grass and forest; big American mammals had already survived the ends of at least twenty-two previous Ice Ages without such an extinction spasm; and there were far fewer extinctions in Europe and Asia when the glaciers of those continents melted around the same time.

If changing climate had been the cause, one might have expected opposite effects on species preferring hot and cold climates. Instead, radiocarbon-dated fossils from the Grand Canyon show that the Shasta ground sloth and Harrington's mountain goat, derived from

areas of hot and cold climates respectively, both died out within a century or two of each other, around 11,100 years ago. The sloths were common until just before their sudden extinction. In their softball-sized dung balls, still well-preserved in some southwestern U.S. caves, botanists identified remains of plants on which the last sloths chomped: Mormon tea and globe mallow, which still occur around those caves today. It is highly suspicious that both those well-fed sloths and the goats of the Grand Canyon disappeared just after Clovis hunters reached Arizona. Juries have convicted murderers on the grounds of less compelling circumstantial evidence. If climate really was what did in the sloths, we would have to credit those supposedly stupid beasts with unsuspected intelligence, since they all chose to drop dead simultaneously at just the right instant to deceive some twentieth-century scientists into blaming Clovis hunters.

A more plausible explanation of this "coincidence" is that it really was a case of cause and effect. It was Paul Martin, a geoscientist at the University of Arizona, who described the dramatic outcome of hunter-meets-elephant as a "blitzkrieg." According to his view, the first hunters to emerge from the ice-free corridor at Edmonton thrived and multiplied, because they found an abundance of tame, easy-to-hunt big mammals. As the mammals were killed off in one area, the hunters and their offspring kept fanning out into new areas that still had abundant mammals, and kept exterminating the mammal populations at the front of their advance. By the time the hunters' front finally reached the south tip of South America, most of the big mammal species of the New World had been exterminated.

**MARTIN'S THEORY** has attracted lots of vigorous criticism, most of it centering on four doubts: Could a band of a hundred hunters arriving at Edmonton breed fast enough to populate a hemisphere in a thousand years? Could they spread fast enough to cover the nearly eight thousand miles from Edmonton to Patagonia in that time? Were Clovis hunters really the first people in the New World? And could Stone Age hunters really have pursued hundreds of millions of big mammals so efficiently that not a single individual survived, while nevertheless leaving little fossil evidence of their hunts?

Take first the question of breeding rates. Populations of modern hunter-gatherers on even their best hunting grounds number only about one per square mile. Hence, once the whole western hemisphere had been settled, its population of hunter-gatherers would have been at most ten million, since the New World's area outside of Canada and other areas covered by glaciers in Clovis times is about ten million square miles. In modern instances when colonists have arrived at an uninhabited land (e.g., when the H.M.S. *Bounty* mutineers reached Pitcairn Island), their population growth has been as rapid as 3.4 percent per year. That growth rate, which corresponds to each couple's having four surviving children and a mean generation time of 20 years, would multiply 100 hunters into 10 million in only 340 years. Thus, Clovis hunters should easily have been able to multiply to 10 million within a millennium.

Could the descendants of the Edmonton pioneers have reached the southern tip of South America in 1,000 years? The overland straight-line distance is slightly under 8,000 miles, so that they would have had to average 8 miles a year. That's a trivial task: any fit hunter or huntress could have fulfilled the year's quota in a day and not moved for another 364 days. The quarry from which a Clovis tool was made can often be identified by its local type of stone, and we know in that way that individual tools traveled up to 200 miles. Some of the nineteenth-century Zulu migrations in southern Africa are known to have covered nearly 3,000 miles in a mere 50 years.

Were Clovis hunters the first humans to spread south of the Canadian ice sheet? That's a harder question, and it's extremely controversial among archaeologists. Primacy claims for Clovis are inevitably based on negative evidence: there are no unequivocal human remains or artifacts with universally accepted pre-Clovis dates anywhere in the New World south of the former Canadian ice sheet. Mind you, there are dozens of *claims* of sites with pre-Clovis human evidence, but all or almost all of them are marred by serious questions about whether the material used for radiocarbon dating was contaminated by older carbon, or whether the dated material was really associated with the human remains, or whether the tools supposedly made by humans were just naturally shaped rocks. The two most nearly convincing of those claimed pre-Clovis sites are Meadowcroft Rock Shelter in Pennsylvania, dated to about sixteen thousand years ago, and the Monte Verde site in Chile, dated to at least thirteen



thousand years ago. Monte Verde is described as having amazingly good preservation of many types of human artifacts, but those results haven't yet been published in detail, so they can't yet be properly evaluated. At Meadowcroft there has been an unresolved debate about whether the radiocarbon dates are in error, especially because the plant and animal species from the site are ones expected to have been living there only much more recently than sixteen thousand years ago.

In contrast, the evidence for Clovis people is undeniable, is to be found in all forty-eight contiguous states, and is accepted by all archaeologists. Evidence for the still earlier settlement of the other habitable continents by more primitive humans is also unequivocal and universally accepted. At one Clovis site after another, you can see a level with Clovis artifacts and bones of numerous large extinct mammal species; immediately above (i.e., younger than) the Clovis level, a level with Folsom artifacts but with the bones of not a single large extinct mammal except for bison; and immediately below the Clovis level, levels spanning thousands of years before Clovis times, reflecting benign environmental conditions, and full of the bones of large extinct mammals, but with not a single human artifact. How could people possibly have settled the New World in pre-Clovis times and *not* left behind the usual trail of abundant evidence that convinces archaeologists, like stone tools, hearths, occupied caves, and occasionally skeletons, with unequivocal radiocarbon dates? How could there have been pre-Clovis people who left no trace of their presence at Clovis sites, despite such favorable living conditions? How could people have gotten from Alaska to Pennsylvania or Chile, as if by helicopter, without leaving good evidence of their presence in all the intervening territory? For these reasons, I find it more plausible that the dates given for Meadowcroft and Monte Verde are somehow wrong than that they are correct. The Clovis-first interpretation makes good sense; the pre-Clovis interpretation just doesn't make sense to me.

**T**HE OTHER HOTLY CONTESTED ARGUMENT OVER Martin's blitzkrieg theory concerns the supposed overhunting and extermination of big mammals. It seems hard to imagine how Stone Age hunters could kill a mammoth at all, much less hunt all mammoths to extinction.

Even if the hunters *could* slaughter mammoths, why would they *want* to? And where are all the skeletons now?

Certainly, when we stand under a mammoth skeleton in a museum, the thought of using a stone-tipped spear to attack such a gigantic tusked beast feels utterly suicidal. Yet modern Africans and Asians with equally simple weapons do succeed in killing elephants, often hunting as a group relying on ambush or fire, but sometimes stalking an elephant as a single hunter armed with a spear or poisoned arrow. These modern elephant hunters still rate as amateur dabblers, compared to the mammoth hunters of Clovis times, heirs to hundreds of thousands of years of hunting experience with stone tools. Museum artists like to depict late Stone Age hunters as naked brutes risking their lives to hurl boulders at an enraged charging mammoth, with one or two hunters already lying trampled to death on the ground. That's absurd. If any hunters had died in a typical mammoth hunt, mammoths would have exterminated hunters, rather than vice versa. Instead, a more realistic picture is of warmly clad professionals safely spearing a terrified mammoth ambushed in a narrow streambed.

Recall also that the big mammals of the New World had probably never seen humans before Clovis hunters, if the hunters indeed were the first people to reach the New World. We know from Antarctica and the Galápagos how tame and unafraid are animals that evolved in the absence of humans. When I visited New Guinea's isolated Foja Mountains, which lack any human population, I found the large tree kangaroos so tame that I could approach within a few yards of them. Probably the New World's large mammals were equally naïve and were killed off before they could have time to evolve a fear of man.

Could Clovis hunters have killed mammoths fast enough to exterminate them? Assume again that an average square mile supports one hunter-gatherer and (by comparison with elephants in Africa today) one mammoth, and that one-quarter of the Clovis population consisted of adult male hunters who each killed a mammoth every two months. That means six mammoths killed per four square miles per year, so the mammoths would have had to reproduce their numbers in less than a year to keep up with the killing. Yet modern elephants are slow breeders that take about twenty years to reproduce

their numbers, and few other large mammal species breed fast enough to reproduce their numbers in less than three years. Thus, it could plausibly have taken Clovis hunters only a few years to exterminate the large mammals locally and to move on to the next area. Archaeologists trying to document the slaughter today are searching for needles in a fossil haystack: a few years' worth of butchered mammoth bones among the bones of all the mammoths that died naturally over hundreds of thousands of years. It's no wonder that so few mammoth carcasses with Clovis points among the ribs have been found.

Why would a Clovis hunter even want to kill a mammoth every two months, when a five-thousand-pound mammoth yielding twenty-five hundred pounds of meat would provide ten pounds of meat per day per person for two months for the hunter, his wife, and two children? Ten pounds may sound like gross gluttony, but it actually approaches the daily meat ration per person on the U.S. frontier in the last century. That's assuming that Clovis hunters really ate all twenty-five hundred pounds of mammoth meat. But to keep the meat for two months would require drying it: would you go to the work of drying a ton of meat, when you could instead just go kill a fresh mammoth? As Vance Haynes noted, Clovis mammoth kills prove to have been only partly butchered, suggesting very wasteful and selective utilization of meat by people living amidst an abundance of game. Some hunting probably wasn't for meat at all but for ivory, hides, or just machismo. Seals and whales have similarly been hunted in modern times for oil or fur, leaving the meat to rot. In New Guinea fishing villages I often see the discarded carcasses of large sharks, killed only for their fins to make the delicacy shark's fin soup.

We are all too familiar with the blitzkriegs by which modern European hunters nearly exterminated bison, whales, seals, and many other large animals. Recent archaeological discoveries on many oceanic islands have shown that such blitzkriegs were an outcome whenever earlier hunters reached a land with animals naïve to humans. Since the collision between humans and large naïve animals has always ended in an extermination spasm, how could it have been otherwise when Clovis hunters entered a naïve New World?

**T**HIS END, though, would hardly have been foreseen by the first hunters to arrive at Edmonton. It must have been a dramatic moment when, after entering the ice-free corridor from an overpopulated, overhunted Alaska, they emerged to see herds of tame mammoths, camels, and other beasts. In front of them stretched the Great Plains to the horizon. As they began to explore, they must soon have realized (unlike Christopher Columbus and the Plymouth Pilgrims) that there were no people at all in front of them, and that they had truly arrived first in a fertile land. Those Edmonton Pilgrims, too, had cause to celebrate a Thanksgiving Day.