JUST PICK A NUMBER

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Selection of my topic for tonight began with my wandering around a bookstore and picking up a (then) recent book by Charles C. Mann, entitled simply 1491. It was purported to be a description of the condition in the Americas just prior to the arrival of Columbus.

I quickly became intrigued by the fact that many of the most obvious questions have yet to be answered. Who were the initial settlers of North America, from where did they come? How did they get here? How did they live and migrate once they were here? What was the ultimate population size? There has been, as I had expected, general agreement on the answers to these questions over the past few decades. The problem is that the answers change from decade to decade.

Before I begin this presentation, let me address one bit of terminology that will be used throughout. There will be repeated references to the original North American population, and I want to be sensitive with the names used in referring to this group. Many of the sources I read for this paper addressed the nomenclature issue, with the most common preferences being Native Americans and American Indians. These sources included, of course, some written by members of this group themselves. American Indian was the most commonly accepted term and that's what I will use. It should be noted however, that this name was given by Christopher Columbus when he mistakenly believed that he had landed in Asia when he arrived in America.

The Beginning

To embark on this investigative journey, I'd like to invite you to climb into the "way-back" machine with me, to the very beginning of human immigration into North America. We have a problem right off the bat, however. Currently there is no general consensus as to when or where that was.

The Oxford Handbook of North American Archaeology, published in 2012, begins by stating

"Little more than a decade ago, most American Archaeologists thought they knew when and how the Americas were first settled. Today, there are more questions than answers about the origins of the first Americans, a situation that has stimulated new ideas and reinvigorated theories once considered to be marginal. Much has yet to be resolved about when humans first arrived in the New World, how many discrete migrations took place, and precisely where these founding populations came from."

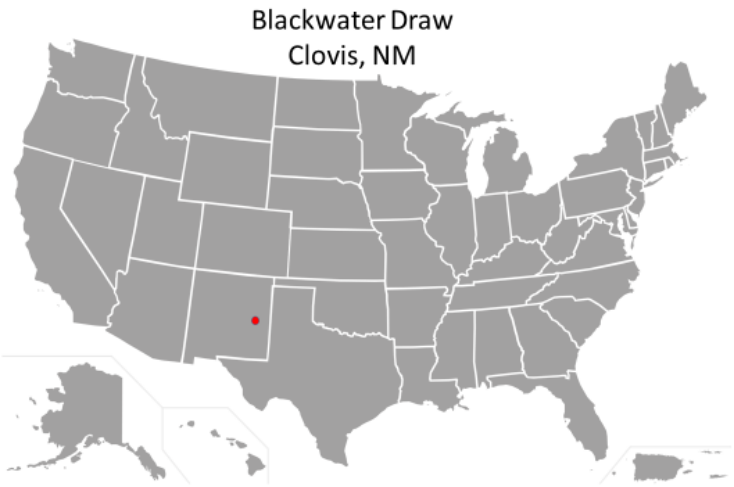
And in another quote, "The initial humanization of North America presents a nagging archaeological mystery. The various issues of who, when, and how the process unfolded have been 'solved' countless times, only to be refuted by the discovery of new sites, new dates, and theoretical developments."

For many years there was a prevailing view about the origins and pathways of American immigrants. The scenario was that Asian peoples came to North America via Beringia, a bridge of land between Siberia and Alaska that was exposed only during the ice age. This theoretical starting point was especially appealing in that it was not inconsistent with the religious position that all humans evolved from Adam and Eve. The accepted view was that the immigrants had made their way into North America about

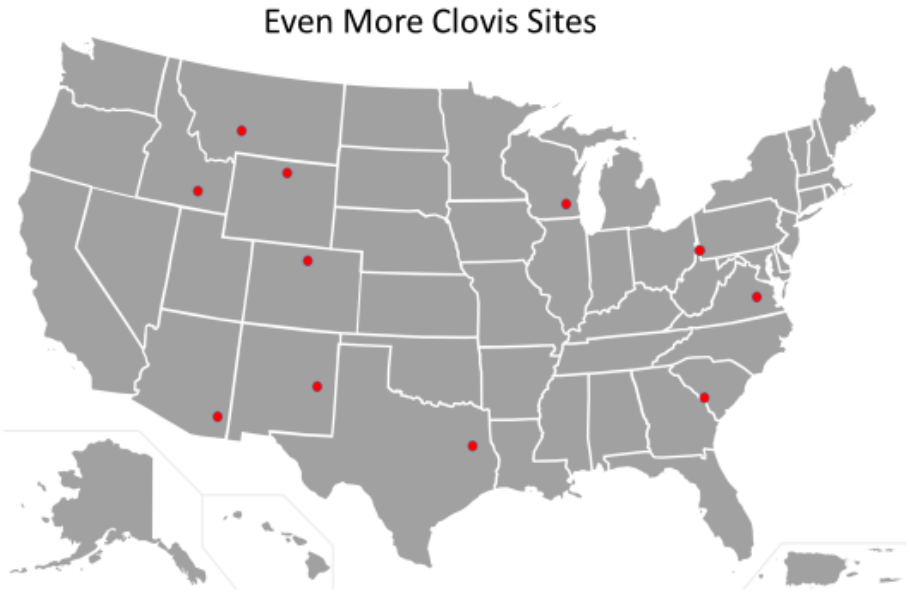
three thousand years ago. During the first quarter of the 20th century any discoveries suggesting that humans had arrived in the Americas prior to this time gave rise to much suspicion and heated debate. A leading proponent and staunch defender of the current thinking at that time was Ales Hrdlicka, then curator of what is now the Smithsonian Museum National Museum of Natural History. Any evidence to the contrary met strong challenge and accusations, and the provider of this evidence risked damage to his reputation and career.

In 1908, an ex-slave cowboy and ranch foreman named George McJunkin was riding across the Crowfoot Ranch, located about 8 miles west of Folsom, New Mexico, following a very severe thunderstorm. He noticed and investigated a number of large bones exposed where flash flooding had cut deeply into a creek bed. McJunkin was a self-educated man with enough interest in geology and archaeology to recognize that the bones were not modern bison and had been too deeply buried to be recent. For several years after, he tried to get field archaeologists to visit the site, and had no success. In 1918 McJunkin and the teenage son of the Crowfoot Ranch's owner dug some bones and a fluted lance point out of the river bank and sent them to the Denver Museum of Natural History. Finally, the museum sent a paleontologist to do some exploratory digging with McJunkin the following spring. At last someone was willing to look. McJunkin died in 1922. It was in 1926, four years after his death, that an archaeologist from the Denver Museum established that the bones containing the projectile point were those of a species of bison that had been extinct for 10,000 years. The theory that North American habitation had begun three thousand years ago was clearly threatened, and new theories were needed. Soon there were several explorations around the Folsom area.

Three years later, in early 1929, the Smithsonian received a letter from Ridgely Whiteman, a 19 year old who had been following the archeological activity in Folsom. Whiteman had found some immense old bones in Blackwater Draw, near Clovis, New Mexico. The Smithsonian sent someone to investigate, and he quickly dismissed the site as uninteresting. Others heard about and became interested in the findings, however, and within a few years they uncovered several relics like those from Folsom. More importantly, however, they found a lower strata with even older, more primitively made artifacts. The spear points in this lower strata were very different from those initially found around Folsom. This more primitive design became known as Clovis points, and the Clovis culture and was subsequently dated between 13,500 and 12,900 BP (that is before the present time).



Over the next few decades there were more than eighty new findings of Pliestocene (i.e. ice age) human presence across North America. All had either Folsom or Clovis points, and the general consensus was that the people of Clovis, the earlier of the two, must have been the original Americans and that Clovis, New Mexico was the center from which migration across America eventually took place.



In the 1960's the following scenario was developed and began to be accepted. The enormous accumulation of ice during the ice age had lowered the oceans of the world by as much as 400 feet, and the result was a large land bridge labelled Beringia that was many miles wide and connected Siberia and North America. Around 14,000 years ago, the ice age began to subside. This meant that temporarily (for a few hundred years) there was an inhabitable pathway between two ice sheets through Canada and down into the interior of North America.

This pathway gave rise to the “ice free corridor” version of immigration into North America.

In this version, over the next few hundred years the numbers of Clovis people grew to around 10 million and they spread throughout North America in their search of large game. This explanation was consistent with the archaeological findings to date and became generally accepted.

There was an alternate theory of immigration in the 1960’s in which the people, after coming across via Beringia, had taken a more southerly coastal route and then migrated across North America from west to east.

The major glaciers are thought to have receded sufficiently from the Pacific coastline to permit coastal migration around 17,000 years ago. Although not the most widely accepted theory, this coastal immigration scenario was also consistent with the Clovis findings. I should also note that both of these theories of western or northwestern entry points were consistent with the evidence that the ice sheet covering northeastern American had recently been as much as a mile thick. The ice free corridor and the "Clovis first" theories provided the explanation that was most widely accepted by far, especially among the leaders of the established scientific organizations.

The major problem with pursuing the coastal migration theory is the fact that global sea levels have risen nearly 400 feet since the end of the ice age. Much of the landscape through which the coastal immigrants might have travelled is flooded. There was very little evidence to support the coastal migration theory over the interior migration route because there were few artifact discoveries on the Pacific coast, and what was found was judged to not be consistent with migration from the Clovis area (and therefore discounted).

More recently, some stemmed points (distinctly different from the Clovis points) have been found in the Paisley Caves in south-central Oregon and dated to about 12,000 years ago (early in the period estimated for Clovis and the separating ice sheets). Some scientists now believe that California's North Channel Islands have been occupied by humans for at least 13,000 years. The points found on the Channel Islands are quite similar to some found in Japan and dated about 15,000 to 14,000 BP. While the shapes of the spear points were distinctly different, the differences in dates were not great enough to cause rejection of the ice free corridor and Clovis-first theories. Further, there still is little direct evidence of migration around Beringia and the western slope of North America, because that route would now be submerged on the continental shelves. While the geographic evidence was very hard to come by, a rapidly growing array of chronological evidence has been very important and persuasive.

In 1959 Penon Woman was found by an ancient lake bed near Mexico City, and she was recently dated at 12,700 BP. In 1975 a veterinary student visiting Monte Verde, Chile was shown a strange "cow bone" collected by nearby farmers who had found it exposed by some erosion due to logging. The bone proved to be from a mastodon, and subsequent excavation uncovered remains of a village of 20 to 30 inhabitants dated at 14,800 BP.

More recent findings on the site have been dated as potentially as early as 33,000 years old, but there is not complete agreement on that date. The importance of this discovery is that it demonstrates that if humans entered North America via Beringia they had made their all the way down to the southern portion of South America before the ice free corridor had opened up. Therefore the ice free corridor and "Clovis first" theories were thrown into disarray. Further, these discoveries encouraged archaeologists to not focus their exploration on Clovis era artifacts, but to dig further down in promising sites with some likelihood of unearthing even older pieces.

In 1975 a woman named Luzia was found in a cave near Belo Horizonte, Brazil and dated at 11,500 BP. Last year National Geographic reported on the discovery of Naia, a 12,000 to 13,000 year old teenage female found in an underwater cave on the Yucatan Peninsula. Some artifacts found in a groundhog burrow led to discoveries in Meadowcroft, Pennsylvania that were examined in the 1970's and 1980's and found to be 19,000 to 16,000 years old. In 2014 the New York Times reported on findings in Serra Da Capivara National Park, Brazil dated as early as 22,000 BP. An archeologist from the University of South Carolina has reported finding tools at the Topper Site in South Carolina and dating them at around 3,000 years before the Clovis culture. The Cactus Hill site, in southern Virginia is claimed to have yielded relics that are 18,000 to 20,000 years old. Buttermilk Creek, Texas, has yielded many pieces spread over a large area and dated to about 15,500 years ago. An underwater cave near the Big Bend area of Florida has yielded artifacts thought to be around 15,000 years old.

The current state is that few of these discoveries have achieved wide acceptance. Many doubt the dating methodologies and the conditions under which the relics have been unearthed and handled. The Monte Verde evidence has been the most compelling, and it, alone, has caused widespread rethinking of the Clovis First theory.

DNA technology has been used where possible. The current thinking is that almost all American Indians belong to one of four mitochondrial haplogroups, three of which are common in Asia. The Anzik burial site in western Montana was excavated in 1968. It held tools consistent with Clovis technology and the

remains of a one and a half year old boy about 12,500 years old. Examination of his DNA showed a connection to an estimated 80 percent of the Native Americans in both of the Americas, as well as being connected to ancestral peoples in Siberia or northeast Asia. All of this was supportive of the ice free corridor and "Clovis first" theories.

What appears to be emerging is the notion that there may be more than one answer to the immigration question. This is often couched as a "multiple wave" theory. While the Clovis explanation has much supportive evidence, it was not necessarily the first wave of immigration. Much of the older evidence is still questioned by the establishment, but there seems to be a growing acknowledgment that initial inhabitation of the Americas could have occurred as early as 50,000 years ago. In addition, at least some of the immigration may well have taken place along the coastal route. Some have proposed that very early immigration, before the largest ice accumulation, may have come from Europe along a northeastern route. Finally, others have argued that findings in South America are more consistent with peoples of Indonesia, and that some migration could have come directly across the water. People in the western Pacific were colonizing islands and making substantial sea voyages 50,000 to 25,000 years ago. This would be akin to the settlement of New Zealand and Australia from Asia. It is also consistent with similarities in physical characteristics and DNA with Southern Pacific populations.

Even though I have been throwing around dates and time periods in units of a thousand or ten thousand years, much of the thinking about the origins of the American population is only a few years (or even a few months) old. The best advice seems to be to just stay tuned for future developments produced by applications of refined exploration, dating, and DNA technologies. For now, however, if you want an estimate of the earliest migration into the Americas, JUST PICK A NUMBER.

The American Indian Populations

My effort to start at the beginning of North American civilization was totally ineffective. In this next section I will shift gears and attempt to examine the Indian populations and come up with an estimate of their maximum size. This is the question that caused my initial surprise with the uncertainty and the diverse range of answers.

I should also acknowledge that there seem to be some preferences and biases with respect to the accepted answer to the population question. If, for example, the American Indian populations are described loosely as small independent groups of wandering hunter-gatherers, then it is easier to conclude that they had no ownership rights over the land and that the Europeans' exploration and expansion activities were not so bad. Much of the study of early American history is broken into "historic" and pre-historic" eras, with the delineation being the existence of written records after arrival of the Europeans. This delineation has been claimed to lead to unfortunate biases. The processes of change in the historic era are presumed to have been caused by individuals and documented events that determined the course of human development. The processes of change in the prehistoric era are said to be evolutionary, in that human beings and events were not the determinants of history but were merely pulled along by it.

A major challenge of the study of Indian history is the lack of scale. The traditional cultures were determined in large part by the environmental conditions they faced.

In addition, lack of a central organizing force could have been due to the differing backgrounds across the multiple waves of immigration (if you buy that set of theories). At any rate, there were approximately 1200 distinct languages spoken by the Indian population, and this in itself would have resulted from great diversity and precluded higher levels of social organization.

Most of the questions about the preColumbian Indian population are masked by one disastrous truth… nearly all of the Indian population was eliminated by disease that came with the Europeans. Estimates are that native populations in the greater Southwest were reduced by as much as 90% prior to 1678. From a few incidents in which before and after population totals are known with relative certainty, researcher Henry Dobyns calculated that in the first 130 years of contact about 95 percent of the people in the Americas died.

Early estimates of the indigenous population had been done at the Smithsonian Institution in 1928. They were based on written records and official documents of the time of the arrival of Columbus. Original estimates of the size of the Indian population based on these documents were as low as 900,000 people for all of North America, a population density of less than one person for every six square miles. It soon became recognized, however, that in their first attempts at census taking, the Europeans had been simply counting and studying a few survivors rather than the thriving populations that had preceded them.

After the recognition of the dramatic population declines, subsequent population estimates were far greater, usually driven by the multiplication factor one used to account for the massive depopulation that had occurred. The magnitudes of the population declines were determined by many different factors, such as the settlement patterns, degree of isolation, population density, climatic conditions, and more. There was, of course some decrease in the population due to warfare, both with Europeans and with other tribes. In my reading, the effect of warfare is generally accepted as being not nearly as great as the epidemics. Any serious attempt to estimate the population had to take into account, to the extent possible, the culture and the local conditions and their likely effects on the impact of the epidemics. The

result of one such examination was that when Columbus landed, the central Mexican plateau alone had a population of 25.2 million. By contrast, Spain and Portugal together had fewer than ten million inhabitants at that time. Central Mexico, these researchers said, was the most densely populated place on the earth, with more than twice as many people per square mile as China or India.

Dobyns argued that the Indian population of the Americas in 1491 was between 90 and 112 million people, and others have estimated the number to be as high as 145 million. Thus, when Columbus sailed, more people lived in the Americas than in Europe. The total population of the earth at the beginning of the 16th century had been estimated at about 500 million people. If Dobyns' numbers were correct, disease killed nearly 100 million Indians, or about one out of every five people on the earth. The notion introduced by Dobyns and generally accepted was that the epidemics spread among the Indians even before European settlement. Initial contact with the Europeans introduced the disease that quickly spread among the Indian population, even to those who had not yet had European contact. This meant that throughout the Americas the whites were encountering populations and places that had already been depopulated.

An example of the disastrous effects follows the arrival of Hernando De Soto and his private army near Tampa Bay, Florida in 1539. De Soto arrived with six hundred soldiers, two hundred horses, and three hundred pigs. For four years his force marched across the southeast looking for gold and wrecking most everything they touched. In one encounter, they floated across the Mississippi and were watched closely by several thousand Indian soldiers. Indian villages were so close together that from each of them one could see several others. By one account, the Indians viewed these Europeans as "physically weak, sexually untrustworthy, atrociously ugly, and just plain smelly." (That was De Soto's army, not the pigs!) De Soto went on into what is now Arkansas and found it thickly populated with sizeable towns, each having earthen walls, moats, and accurate archers. De Soto simply demanded food and then left. No Europeans visited this part of the Mississippi valley for more than a century. In 1682 Frenchmen in canoes arrived, and they found the entire area deserted. Most historians believe that the source of contagion that decimated the area was not De Soto's army, but diseases carried by his three hundred pigs. Further west, on the Texas-Arkansas border the societies of the Caddo experienced a population drop from 200,000 to about 8500 (nearly 96%) between the visits of De Soto and La Salle.

Estimates were that the population of Central Mexico, set at 25.2 million just after Columbus, quickly fell to 730,000. Even later, the population of Native Americans in California fell from around 200,000 in the mid-nineteenth century to roughly 15,000 within the span of a generation or two. Disease and destruction and appropriation of subsistence areas reduced the NorthWest Coast Indian population of around 165,000 by at least 90 percent.

In addition to the uncertainty regarding population density, the rapid depopulation of the Indian societies limits our understanding of other aspects of these societies. It is now believed that the Indians had developed their environments substantially. They had shaped the necessary spaces through the use of fire. They had developed farming practices to control erosion. The destruction of Native Americans also destroyed these ecosystems that they had managed. Many open landscapes observed by the first Europeans quickly filled in with forests as Indians no longer burned the land for clearing. Perhaps many of what were considered virgin forests were the overrun of these previously cleared lands. There is also evidence that in many parts of America the bison became prevalent only after the Indians had died.

In spite of the inability to observe the Indian cultures directly, we have several importance pieces of evidence about their level of development. The Hohokam of southern Arizona were notable for their water management and the dense populations their agricultural productivity made possible. In use from

500AD until around 1450AD, their canal systems around the Phoenix basin had major trunk lines totaling 600 kilometers and watering as many as 100,000 acres. Maximum population estimates for the core area range from 25,000 to more than 100,000.

Cahokia was an Indian city located near St. Louis, near the confluence of the Ohio, Mississippi, and Missouri rivers. Its population of at least 15,000 made it comparable in size to London. There were several mounds, with the largest being Monk's Mound, a large earthen slab covering almost 15 acres. This was a largely agricultural community, and here the population density led to difficulties. Problems of water access, sewage, and distances to the fields led to problems with maintaining the population-land balance. Their efforts at irrigation through rerouting creeks, for example, led to flooded fields and erosion that destroyed the harvests.

Poverty Point, in northeast Louisiana, is dominated by six concentric ridges and five mounds and was populated around 3500 years ago. The explanation of activities and purposes for Poverty Point are not well understood. It may have served as some combination of trading center, population center for as many as 4,000 people, home of rituals, and ceremonial center. It is unique in both its structure and its size, especially for that part of the country.

Other notable sites include the fascinating caves of Mesa Verde, in the four corners region of the Southwest. The area was inhabited seasonally by members of the Clovis and Folsom cultures as early as 9,500 years ago. They survived through a combination of hunting, gathering, and subsistence farming. The mesa's first Pueblo dwellings were built around 650, and by the end of the 12th century they began to construct the massive cliff dwellings. By 1285 the cliff dwellings had been abandoned following a series of severe and prolonged droughts.

Closer to our home were the Adena culture from 800BC to 200 AD and the Hopewell culture from 300 BC to 700 AD. The Serpent Mound in southeastern Ohio is now thought to be from the Adena era, around 300BC, even though some portions have been dated as late as 1000. This is latter finding is thought to have been caused by repairs to the structure by later residents. The purpose of the Serpent Mound is still subject to some conjecture, with one popular explanation being that it was to direct spirits from nearby burial and ceremonial grounds northward.

The site of Fort Ancient is also near to Columbus and of considerable significance. Much is still being learned about the details and the purpose of this earthen structure. Set on the top of a hill overlooking the banks of the Little Miami River, the structure includes more than three miles of walls in a 100 acre complex. As with the Serpent Mound, there are several astronomical features to this work. I'd like to add a personal note on Fort Ancient. When I was a Boy Scout growing up in southern Ohio, we took a couple of camping trips to Fort Ancient. I recall the main building as being a museum across the road from the river, well below the primary Fort Ancient structure on top of the hill. The museum held many artifacts and included some remains whose display would be judged unacceptably insensitive today. There were some shallow walls down along the river. That's where we would run around after dark in our own primitive version of paintball, trying to hit each other with our small brown paper bags filled with flour. If at some point in the future you should read of the puzzling discovery of old paper bags at Fort Ancient that seem to defy carbon dating, you'll have an answer.

The current understanding of the prehistoric Indian population in North America is that it is substantially larger than originally thought. However, we do not yet have good answers regarding the support required by the large populations and why we have not found greater archeological evidence of them.

What were the land use systems that supported large populations? What were the levels of social organization?

In general, we also now have evidence that the Native American populations were older and more sophisticated that originally believed. I have mentioned just a portion of the substantial structures that were built for dwelling, for ceremonies, and for as yet unknown purposes. The astronomical features of some of these works would rival those being produced by the Greeks at the time.

Finally, it is now believed that the Indians had far greater impact on their environment than originally thought. They kept their agricultural lands clear with fire and developed small planting mounds and irrigation streams to enhance productivity. They had shaped their environment to meet their needs. The idyllic picture of a land that was sparsely settled in pristine wilderness that had existed forever and was simply being used temporarily as the Indians wandered around is not the current belief.

It is also very clear that the wide variety of backgrounds, cultures, and living environments as depicted on the slide make a single answer to most of these questions impossible. So, with respect to my original question, what was the maximum population size of the American Indians? JUST PICK A NUMBER

Take Aways

In the course of researching and writing this essay I have made a few observations that I will offer for your consideration.

This research puts global warming in a whole new light. Given the disappearance of the ice sheets over North America, it seems to have been going on for a while and unlikely to be stopped by any government policies either party might want to create.

In a cynical view, one might say that the research also provides a perspective within which to consider immigration policies or the lack thereof.

Most important to me, the work on this essay also gave some perspective on the management of scientific research and the evolution of knowledge. Whether in anthropology, nano technology, or cancer research the role of gatekeeper is a critical one. If those in control (via funding or editing the scientific journals of the field) hold on too tightly in the name of keeping high standards, they may end up being overprotective of the status quo (and their own status in the field). They can thereby stunt evolution of knowledge in the field. The critical tension is to allow for the possibility and acceptance of truly surprising findings while limiting the distractions caused by truly random or erroneous findings. One's view of the proper balance probably depends on their position as a researcher well established in and very comfortable with the currently accepted paradigms versus one who believes they can best contribute through their fresh ideas.

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