Chapter 31

The First Americans: A Review of the Evidence for the Late-Pleistocene Peopling of the Americas

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ABSTRACT

Archaeological evidence from North America shows that Clovis complex sites date between 13,000 and 12,600 cal yr BP. The evidence for the Clovis complex pre-dating 13,000 cal yr BP is equivocal. Artifact assemblages are found at a number of sites in South America that date to 13,000 cal yr BP that have no affinity to Clovis. These data show that both continents were contemporaneously occupied at 13,000 cal yr BP. The absence of Clovis artifacts in Beringia and the geographic concentration of the Clovis complex in North America south of the continental ice sheets indicate that Clovis likely originated somewhere in the continental United States from an antecedent group. Several archaeological sites in North and South America provide credible evidence for the occupation of the Americas before Clovis, and these sites date back to ca. 15,000 cal yr BP, some 2000 calendar years before Clovis. Artifacts from these sites show that these early people made and utilized bifaces, blades, bladelets, and osseous tools. A migration of people into the Americas, a few thousand years prior to Clovis, is supported by the modern genetic evidence. The presence of people in the Americas prior to Clovis also correlates with the initial decline in megafaunal populations during the fifteenth and fourteenth millennia. We propose the term “Exploration Period” to encompass the sites predating the emergence of the recognizable hallmarks of the Clovis complex.

KEYWORDS: Clovis, Older-than-Clovis record, Exploration Period, Chronology

Introduction

The discovery of lanceolate, fluted projectile points that we now call Clovis, associated with mammoth remains underlying a Folsom horizon at Blackwater Draw, New Mexico, in 1933 and the work that followed showed that people had entered North America by 13,000 years ago. Since that time, some archaeologists have been looking for evidence that people occupied the Americas even earlier, while others have worked on issues related to Clovis and the post-Clovis time period. In the decades since the discovery of Clovis, several sites were investigated and presented as evidence of older-than-Clovis occupation of the Americas. In most cases, this evidence did not stand up to scientific scrutiny. There was always something wrong with the geological context, the dating of the site, or archaeological evidence from the site (Haynes 1967; Waters 1985). At the same time, more “Clovis sites were being discovered. Clovis sites were found scattered across North America, they yielded consistent late-Pleisto-
cene radiocarbon ages, and these sites had a regionally recognized and diagnostic set of artifacts. Thus, as we learned more about Clovis and as the older-than-Clovis sites failed to pass muster, the Clovis-First paradigm became entrenched in our teaching, research, and thinking. Building on a few of the older-than-Clovis sites that stood their own over time and the discovery and publication of new data, we need to reevaluate this long-held paradigm in North American archaeology and develop a new, more inclusive paradigm for the peopling of all the Americas.

**The Clovis-First Paradigm**

The Clovis-First paradigm states that the ancestors of Clovis originated from northeast Asia and crossed over the Bering Land Bridge into what is now Alaska at the end of the last ice age (Haynes 2005). These people did not have recognizable Clovis technology, but had some sort of non-Clovis antecedent technology—likely biface, blade, and osseous technology. Haynes (2005) believes that this ancestral population, with a non-Clovis technology, came through the Ice-Free Corridor and exited into what is now southern Alberta around 13,500 years ago. Upon leaving the corridor and encountering a new environment with unfamiliar plants and animals, they immediately developed Clovis technology and weaponry. In his most recent statement on this topic, Haynes (2005) suggests that this ancestral population was the Nenana peoples from south-central Alaska. Regardless of who these people were, what is important is that Clovis developed south of the ice sheets and is a North American invention. Haynes believes that the earliest people passing through the corridor were skilled hunters especially adapted to cold environments. Upon entering non-glacial terrain, they soon dropped their arctic-adapted gear and developed a new technology and weapons (Clovis) at the mouth of the Ice-Free Corridor. These people with their new Clovis technology then spread rapidly across uninhabited North America, with their descendants arriving at the southern tip of South America about 800 years later. Paul Martin (1967) went on to suggest that this rapid spread of well-armed folks hunted scores of species of mega-fauna into extinction.

Over the years, several definitions of Clovis have arisen. To some, Clovis is a time period or era (Haynes 2002). To others, Clovis is a culture (Haynes 2005). And to still others, Clovis is a techno-complex (Bradley et al. 2010). In this paper, we subscribe to the latter view, that Clovis is a techno-complex that has very well defined biface, blade, and osseous technologies. People making Clovis artifacts selected the finest lithic raw materials to make their tools, and their lithic tools were made in a specific and prescribed way (Bradley et al. 2010; Waters et al. 2011a). These technological traits are consistent over a defined geographic area (continental United States and Mexico), and they occur during a short time period.

While the Clovis-First model provides an elegant explanation of the peopling of the Americas, we must ask—Does the Clovis-First paradigm still work? Does it explain and tie together all the existing data from the Americas, especially new data that have emerged over the last decade?

**What Is the Age of Clovis?**

Before we can talk about Clovis origins, older-than-Clovis occupation of the Americas, mobility, and colonization, we need to understand the age of Clovis. This is absolutely critical. All calibrated ages presented in this paper were derived using Calib6.01, which utilizes the IntCal09 database (Reimer et al. 2004).

Accurate and precise radiocarbon ages from 13 sites with technologically diagnostic Clovis artifacts place this complex from 11,080 ± 40 14C yr BP (Lange-Ferguson, SD) to 10,705 ± 35 14C yr BP (Anzick, Montana) (Waters and Stafford 2007). There are a number of additional sites with Clovis artifacts with dates in this range, but these have large standard deviations (e.g., Clovis levels at Cactus Hill, Virginia, McAvoy and McAvoy 1997). There also are at least five sites—Indian Creek, Montana (Davis and Baumler 2000); Lubbock Lake, Texas (Johnson 1987); Bonneville Estates, Nevada (Goebel et al. 2006); Kanorado, Kansas (Mandel et al. 2005); Arlington Springs, California (Johnson et al. 1999)—that date to the Clovis time period, but have no Clovis diagnostic artifacts and therefore make their identification as Clovis not possible (Waters and Stafford 2007). This is the empirical record—the hard data (Figures 31.1 and 31.2).

Some authors espouse the belief that there are “older” Clovis sites. By this they mean older than the age of the Lange-Ferguson site, South Dakota. Morrow and others (2012) have even claimed that Waters and Stafford (2007) have “biased . . . the temporal limit of Clovis at 11,100 RCYBP.” They and others suggest that there are older Clovis sites that are several centuries older than 11,100 14C yr BP. The specific “older” Clovis sites vary depending upon the author, but boil down to four sites—Casper, Wyoming; Aubrey, Texas; East Wenatchee, Washington; and Sheaman, Wyoming (Prasciunas 2008; Hamilton and Buchanan 2007; Morrow et al. 2012). Let’s review the evidence from these four “old” Clovis sites.

At the Casper site, Wyoming, a single Clovis point was found by two avocational archaeologists in loose disturbed sand in an area where 8 m of dune sand had been removed by mechanical equipment. After the discovery of the point, they dug into the sand and found bison bones. This discovery led to the investigation of the site by Frison (1974), who uncovered numerous Hell Gap–style projectile points associated with the remains of over 100 bison. Two dates from the bone bed, one on charcoal of 9830 ± 135 14C yr BP (RL-125) and the other on a bison bone of 10,060 ± 170 14C yr BP (RL-208), place the Hell Gap bison kill at about 11,400 cal yr BP. Below the bison remains, a single camel was unearthed, and purified collagen extracted from the bone dated to 11,190 ± 50 14C yr BP (CAM2-61899) or 13,075 ± 110 cal yr BP (Frison 2000). No artifacts were associated with the camel, but the bones did show several green-bone fractures. Clearly, there is no stratigraphic association between the buried and
dated camel remains, and the stray Clovis point found at the surface. However, Hamilton and Buchanan (2007) believe the dated camel bone "suggests that a Clovis occupation underlies the Hell Gap kill at the site." Because there is no association between the Clovis point and the camel remains, the date obtained from the camel cannot unequivocally be associated with the point. The date on the camel provides no information on the age of Clovis. Whether or not the camel represents an archaeological site is presently unknown.

Morrow and others (2012) suggest that the Clovis artifacts from the East Wenatchee site, Washington, date to ca. 13,600 cal yr BP. Their age estimate of the cache is based on the reassessment of the age of the Glacier Peak Ash to ca. 11,600 ± 50 14C yr BP or ca. 13,410–13,710 cal yr BP (Kuehn et al. 2008) and the belief that the Glacier Peak Ash and Clovis artifacts are contemporaneous.

The age of the Glacier Peak Ash, which was originally estimated to be ca. 11,200 14C yr BP (Mehrinrger, 1989; Mehringer and Foit, 1990), has been reassigned an age of ca. 11,600 ± 50 14C yr BP (Kuehn et al. 2008). Multiple radiocarbon ages from many sites support this age for the Glacier Peak Ash (Carrara and Trimbel 1992; Kuehn, et al. 2008). The crucial question is the relationship between the Clovis artifacts and Glacier Peak Ash. Are the artifacts contemporaneous with the Glacier Peak Ash, or do they post-date the ash?

At the cache site, there are no recognizable lenses or beds of the Glacier Peak Ash or even the later Mazama Ash (Mehrinrger and Foit 1990). The only discrete lenses or beds of these ashes were found 500 m north of the cache site in a swale (Mehrinrger 1989). Glacier Peak pumice particles were found at the site, but these particles occurred in low densities and were dispersed in the sediments making up the site matrix. Mehringer and Foit (1990) note that the pumice fragments were most abundant in the sediments below the artifacts. However, Glacier Peak pumice particles were also identified in the sediments between and above the Clovis artifacts, although in lower concentrations than below the artifacts (Mehrinrger 1989). The absence of a discrete lens of the Glacier Peak Ash, and the dispersed nature and low concentrations of Glacier Peak pumice particles in the sediments suggest that the ash particles do not occur in primary context and were likely redeposited at the site. Finally, some of the artifacts in the cache are coated on their undersides and edges with a botryoidal silica cement that likely represents a duricrust (Birkeland 1999) derived from the dissolution of SiO2 from the underlying ash-bearing sediments (Mehrinrger and Foit 1990). This crust could have been precipitated almost any time after the deposition of the artifacts.

Clearly, the Glacier Peak Ash pre-dates the deposition of the Clovis artifacts. How much time elapsed between the emplacement of the Glacier Peak Ash pumice fragments and the deposition of the artifacts is unknown. Therefore the Glacier Peak Ash provides only a maximum limiting date on the East Wenatchee site.

Prasciunas (2008) and Haynes and others (2004) suggest that the Clovis component at the Sheaman site, Wyoming, dates to 11,225 ± 50 14C yr BP, or 12,975 to 13,200 cal yr BP. However, there are several problems at the Sheaman site. First, cultural material from at least two different time periods appears to be mixed on a common surface. Debitage from the site, especially overshot flakes, suggest the presence of Clovis biface technology (Bradley 1982). However, the projectile point recovered from the site is typologically Goshen (Frison 1991; Frison et al. 1996). These artifacts are coming from the same horizon, possibly an eroded surface. Second, bioturbation is an identified problem at the Sheaman site (Haynes et al. 2004). Third, there is only one accurate age for the site, and it is much younger than the proposed date for the site.

Dating the Sheaman site has been difficult. Frison (1982) reports three ages from the site. Two dates on charcoal are 10,140 ± 500 14C yr BP (RL-1241) and 10,100 ± 2800 14C yr BP (RL-1000). These dates are considered by Frison (1982) to represent post-occupation burning of the site and thus post-date the artifact-bearing horizon. The large standard deviations are the result of small sample sizes. Frison (1982) also dated bison long-bone fragments from the artifact zone and they yielded an unpurified collagen age of 10,030 ± 280 14C yr BP (RL-1263). To clarify the age of the site, Haynes and others (2004) attempted to redate the site. They obtained two dates on dispersed pieces of charcoal below the artifact zone. These are 10,153 ± 90 14C yr BP (AA-42979) and 1820 ± 170 14C yr BP (AA-42535). Another sample of dispersed charcoal was dated from the artifact-bearing zone. This sample yielded a charcoal (HCl-insoluble fraction) age of 10,251 ± 72 14C yr BP (AA-42533) and a humate (alkali-soluble fraction) age of 10,026 ± 86 14C yr BP (AA-42534). Another date on dispersed charcoal above the artifact layer yielded a date of 9086 ± 70 14C yr BP (AA-42532). Directly from the artifact-bearing zone, a bulk sediment sample was collected and dated. Haynes and others (2004) report that these samples consisted of charcoal and other acid-insoluble organic matter removed from the sediment. Three ages were obtained, 11,040 ± 70 14C yr BP (AA-40989), 11,379 ± 70 14C yr BP (AA-40991), and 11,810 ± 300 14C yr BP (AA-40988). These ages, even though they do not overlap by one standard deviation and one has a 300-year standard deviation at one sigma, were averaged to obtain a date of 11,225 ± 50 14C yr BP. Haynes and others (2004) rejected the dispersed charcoal ages and accepted the average age of 11,225 ± 50 14C yr BP as the correct age of the site. However, the bulk sediment and charcoal samples may be contaminated by coal as occurs at the Mill Iron site, Montana (Frison 1996), and thus do not date the cultural horizon. To clarify the age of the site, Waters and Stafford (2007) directly dated an artifact from the cultural horizon. An osseous projectile point made of cervid bone or antler (previously identified as ivory) was found with the Clovis artifacts and the Goshen point. Three dates on XAD-purified collagen from this osseous artifact yielded an average age of 10,305 ± 15 14C yr BP (Waters and Stafford 2007). Considering all the ages from Sheaman, we believe the most accurate ages are those derived from the osseous artifact because the
dates were obtained on an artifact directly associated with the cultural horizon and the ages were derived from highly purified collagen. The artifact technology and reliable ages suggest that the Sheaman site is likely a mixed assemblage of Clovis and Goshen artifacts and that the osseous tool appears to be dating the Goshen occupation. The age of the Clovis component at Sheaman remains unknown.

The Clovis component at the Aubrey site, Texas (Ferring 2001), is reported to date to ca. 13,400 cal yr BP. Recently, Haynes and others (2007) and Morrow and others (2012) championed these ages as accurately dating the earliest Clovis occupation in the Americas. However, prior to the reevaluation of Clovis chronology by Waters and Stafford (2007); Haynes (2002) and Fiedel (2004) questioned the ages from Aubrey. Haynes (2002) described these dates as “outliers” and “possibly not accurate.” Fiedel has repeatedly challenged these ages as too old, and most recently Morrow and others (2012) wrote, “The Aubrey dates are anomalous. The charcoals are not closely associated with Clovis artifacts or features, and they may reflect an “old wood” effect.” The authors offer no new analyses of samples from the site or any other empirical data to explain their new stance on these ages; the shift in interpretation appears to be a reaction to our 2007 study.

The evidence for early Clovis occupation at the Aubrey site, Texas, is based on two radiocarbon dates on charcoal, 11,540 ± 110 14C yr BP (AA-5271) and 11,590 ± 90 14C yr BP (AA-5274), which average 11,570 ± 70 14Cyr BP or 13,395 ± 80 cal yr BP (Ferring 2001). This charcoal was obtained from the Clovis occupation surface; it did not come from an archaeological feature or a discrete geological stratum. The dated charcoal was found dispersed on an eroded surface. Alluvial sediments underlying the Clovis surface have yielded radiocarbon ages on humates ranging from 12,335 ± 170 14C yr BP (SMU-2478) to 14,200 ± 220 14C yr BP (SMU-2236). The samples used to date the Clovis horizon may have originated from these older deposits. Further, the Late Quaternary sediments at the site are predominately derived from coal-bearing Cretaceous bedrock that contains large amounts of 14C-free carbon. Large amounts of 14C-depleted carbon occur in the late-Pleistocene deposits in the form of recycled Cretaceous palynomorphs (Hall 2001). Consequently, Cretaceous sediments represent a potential source for the disseminated, solid organic matter that was collected as human-produced charcoal in the Clovis horizon. This geological environment could enable geologically ancient carbon to become commingled with and contaminate the samples. Finally, the precise provenance of the two dated samples from Camp B has not been reported. Interestingly, humates from Unit E1 overlying the Clovis surface in the west Pond Area yielded an age of 10,940 ± 80 14C yr BP (SMU-2194). These sediments were directly above the Clovis horizon, and their age is well within the range of ages for Clovis reported in Waters and Stafford (2007). This situation has raised concerns about the validity of the early ages from the site. One other concern is the possibility of lignite contamination of the samples. The Lewisville site (Crook and Harris 1958) is located about 30 km downstream of the Aubrey site. Both sites are situated along the Elm Fork or the Trinity River. At Lewisville, charcoal samples from hearths around which Clovis points and artifacts were found yielded ages of > 37,000 14C yr BP (O-235 & O-248). Reinvestigation of the site in the 1980s uncovered new hearths. Samples from these hearths showed minor amounts of lignite contamination that skewed the radiocarbon dates (Stanford 1983; Shiley et al. 1985). This lignite is from the late Cretaceous-Woodbine Formation, which occurs in the drainage basin of both sites. Until more samples of chemically distinct and taxonomically identified charcoal are dated from the Aubrey site, the true age of the site will remain unknown.

In conclusion, 13 Clovis sites still provide the most accurate and precise ages for the Clovis complex. The ages from these sites range from 11,080 ± 40 14C yr BP to 10,705 ± 35 14C yr BP or 13,000 ± 85 to 12,615 ± 40 cal yr BP (Figure 31.2). This is a small sample size, but it is what we have. We must be diligent in our efforts to date more Clovis sites as they continue to be discovered.

Is Clovis Found in Siberia or Alaska?
Clovis projectile points or other artifacts distinctive of Clovis technology have not been reported from Siberia. A “fluted” biface was reported from the Uptar site in the Magadan region of northeast Russia (King and Slobodin 1996). However, the “flute” on this biface turned out to be an impact scar extending from the tip and was not technological end thinning from the base.

In Alaska, fluted, lanceolate projectile points are rare and occur at about two dozen sites (Clark 1991). Most of these artifacts have been found on the surface, especially in the northern part of Alaska. Buried fluted-point sites are rare. When they are found, fluted points are usually mixed with younger microblades and wedge-shaped cores. Recently, two sites with buried fluted projectile points in a secure geological context have been reported—Serpenite Hot Springs and Raven Bluff.

The Serpentine Hot Springs site is located on a knob overlooking a broad upland valley on the Seward Peninsula (Young and Young 2007; Goebel et al. 2013). Here, fluted projectile points are associated with five fire hearths that are buried in a thin loess. Twenty-four radiocarbon ages on the charcoal from these fire hearths showed that the fluted points are no older than 12,400 cal yr BP and likely date between 12,000 and 12,400 cal yr BP (Goebel et al. 2013). The Raven Bluff site is located on a small knoll above the Kivalina River about 30 miles from the Chukchi Sea at the western end of the Brooks Range (Hedman 2010). Here Alaskan fluted points are found in buried contexts that appear to be dating to the same time period as those from the Serpentine Hot Springs site. These two recent finds show that fluted points in Alaska are about 200 to 600 years younger than Clovis (Figures 31.1 and 31.2).

Morphologically and technologically, fluted points from...
Alaska are different from Clovis fluted points (Clark 1991). The Alaskan points are smaller and narrower than Clovis points, and they appear to have been made on flakes rather than by bifaceal reduction. Alaskan fluted points have deep concave bases and multiple narrow flute scars on both faces (typically two to three) that extend from the base. This fluting appears to have been done with the aid of a punch (instrument-assisted fluting technology). Flaking extends to the midline of the points, and no overshoot or overface flake scars extend past the midline.

The Alaskan fluted points are morphologically and technologically similar to post-Clovis instrument-assisted fluted point technologies. Chronologically, Alaskan fluted points post-date Clovis by up to 600 years and are thus too young to be antecedent to Clovis. The Alaskan fluted points represent the movement of fluted-point-making peoples or this technology into Alaska from the south during post-Clovis times (Goebel et al. 2013).

The most securely dated fluted point in Canada was found at Charlie Lake Cave (Figures 31.1 and 31.2) in British Columbia (Driver 1996, 1999; Fladmark et al. 1988). Here, a single heavily resharpened point with multiple flute scars, similar to the Alaskan fluted points, was found in a buried context and associated with bison. A previous date on collagen extracted from bison bone associated with the point gave an age of 10,770 ± 120 14C yr BP (SFU-454). Two new ages were obtained on XAD-purified bison bone collagen from this level. These samples yielded ages of 10,435 ± 25 14C yr BP (UCIAMS-11346) and 10,430 ± 30 14C yr BP (UCIAMS-11347). These dates average 10,435 ± 20 14C yr BP or 12,355 ± 155 cal yr BP. This age is hundreds of years younger than Clovis to the south, and the date is comparable to the ages on fluted points from Alaska.

Clearly, Clovis-complex artifacts are not present in Siberia or Alaska. This agrees well with the Clovis-First paradigm that states Clovis originated in the New World and south of the Laurentide and Cordilleran Ice Sheets.

Are There Clovis-age Sites in South America, and Are They Clovis?
Yes, there are credible archaeological sites in the Southern Cone of South America that date to the same time as the earliest known Clovis sites in North America. There are at least five well-dated South American sites that are contemporaneous with Clovis (Figures 31.1 and 31.3), but these sites lack Clovis tools and technologies (Waters and Stafford 2007).

In Argentina, one site is Cerro Tres Tetas 1 (Paunero 2003; Prates et al. 2013). In the lowest stratigraphic unit, six radiocarbon ages were obtained on charcoal from hearths. These ages range from 11,100 ± 150 14C yr BP (AA-22233) to 10,850 ± 150 14C yr BP (LP-781). Charcoal from a single hearth from the lowest layer yielded four ages that average 10,995 ± 35 14C yr BP or 12,845 ± 95 cal yr BP. At Casa del Minero 1, Argentina (Paunero 2003), charcoal from hearths in stratigraphic Unit 4 yielded dates of 10,967 ± 55 14C yr BP (AA-37208) and 10,999 ± 55 14C yr BP (AA-37207). These two ages average 10,985 ± 40 14C yr BP or 12,835 ± 95 cal yr BP. Two radiocarbon ages were obtained from the lowest occupation level (Unit 6) at Piedra Museo, AEP-1, Argentina (Miotti and Salemme 2003; Prates et al. 2013). Charcoal from this layer yielded an age of 11,000 ± 65 14C yr BP (AA-27950) which calibrates to 12,890 ± 155 cal yr BP. At all these sites, the lithic assemblages are mostly composed of cores, informal modified flake tools, bifaceal knives, scrapers, choppers, hammerstones, and debitage. No stone projectile points have been found in these assemblages. Fishtail points appear in the Southern Cone after this time.

Along the Pacific coast is the Quebrada Santa Julia site, Chile (Jackson et al. 2007; Maldonado et al. 2010). Buried in a peat deposit about 9 m below the surface is an archaeological horizon with numerous artifacts (Figure 31.1). A hearth yielded three radiocarbon ages on charcoal and wood that averaged 11,025 ± 45 14C yr BP. This yields a calibrated age of 12,925 ± 140 cal yr BP (Figure 31.3). In this artifact horizon were found four retouched knives, several informal modified flake tools, a scraper, a graver, a fracture pebble, unidirectional core, two bifaces, and numerous flakes. Also along the Pacific Coast is the site of Quebrada Jaguay, Peru (Sandweiss et al. 1998). Here two radiocarbon ages of 11,088 ± 220 14C yr BP (BGS-2024) and 11,105 ± 260 14C yr BP (BGS-1942) were obtained on charcoal from buried deposits containing expedient flake tools, bifaces (but not points), and debitage (Figures 31.1 and 31.3). These two dates average 11,095 ± 170 14C yr BP or 12,955 ± 180 cal yr BP.

It has been suggested that the similarity between the dates for Clovis in the Northern Hemisphere with those at sites with non-Clovis assemblages in the Southern Hemisphere is due to carbon-reservoir issues, with ocean upwelling creating an atmosphere over South America that is depleted in 14C relative to the Northern Hemisphere. This would make sites in South America younger than their associated radiocarbon dates suggest (Kelly 2003; Fiedel and Kuzmin 2010). Thus, the calibration curve for radiocarbon dates established for Northern Hemisphere samples cannot be used in the Southern Hemisphere with accuracy. Several studies of the offset in the radiocarbon record between the two hemispheres indicate that wood from the Southern Hemisphere dates slightly older than contemporaneous Northern Hemisphere samples. Studies have shown that the calculated offset is minimal and not constant over time. Southern Hemisphere samples are older than Northern Hemisphere samples by an average of 43 ± 23 years (Hogg et al. 2013). Even with this correction, the dates from the older South American sites are still contemporaneous with those of Clovis in North America.

Are There Credible Archaeological Sites Pre-Dating Clovis in the Americas?
There are a handful of North and South American archaeological sites that provide solid cases for occupation before Clovis (Figures 31.3 and 31.4). They all have a strong geological context, are well dated, and have clear human-made artifacts. All these sites are 1000 to 2000 years older than Clovis.
Historically, Monte Verde II is the most important of these early sites. Monte Verde II, buried in terrace deposits along Chinchappi Creek in southern Chile, provides evidence of early human occupation of the Southern Cone of South America (Dillehay 1989, 1997). Here, extensive excavation uncovered wood tent remains, structural foundations and floors, hearths and braziers, digging sticks, lances, numerous stone tools including a bi-pointed El Jobo–like point, bifaces, bolo stones, human footprints, medicinal and edible plant remains, animal bones, hide, and soft tissue. Dillehay interprets the evidence to represent year-round occupation of the site. These people exploited a wide variety of habitats,
including the coast and mountains. He feels the people occupying the site were settled into and were familiar with the local environment. Dillehay (1997; Dillehay and Pino 1989, 1997) originally dated the site based on five dates on wooden artifacts from the site (Table 31.1). These ages ranged from 12,230 ± 140 14C yr BP (Beta-6755) to 12,780 ± 240 14C yr BP (Beta-59082). In 2008, two new ages were reported from samples derived from hearths from two of the structures at the site (Dillehay et al. 2008). These two dates were on seaweed—12,290 ± 60 14C yr BP (Beta-238355) and 12,310 ± 40 14C yr BP (Beta-239650). Because seaweed is short-lived and grows in the upper part of the water column that is well aerated, these dates likely represent the most accurate ages for the occupation of the site (Erlandson et al. 2008). These dates average 12,305 ± 15 14C yr BP or 14,490 ± 250 cal yr BP. Additionally, 16 radiocarbon ages on wood, including spruce, were obtained from below, within, and on top of the mammoth bones. Thus, some of the materials predate the bone deposit, others are contemporaneous with it, and other dates post-date the bone bed. These ages range from 12,290 ± 60 14C yr BP (CAMS-72140) to 12,570 ± 45 14C yr BP (CAMS-95521). One wood specimen dated to 12,300 ± 70 14C yr BP (Beta-141277; 14,270 ± 240 cal yr BP) lay atop the bone pile in direct contact with the bone. This age agrees well with the ages from the bone. The evidence from the Schaefer site clearly shows people were butchering a woolly mammoth at 14,490 ± 250 cal yr BP. It is interesting to note that unpurified bone collagen from a mammoth bone at the site initially provided a Clovis-age of

The Schaefer site, located in southeastern Wisconsin, is one of these key localities (Figures 31.3 and 31.4). Here the remains of a single woolly mammoth were found sealed in pond clays that also contained stone tools (Johnson 2006, 2007; Joyce 2006). This is an isolated find; there are no other archaeological sites in the immediate vicinity of the site, and no younger archaeological components overlie the bones. The mammoth remains show multiple signs of butchering, including cut and pry marks. Two blade-like flakes made on local cherts were recovered in association with the mammoth. Thirteen radiocarbon ages on XAD-purified bone collagen obtained from different elements of the mammoth (Table 31.1) yielded an average age of 12,460 ± 15 14C yr BP or 14,490 ± 250 cal yr BP. These dates likely represent the most accurate ages for the occupation of the site (Erlandson et al. 2008). These dates average 12,305 ± 35 14C yr BP or 14,260 ± 220 cal yr BP. These more precise ages agree well with the previous younger age estimate for the site. Despite numerous critical examinations of Monte Verde, the site remains a key First Americans archaeological site. With the acceptance of Monte Verde as a site dating 1200 to 1400 years before Clovis comes the realization that there must be early sites in North America. Whether the early migrants traveled by boat or on foot or a combination of both, they had to have transited North America on their way to the Southern Cone. Undoubtedly, some people remained behind and occupied North America. Evidence for older-than-Clovis occupation of the Americas comes from several of these North American sites.

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Figure 31.2 Ages for Clovis complex, Eastern fluted (Gainey), Folsom, and Northern fluted sites in cal yr BP. The gray shaded area indicates the time of megafauna extinctions; bison and caribou occur in the post–12,700 cal yr BP sites, while mammoth and mastodon occur in the pre–12,700 cal yr BP sites. Note that fluting technology lasted in North America for a maximum of 1000 years from 13,100 to 12,100 cal yr BP. Because of the nature of the radiocarbon method, it should be noted that while a range spanning many years is shown for each site, many of these sites are single-event sites and represent just one time in this range of possible dates.
10,960 ± 100 14C yr BP (Beta-62822) for the site. This date underscores the need to obtain purified collagen ages to accurately date a site and explains why some older-than-Clovis sites could go unidentified and mistaken as Clovis occupations.

The second site, in southeastern Wisconsin, is the Hebior site (Figures 31.3 and 31.4), which is 1 km south of the Schaefer site. Here the remains of a single woolly mammoth were found sealed in pond clays (Johnson 2006, 2007; Overstreet 2005). These bones have cut and pry marks—indicators of butchering. Also, four lithic artifacts, including two non-diagnostic bifaces, were found in direct association of butchering. In some of the lowest levels of Cave 5, three human coprolites dating before Clovis were found along with a few stone artifacts (Figures 31.3 and 31.4). Six radiocarbon dates (Table 31.1), from two laboratories, on these coprolites ranged from 12,140 ± 70 14C yr BP (OxA-16495) to 12,400 ± 60 14C yr BP (Beta-213424). Preserved mitochondrial (mtDNA) from these coprolites corresponds to Native American founding haplogroups A and B. Because these initial results were challenged (Poinar et al. 2009), additional work was conducted at the caves to address the issues raised by critics (Jenkins et al. 2012). The stratigraphic integrity of the site is now confirmed by 190 new radiocarbon dates. Two additional older-than-Clovis coprolites contained ancient human DNA of haplogroup A. This finding was confirmed independently in two different ancient DNA laboratories. Dates on the macroflora from these two coprolites were 12,265 ± 25 14C yr BP (UCIAMS-79706) and 12,165 ± 25 14C yr BP (UCIAMS-79706). All eight radiocarbon dates on human coprolites overlap by
Table 31.1 Cont’d.

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<th>Site</th>
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<th>Lab. number</th>
<th>Material dated</th>
<th>Reference</th>
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</tr>
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<td>Dillehay et al. 2012</td>
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<td>Equus¹, spiral fracture</td>
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<tr>
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<td>I-7028</td>
<td>Unpurified collagen</td>
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<td>XAD-collagen</td>
<td>This report</td>
<td>Mammutus hemimerus</td>
</tr>
</tbody>
</table>

1,2: Same bone.

one standard deviation and average 12,240 ± 15 14C yr BP or 14,340 ± 65 cal yr BP (Table 31.1).

At the Manis site, Washington (Figures 31.3 and 31.4), a single male mastodon (*Mammut americanum*) was excavated from sediments at the base of a kettle pond (Gustafson et al. 1979; Waters et al. 2011b). The bones of the right side of the mastodon were disarticulated and moved 0.6 to 3 m from the rest of the skeleton and toward the bank of the pond. Some bones were spirally fractured, multiple flakes were removed from one long-bone fragment, and other bones showed cut-marks. The only associated artifact was the tip of a projectile point made of mastodon bone that was embedded into one of the mastodon’s ribs. Four dates on XAD-purified collagen from the rib with the bone point and from the tusk ivory of the skeleton were averaged and yielded an age of 11,960 ± 17 14C yr BP, or 13,815 ± 50 cal yr BP (Table 31.1). The Manis site provides further evidence of a human presence in the new World 800 years before Clovis and demonstrates that people were hunting with bone weapons.

The Debra L. Friedkin site is located in central Texas (Figures 31.3 and 31.4) at the edge of the Edwards Plateau (Waters et al. 2011c). The site lies in a small valley incised into chert-bearing, Cretaceous Edwards Limestone along Buttermilk Creek and is about 250 m downstream of the Gault site. In 1.4 m of floodplain clays accumulated on the second terrace above the creek is an archaeological record spanning back to 15,500 yr BP. From the top to bottom of the sequence are found artifacts, including 60 time-diagnostic artifacts, dating to the Late Prehistoric, Late Archaic, Early Archaic, Paleoindian (Golondrina and Dalton), Folsom-Midland, and Clovis. Below the Clovis horizon is a 20-cm-thick layer containing artifacts that represent repeated visits to the site and together define the Buttermilk Creek Complex. Below this horizon, which can be up to 25 cm thick, no in situ artifacts occur. Forty-nine optically stimulated luminescence (OSL) ages from two sediment columns have been obtained from these floodplain clays. The OSL ages derived from the known occupation periods correspond with the known age...
of these components as defined at other sites. Eighteen OSL ages obtained from the Buttermilk Creek Complex layer place it between 13,200 to 15,500 yr BP. Older ages ranging back to 32,000 yr BP were obtained from the underlying archaeologically sterile deposits. The Buttermilk Creek Complex assemblage consists of over 16,000 artifacts, mostly debitage. Fifty-six stone tools identified as of 2009 include 12 bifaces (point preform and chopper/adze), a discoidal core, 23 edge-modified flake tools (notches, gravers, and scrapers), 5 blade fragments, 14 bladelets, and a piece of polished hematite. The bifaces appear to be made through core reduction. Numerous radially broken tools also found in the assemblage show extensive usewear under high magnification along their stout chisel-like edge and corners, likely produced while working wood and osseous materials. All flaked-stone tools and debitage are Edwards chert. In general, the Buttermilk Creek Complex tools and cores are small and lightweight, and represent a toolkit designed for high residential mobility. Artifacts in a similar, dated geological context are reported at the Gault site, Texas, just 250 m upstream (Collins and Bradley 2008). Morrow and others (2012) recently questioned the accuracy of the OSL ages and the geological context of the artifacts at the site, but provided no new data from the site to support this claim. For an accurate and critical discussion of the stratigraphic position of diagnostic artifacts found at the site and the specific ages associated with them, see Waters

![Figure 31.3](image_url)

**Figure 31.3** Ages for the Exploration Period, Clovis complex, Clovis-age sites in South America, Eastern fluted (Gainey), Folsom, and Northern fluted sites in cal yr BP. The gray shaded area indicates the maximum period for Clovis—12,600 to 13,100 cal yr BP.
and others (2012) and Jennings (2012). For a comprehensive appraisal of the geological and pedological site context and site formation processes that is based on data, see Driese and others (2013) and Lindquist and others (2011).

The Lindsay site in eastern Montana (Figures 31.3 and 31.4) provides an especially interesting case for older-than-Clovis occupation of the Americas. In 1967, a nearly complete skeleton of a mammoth was excavated from late-Pleistocene loess by Les Davis (Davis and Wilson 1985). The pivotal importance of this site is that it provides solid evidence for older-than-Clovis occupation of the Americas, even though no stone tools were found.
A recent analysis of the Lindsay site mammoth bones by Krazinski (2010) identified 15 unequivocal butchery marks made by stone tools on 4 different bone elements. Cutmarks include eight on one long-bone fragment, one on the distal end of a radius, one on a rib, and three on a calcaneus proximal epiphysis. These elongate marks are perpendicular to the long axis of the bone. The high cutmark frequencies on the long bones suggest meat stripping and disarticulation of a fully fleshed carcass. The cutmarks on the calcaneus are interpreted to have been produced while dismembering feet or accessing fat pads. The cutmark on the rib shaft was produced during meat stripping. There were additional broken bones and bones with chop marks, both of which indicate human activity at the site.

No stone artifacts were found at the Lindsay site. However, directly associated with the mammoth remains were eight sandstone blocks. These boulders occurred beneath the mandible, beneath the vertebrae and articulated ribs, and beneath and beside one modified humerus. Davis and Wilson (1985) suggested that these were manipures (a reasonable assumption given that there is no geological explanation for their occurrence within a loess) and were used as percussion implements to break open the long bones for extracting marrow. Krazinski (2010) found on the bones notches and other breakage patterns that suggested to her that the bones were broken intentionally by humans to extract marrow and splinter the bone. Also, some of the mammoth elements were stacked. Two femora were found on top of a pile of ribs. Also, the cranium and mandible were disarticulated. Wilson and Davis (1985) infer that humans were responsible for this patterned distribution of bones.

Five radiocarbon dates were initially obtained from the bones of the Lindsay mammoth (Hill 2006; Davis and Wilson 1985; Hill and Davis 1998; Huber and Hill 2003). These dates are 9490 ± 135 14C yr BP (l-7028), 10,700 ± 290 14C yr BP (WSU-652), 10,980 ± 225 14C yr BP (I-9220), 11,500 ± 80 14C yr BP (Beta-102031), and 11,925 ± 350 14C yr BP (S-918). All these dates were obtained on unpurified bone collagen and represent minimum ages. Subsequently, three additional dates were run on a mammoth rib from the site: KOH collagen yielded an age of 12,105 ± 40 14C yr BP (CAMS-82416), Gelatin-KOH collagen yielded an age of 12,175 ± 40 14C yr BP (CAMS-80541), and the XAD-purified collagen yielded an age of 12,330 ± 50 14C yr BP (CAMS-72348; Table 31.1).

To estimate the age of the Lindsay mammoth, Krazinski (2010) averaged all eight radiocarbon measurements—from those on unpurified and purified collagen and spanning 9490 to 12,330 14C yr BP—to derive an average age of 11,210 ± 190 14C yr BP or 13,110 ± 190 cal yr BP for the site. Based on this averaging method, she suggested that this butchering likely represented the work of Clovis hunters. Evaluation of the radiocarbon record indicates that the unpurified bone collagen ages are minimum ages and cannot be used for valid age interpretations. Based on the chemical fractions dated, the XAD-purified collagen that gave the age of 12,330 ± 40 14C yr BP or 14,295 ± 215 cal yr BP (CAMS-72348) provided the most accurate age from this second group of dates.

Recently, we obtained six additional dates on Lindsay mammoth remains, three each from the femur and humerus; two of the dates were on XAD-purified collagen and were 12,300 ± 35 14C yr BP (UCIAMS-12308) for the femur and 12,270 ± 35 14C yr BP (UCIAMS-127316) for the humerus. The three XAD ages average 12,300 ± 25 14C yr BP or 14,255 ± 215 cal yr BP. See Table 31.1 for the other dated chemical fractions extracted from the femur and humerus.

Krasinski (2010) states unequivocally that the cutmarks on the bones from the Lindsay site were made by people butchering the mammoth with stone tools. She believes that even when stone tools are absent from a site, if prehistoric cutmarks can be found, they provide absolute evidence of human activity. Krasinski (2010:391) states, “In the absence of stone tools and diagnostic site structure, bone surface modifications may be used to determine whether the remains were altered by humans in the past. It requires the preservation of cortical surfaces and identification of a single genuine prehistoric mark.” The Lindsay mammoth site “demonstrated clear evidence of mammoth utilization in the form of cutmarks” (Krasinski 2010:392). If these statements are true, the Lindsay mammoth site represents evidence of humans butchering extinct megafauna 1200 calendar years before Clovis.

The Lindsay site is unique in that it produced strong evidence for older-than-Clovis occupation of the Americas based on taphonomic evidence alone, as stone tools are absent from the site. The Lindsay site opens the door to accepting other similar sites as predating Clovis. A few examples of these situations include the Burning Tree Mastodon from Ohio dated to 13,255 ± 80 cal yr BP (Fisher et al. 1994), the ground sloth remains from northern Ohio dated to 13,580 ± 90 cal yr BP (Redmond et al. 2012), and the bison remains from Ayer Pond, Washington, dated to 13,840 ± 55 cal yr BP (Kenady et al. 2010). At these sites and others, taphonomic evidence (cutmarks, bone-breakage patterns, and arrangements of bones) suggests human butchering, but where stone tools are absent. Careful analysis, as exemplified by the work of Krasinski (2010) at the Lindsay site and at the other sites mentioned above, is needed at other localities containing tantalizing evidence for humans significantly predating Clovis.

Meadowcroft Rockshelter, Pennsylvania (Figure 31.3), provides compelling evidence of human occupation at 12,800 cal yr BP (Adovasio and Pedler 2004). Meadowcroft Rockshelter is a deeply stratified rockshelter located southwest of Pittsburgh, Pennsylvania. Here about 700 artifacts occur in the lower and middle parts of Stratum IIa, and older-than-Clovis horizon. Lithic debitage includes secondary and tertiary core reduction and biface thinning from late-stage manufacture and the refurbishing of finished tools. Flaked-stone artifacts include small prismatic blades that were detached from small prepared cores, unifacial and bifacial knives and gravers, and edge-modified flakes. A small unfluted lanceolate projectile point, called the Miller lanceolate projectile point, was found in situ on the uppermost living floor of lower Stratum Ila. This floor is dated by bracketing radiocarbon dates above and below of
11,300 ± 700 14C yr BP (SI-2491) and 12,800 ± 870 14C yr BP (SI-2489), respectively. Bone, wood, and plant fibers were also recovered from the older-than-Clovis levels, including simple plaited basketry, a bone punch, bone awl fragments, and a bi-pointed wooden tool. Over 50 radiocarbon ages have been obtained from the site. Six samples of charcoal, from six different hearths, were obtained from Stratum Ila (Table 31.1). These range from 12,800 ± 870 14C yr BP (SI-2489) to 16,175 ± 975 14C yr BP (SI-2354). At a minimum, the upper date bracketing the Miller point provides a minimum age for the Meadowcroft assemblage of 12,160 to 14,050 cal yr BP. The date under the point yielded a calibrated age for the Meadowcroft assemblage of 12,160 to 14,050 cal yr BP. The date under the point yielded a calibrated age of 14,085 to 16,565 cal yr BP. Thus, the minimum age for the Miller point is ca. 14,000 cal yr BP. The remaining five dates, directly from the middle and lower Stratum Ila, indicate that at a minimum, the older artifacts from Meadowcroft date to about 14,000 cal yr BP. More information is needed to evaluate it.

Toxodon. Many of the bones of these animals were spirally fractured. Radiocarbon ages (Table 31.1) on collagen from the Equus remains average 11,120 ± 70 14C yr BP or 13,015 ± 100 cal yr BP. Dates on unpurified collagen from bones of the Toxodon average 11,670 ± 55 14C yr BP or 13,515 ± 90 cal yr BP. There are a number of ages for the Megatherium, but the most accurate age is 12,170 ± 55 14C yr BP (OxA-15871) or 14,015 ± 90 cal yr BP, which was obtained on collagen isolated by ultrafiltration. The excavators interpret the range of ages as sequential occupation of the site. These ages on bone collagen must be considered minimum ages until XAD-purified collagen ages are obtained. Further, no report has been produced that shows the position of the artifacts, bones, and radiocarbon ages. More information is needed to evaluate this proposed early site.
What Does the Biological and Genetic Evidence Tell Us?

All prehistoric human skeletons that have been found in the Americas are anatomically modern (Homo sapiens). Modern humans did not colonize central and northeast Asia until roughly 30,000 to 40,000 years ago (Goebel et al. 2008). This puts an absolute basement date on the arrival of people to the Americas. Further, all the skeletal remains from North America have Asian characteristics.

Genetic data from modern indigenous populations provide more information about the homeland of the First Americans and when these people may have spread to the New World (O’Rourke and Raff 2010; Kitchen et al. 2008; Mulligan et al. 2008; Tamm et al. 2007). Genetic studies of mitochondrial (mtDNA) diversity identified five major haplogroups (A, B, C, D, and X) present in indigenous American populations. All these haplogroups are found in Native peoples of Siberia and this evidence indicates that all extant indigenous people in the Americas originated from Asia. The mtDNA lineages of a small number of prehistoric individuals have been identified at four archaeological sites dating 8000 cal yr BP or earlier. Haplogroups A, B, C, and D were identified at these sites in coprolites or human bone (Goebel et al. 2008). This sample, even though it is small, corresponds with the known mtDNA lineages of modern Native Americans.

After several decades of research, analysis of the mtDNA evidence of extant populations is showing a similar population story (Mulligan 2008; O’Rourke and Raff 2010). Some 30,000 years ago, the ancestors of Native Americans diverged from the Asian gene pool. These people became genetically isolated for at least 7000 to 15,000 years (Kitchen et al. 2008; Mulligan et al. 2008; Tamm et al. 2007). This is thought to have occurred somewhere in greater Beringia. During this isolation, genetic variants specific to and present throughout the New World were generated. This was followed by a rapid expansion of people from this population into the Americas about 16,000 years ago. Geneticists indicate that there was a single migration into the Americas by a population of about 1000 to 2000 individuals (Kitchen et al. 2008; Mulligan et al. 2008). While it is likely they did not all come over at the exact same time, small bands from this source population made their way to the Americas over a number of years. A recent study of some of the early human skeletal remains from North America provides physical anthropological data that support this genetic scenario (Auerbach 2012).

Does the Clovis-First Paradigm Still Work?

One of the objectives of science is to formulate models or paradigms that will account for as many observations as possible within a coherent framework. According to Kuhn (1970), a paradigm is based on one or more past scientific achievements, such as the discovery of Clovis at Blackwater Draw and the subsequent discovery and investigation of other Clovis sites. These discoveries affirm that the newly founded paradigm is valid. The paradigm attracts a group of researchers and is open-ended enough that it leaves problems to be resolved. Over time, research sometimes reveals anomalies, information that is difficult to explain within the context of the existing paradigm. Many anomalies are ignored, require small adjustments to the current paradigm, or are dismissed as errors. Discoveries contrary to the paradigm are rare because expectations of the paradigm obscure our vision. However, if enough anomalies accumulate, the paradigm is eventually stretched beyond its limits of credibility. Failure of a paradigm occurs when it cannot account for observed phenomena. Anomalies can no longer be ignored. This leads to a paradigm shift and the formulation of a new paradigm that better incorporates recent information.

At least three major anomalies cannot be explained or no longer ignored by the Clovis-First paradigm. First, at 13,000 cal yr BP both North and South America were occupied by humans. In North America there is the Clovis complex, with its distinctive technologies and tools. In South America the sites of this age are characterized by generalized toolkits with many flake tools and some bifaces, but no diagnostic artifact type. Thus, at the time of Clovis in North America, you have sites of the same age and with different stone-tool technologies and assemblages in South America. Second, there are several credible sites dating before the time of Clovis. These sites have biface, blade, bladelet, and osseous technologies that date at least to 15,000 cal yr BP. These sites are found in both North and South America in well-dated and secure geologic contexts. Third, the current genetic evidence suggests an older-than-Clovis colonization of the Americas between 16,000 and 15,000 cal yr BP. It is now time to create a new model for the peopling of the Americas and explore new questions about the first inhabitants of the Americas.

A New Model for the Peopling of the Americas

A new model for the peopling of the Americas will be formulated in the coming years by merging interpretations from archaeological field data and ancient genetic information from fossil human skeletal remains and perishable materials discarded by these early inhabitants.

Genetic data will play an ever-increasing role in our understanding of the First Americans. Already, modern genetic data from living Native Americans show that the First Americans originated from central Asia, probably from a single source population, and that their ancestors were present south of continental ice sheets by 15,000 to 16,000 cal BP. The new genetic frontier is the recovery and analysis of DNA from prehistoric human skeletons and coprolites. Pioneering studies have already confirmed that haplogroups A, B, C, and D, found in modern Native populations, also occur in ancient skeletons and coprolites. Haplogroup X has yet to be identified in an ancient specimen, and its ultimate ancestral origin remains uncertain. Paleo-genetic studies provide unambiguous information regarding the origin and dispersal of ancient human populations—data not obtainable from other methodologies.

We need more empirical archaeological data—field data—from the older-than-Clovis time period. Numerous sites in North and South America predate Clovis by at least
2000 years. In terms of technology, these early sites show that biface technology (Meadowcroft, Friedkin, Hebior, Monte Verde), blade and bladelet technology (Friedkin, Meadowcroft), and osseous technology (Manis) were present in the Americas before Clovis. These sites also show that these early people exploited different environments and resources across the Americas.

We need a new term for the older-than-Clovis occupation of the Americas. The term “pre-Clovis” has several meanings—most commonly the term is used to describe a separate and older group unrelated to Clovis, or it is used as a chronological term to denote sites older than Clovis. Then there is “proto-Clovis,” which infers that an ancestral population with a different but Clovis-related technology existed in the Americas for a short period before Clovis, but this term infers a direct ancestral relationship between the earliest colonists of the Americas and Clovis. Proto-Clovis has a North American bias and ignores different late-Pleistocene cultural trajectories in the Southern Hemisphere where Clovis is absent. Because pre-Clovis and proto-Clovis are contentious terms, a different descriptor is needed for the period before 13,000 cal BP. We propose the term, “Exploration Period” for the time period of the early entry of humans into the Americas before Clovis. This is a neutral term that does not define the trajectory of cultural development in either North or South America. This is solely a chronological term for the time period before Clovis—current evidence shows that people were in the Americas at least 2000 years before Clovis, and only more research will determine if there is a longer time depth of human occupation of the New World. As the evidence mounts in the coming years, more will be learned about this period of human colonization and relationships between the initial colonists and later complexes.

We need to know more about Clovis origins. Clovis emerged as a recognizable complex by 13,000 cal yr BP and by 12,900 cal yr BP had spread across North America. Clovis developed in North America south of the ice sheets and post-dates, by at least 2000 years, the entry of humans into the Americas. While Clovis technology is distinct and gives the impression that it is distinct from complexes before and after Clovis, present paleo-genetic evidence indicates Clovis peoples were no different genetically than later American Indians and that there is no evidence of a separate Clovis migration to the Americas. Also, humans already in the New World possessed technologies that could have been ancestral to Clovis lithic and bone manufacturing techniques.

The Clovis-First model required that Clovis originated from an antecedent technology immediately south of the Ice-Free Corridor. It is now clear that Clovis did indeed develop south of the ice sheets from an antecedent technology, but farther south of the Ice-Free Corridor, perhaps in the southeastern United States, from people already there. In this regard Aubrey, Texas, might be a key site. If the Aubrey site dates to 13,400 cal yr BP, it could represent a transitional site into Clovis. With one exception (a point fragment that appears to have an end-thinning termination), Aubrey lithic artifacts are similar to those from the Friedkin site, with small expedient tools made on flakes. Blades and bladelets are present, and the core tablet flake that was found at the Aubrey site is from a bladelet core. Why did Clovis emerge suddenly at 13,000 cal yr BP, flourish for only two hundred years from 12,700 to 12,900 cal yr BP, and disappear equally fast? Is the sudden appearance and disappearance of Clovis and its short time span caused by the equally rapid environmental changes occurring at the end of glacial period, the massive and rapid extinction of tens of megafauna genera, and the establishment of new faunal regimes?

With a new understanding of the timing of the arrival of the First Americans, we need to rethink the role that humans played in the extinction of the megafauna at the end of the Pleistocene. Recent work on Sporormiella, a dung fungus associated with herbivores, from cores extending back into the late Pleistocene has been used as a proxy for megafauna population declines at the end of the Pleistocene (Gill et al. 2009). These studies indicate that the megafauna population was stable until 14,800 cal yr BP when megafauna populations began a serious decline, with a dramatic decline at 13,700 cal yr BP, and extinction at 12,700 cal yr BP. It is interesting that each of these juncture points in megafauna population history coincides with human migration into the Americas and technological changes. The decline of megafauna at 14,800 cal yr BP coincides with the archaeological and genetic evidence for the arrival of people into the Americas. The rapid population decline at 13,700 cal yr BP is coincident with the age of many Exploration Period sites. Evidence of early human-mammoth interaction comes from the Schaefer site, Wisconsin (14,490 ± 250 cal yr BP), Hebior site, Wisconsin (14,775 ± 200 cal yr BP), Lindsay mammoth, Montana (14,295 ± 215 cal yr BP), and likely others. We have human-mastodon interaction at the Manis site, Washington (13,815 ± 50 cal yr BP). Finally, the disappearance of the megafauna at 12,700 cal yr BP is coincident with the florescence of Clovis technology, which lasted from 12,900 to 12,700 cal yr BP (Figure 31.2). Most Clovis sites dating to this interval are mammoth kill sites. While we have emphasized the potential role of humans in megafauna extinction, we acknowledge the huge role that climate and habitat change played at the end of the Pleistocene.

We must learn more about the routes taken by the first colonizers into the Americas. Because both the modern and ancient genetic evidence points to Asia as the homeland of the First Americans, there are two viable routes—the Ice-Free Corridor and the Pacific coast. Little research has been done on the timing of the opening of the Ice-Free Corridor for decades. This recently changed with the work of Munyikwa and others (2011) who show that the corridor at about 55°N latitude was open much earlier than previously thought. Areas that were once thought to be covered with glacial ice or proglacial lakes are now shown to be covered by eolian dunes by 15,000 cal yr BP or earlier. What does this mean for the rest of the corridor to the north? Clearly, deglaciation was much more extensive at 15,000 cal yr BP than previously believed. Was the rest of the corridor open at this time? The
coastal route is another viable route into the Americas. The coastal route offers a way for people to move quickly into the Southern Cone and avoid the treacherous disease corridor of Central America. Proof of the early use of boats is supported by the evidence from Arlington Springs on the Channel Islands off the coast of California. Here, human remains are accurately dated using XAD-collagen to 10,960 ± 80 14C yr BP (CAMS-16810) or 12,815 ± 115 cal yr BP (Johnson et al. 2002). Because the Channel Islands were never connected to the mainland, boats must have been used to reach the island. Unfortunately, no artifacts were found with the human remains. It is possible that people could have come via land or sea or even both, as long as they came from the same genetic ancestral source population that had been isolated in Beringia. More work is needed on both routes to determine when these corridors were viable and passable and to find the archaeological evidence of the people who passed along them.

As we build a new understanding of the peopling of the Americas, we need to do this with solid field and laboratory data. Three factors challenge the search for the earliest inhabitants of the Americas—archaeological expectations, geology, and geochronology.

We may not be recognizing the early sites. Our archaeological sight image, until now, has been to expect large lithic artifacts and diagnostic projectile points. However, the evidence is showing that the earliest artifacts in the Americas are nondescript and utilitarian tools with no obviously diagnostic artifact that is as readily recognizable as a Clovis point. These assemblages are recognized as older-than-Clovis only because they occur in a securely dated pre-13,000 cal yr BP geological context. If these artifacts were on the surface, their significance would go unrecognized. Maybe a diagnostic artifact type exists, but has not yet been found. Recall that it took almost 20 years to clarify the picture of Clovis—Clovis was first discovered in 1933, but it was not until Sellards’s publication in 1952 that the regional nature of Clovis was understood. Further, sites like Lindsay show us that early sites can be recognized on taphonomic criteria even if artifacts are absent. Thus, many early sites may be dismissed as paleontological sites. In short, we cannot be biased by expectations; we must be guided by the empirical evidence, even if it confounds us.

Late Quaternary geological processes have affected the early archaeological record and our chances for site discovery. Erosion and sedimentation over the millennia destroy archaeological sites and buries them beyond normal access during site surveys. While we cannot undo the ravages of time that diminish the increasingly older deposits, we can investigate alluviated valleys and marshes that are infrequently explored. The iconic Clovis sites in the American West would have never been found had it not been for artificial gravel quarrying or late-Holocene erosion and valley incision. The geographic area of these small windows into Quaternary alluvium is orders of magnitude smaller than is present in alluviated drainages. The enormous volume of deeply buried, unexplored sediments portends the discovery of our oldest human records.

The enormous potential of absolute geochronology has eluded us as often as it has come to our aid. Chronology hinders us in two ways, first when it is sometimes used to delete sites from further investigation, and second, when inaccurate radiocarbon ages have sometimes falsely dated older-than-Clovis sites to the Clovis time period or later.

Geological or paleontological localities older-than-Clovis have often been overlooked or ignored for archaeological exploration. This Clovis chronological filter causes researchers to under-explore paleontological and geological contexts that are older-than-Clovis. By predetermining that a late-Pleistocene fossil discovery cannot have human associations or that the sediments are “too old” to contain artifacts, scores of older-than-Clovis sites are likely being lost to discovery every year. Until archaeological and paleontological field explorations are unified, our discovery of sites older than Clovis will be minimal.

At the Hebior, Schaefer, and Lindsay sites, among others, initial radiocarbon dates, often directly on megafauna bone, indicated the site’s age was Clovis.Had later, more accurate radiocarbon dating not been done, these older-than-Clovis sites would never have been recognized for the discoveries they have become. Because ages of 11,000 14C yr BP are “accepted” for mammoth or mastodon bones associated with artifacts, archaeologists and radiocarbon labs rarely question if the dates are accurate. Consequently, many sites pre-dating Clovis may go undiscovered owing to simple radiocarbon dating errors. These too-young age determinations extend to human bones, the best example being the Kennewick skeleton (Stafford 2014). This important human skeleton was originally dated by three different AMS radiocarbon labs that returned measurements ranging from 8410 to 5750 14C yr BP. The skeleton’s established 14C age is 8358 ± 21 14C yr BP (average of two XAD-purified collagen ages). These degrees of error dating the Kennewick skeleton and the above proboscidean fossil sites imply that if the ultimate proof of older-than-Clovis presence were ever found—a human skeleton—the skeleton could be dated too young by thousands of years, thereby causing incontrovertible, pre–13,000 cal yr BP evidence of humans in the New World to be lost. Accurate dating of late-Pleistocene archaeological sites and their deposits and fossils requires the strongest adherence to stratigraphy, fossil taxonomy, paleontology, biogeochemistry and radiocarbon chemistry, and physics.

We also need to keep an open mind to new ideas and concepts such as the Solutrean hypothesis (Stanford and Bradley 2012), the hypothesis that an extraterrestrial impact occurred at the start of the Younger Dryas (Firestone et al. 2007), or pre-LGM occupation of the Americas (Madsen 2004). These and other seemingly radical concepts require critical evaluation and testing. We should not just dismiss radical ideas out of hand without a fair and honest evaluation. However, it is incumbent upon the researcher proposing a radical idea to provide a solid case for the idea. Strong beliefs are not a substitute for solid science.
In conclusion, current data support that the First Americans originated in Central Asia from a population that was isolated from 30,000 to 16,000 years ago. Beginning ca. 16,000 cal BP, as few as 1000 to 2000 individuals from this population began entering the New World and started its exploration. These initial explorers carried with them bifaces, blades, bladelets, and osseous tools. Abruptly around 13,000 cal yr BP, Clovis technology exploded onto the landscape and within a few score years spread across North America. While many questions remain, what is unquestionable is that the Clovis complex does not represent the first evidence of humans exploring and occupying the New World. The Clovis-First paradigm served well for decades, but it is now time to realize that earlier peoples preceded Clovis and possibly by much more time than we accept even today.

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