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The First Americans: The Current Debate

Clovis: On the Edge of a New Understanding. Edited by Ashley M. Smallwood and Thomas A. Jennings (College Station, Texas A&M University Press, 2015) 364 pp. $50.00

This publication of the latest archaeological research about the Clovis big-game hunters clearly indicates a major change in current conceptions about the history of early man in the Americas. However reluctantly, even these Clovis specialists are beginning to accept an alternative model to what had been the dominant paradigm in American pre-history until recently. In his introduction to the volume under review, Smallwood gives voice to the change, accepting pre-Clovis cultures as a given. The Clovis culture, now dated to have begun c. 12800 B.P.E. (before the present era), lasted 200 to 400 years. Smallwood also accepts new findings that suggest the existence of other human populations in the Americas at least 1,000 to 2,000 years earlier (2–3).1

The Clovis model, based on then-available archaeological evidence, mostly from North America, postulated that humans arrived from Asia via the Bering Straits around 13500 B.P.E. This first wave of migrating humans was supposedly blocked in the far north by the Laurentide glacial ice shield until c. 12000 B.P.E.

1 Many of the volume’s authors endorse Michael R. Waters and Thomas W. Stafford, Jr., “Redefining the Age of Clovis: Implications for the Peopling of the Americas,” Science, CCCXV (2007), 1122–1126, which finally conceded the existence of pre-Clovis populations in the Americas based on new South American research and archaeological findings in North America (see n. 28). Stuart J. Fiedel, in Chapter 2 of this reviewed volume, however, continues to reject the findings of Waters and Stafford (15).
when a possible ice-free corridor opened in the glacial barrier. The assumption was that the first to arrive through this land opening of the glaciers were big-game hunters, who mostly occupied the southeastern part of the North American continent between 11000 B.P.E. and 10000 B.P.E. These so-called Clovis hunters (named after one of their archaeological sites) were thought to be the founding population and their big-game culture to have slowly spread by land to the rest of the Americas. It was thus believed that humans did not arrive in South America until 10000 B.P.E. to 9000 B.P.E. at the earliest and that they too were big-game hunters.

The past quarter-century has witnessed a fundamental change in our understanding of the origin, culture, date of arrival, and subsequent settlement of early man in the Americas, largely due to the introduction of historical genetic analysis, more sophisticated studies in historical linguistics, and major new archaeological work in South America. All of this new research has resolved certain basic issues long in dispute. Despite conflicting claims of European and Pacific island origins, all genetic studies confirm that the Western Hemisphere was settled by Pleistocene humans and that their origin was from northeastern Asia via the Bering straits through the Beringia land bridge, as the connection between the two continents was called. Scholars have also rejected the three-migration


3 For the dating of these Clovis materials, see Meltzer, First Peoples, 3–4; for his rejection of this older model, see Thomas D. Dillehay, The Settlement of the Americas, A New Pre-History (New York, 2000), 3–6.

4 For the intellectual rigidity of the Clovis model and its dominance during the twentieth century, see Jon M. Erlandson, “After Clovis–First Collapsed: Reimagining the Peopling of the Americas, in Kelly E. Graf, Carline V Ketron, and Michael R. Waters (eds.), Paleoamerican Odyssey (College Station, 2013), 177–132.

5 The Beringia land bridge, which first appeared 5.5 to 4.8 million years ago, was intermittently flooded in the following centuries. The land bridge was still viable as late as 12900 B.P.E. (see Hoffecker and Elias, Human Ecology of Beringia). The only genetic data showing a non-Beringia origin comes from the Botocudo Indians in Brazil, dated to the European contact or post-European period long after the peopling of the Americas had occurred. See Anna-Sapfo Malaspinas et al., “Identification of Polynesian mtDNA Haplogroups in Remains of Botocudo Amerindians from Brazil,” Proceedings of the National Academy of Sciences, CX (2013), 6454–6469. Conversely, Native American markers have been found in the genetic make-up of a Polynesian island. See J. Victor Moreno-Mayar et al., “Genome-Wide Ancestry Patterns in
model, at least insofar as it was based on the supposed existence of only three language families, as posited by linguists in the 1980s. Finally Latin American, European, and North American archaeologists in a major expansion of research regarding early man in the Americas have proven the existence of older pre-Clovis sites throughout South America.

The earliest innovative work was the introduction of genetic studies of human DNA, which began in the 1980s. Concurrently came an expansion of modern archaeological research throughout South America by local and international dirt archaeologists who began to discover pre-Clovis human sites not associated with big-game hunters along the South American coastline, dating at least several thousand years before Clovis settlements. Finally, linguists have challenged the basic assumptions about language groups and language change on which even some of the earlier genetic work was based. All of these developments have led scholars in numerous disciplines to a major revision of the timing and nature of this migration.

Geneticists and physical anthropologists have used the unique female inherited mitochondrial DNA (known as mtDNA) as the single-most important marker to define origins of population. This genetic marker is abundant in humans, easily found in skeletal remains, and it mutates quickly. Unlike nuclear DNA, these mtDNA markers do not recombine; hence, all of the changes in their make-up are the result of accumulated mutations that can be

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estimated and roughly timed. The genetic studies of Amerindians throughout the Americas show that the mtDNA haplotypes of Native Americans belong to one of four ancestral lineages that were subsequently labeled A, B, C, and D, with a smaller X found later. Approximately 97 percent of Native American peoples everywhere had them. They are also found in ancient skeletal remains. These four mtDNA haplogroups common to all Native American populations are matched only in central Asian populations and nowhere else in the world. Moreover, their mutations from the founding Asian populations show that they had become independent of their origin source. Recent studies of the male-derived Y chromosome indicate both Asian origin and a migration date of 17000 B.P.E. Studies also reveal the X mtDNA, which was not so well distributed, to have derived from a founding lineage in Asia, not European in origin.

Initial morphological studies of surviving skeletal remains seemed to reject these initial findings, supporting the case for direct trans-Atlantic and/or trans-Pacific migrations instead. But even once-skeptical physical anthropologists now accept the Beringia model of a single source, though they tend to hold out for a four-migration model to explain what they see as two alternative types of human remains. Thus, nearly every reputable scholar, regardless of field, now agrees that the founding populations of

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9 For the utility of this marker and its evolution in the Americas, see Jason A. Eshleman, Ripan S. Malhi, and David Glenn Smith, “Mitochondrial dNA Studies of Native Americans: Conceptions and Misconceptions of the Population Prehistory of the Americas,” Evolutionary Anthropology, XII (2003), 7.
15 The only scholars who depart from these models are those doing limited cranial studies of pre-contact skeletal remains in Brazil and North America; their initial results were at odds with the genetic studies. See, for example, Walter A. Neves and Hector M. Pucciarelli, “Morphological Affinities of the First Americans: An Exploratory Analysis Based on Early South American Human Remains,” Journal of Human Evolution, XXI (1991), 261–273; Neves and Mark Hubbe, “Cranial Morphology of Early Americans from Lagoa Santa, Brazil: Implications for the Settlement of the New World,” Proceedings of the National Academy of Sciences of the
the Americas came from Asia, given systematic study of an ever-larger number of Native Americans definitely confirming earlier models that postulated this Asian origin. As Goebel, Waters, and O’Rourke concluded in their major survey, “All major Native American mtDNA and Y chromosome haplogroups emerged in the same region of central Asia, and all share similar coalescent dates, indicating that a single ancient gene pool is ancestral to all Native American populations . . . . This history is further supported by ancient DNA studies showing that Paleoamericans carried the same haplogroups (and even sub haplogroups) as modern Native groups.”

These genetic data, as well as archaeological evidence, challenge older estimates about the time of migration, suggesting new, even earlier arrival dates of this human migration—from 18000 B.P.E. to 23000 B.P.E.—which many scholars now deem acceptable. But the number and the means of these migrations through the Americas have raised other debates. The original assumption of three different migrations was based primarily on an outdated linguistic analysis. Given that the Americas contained an estimated 108 of the world’s 420 languages, such linguistic diversity appears to be explicable only by either a single migration with a


later dispersal or innumerable migrations. Moreover, neither the old method of historical linguistics nor the repudiated premise of three language families in the Americas can offer any help in the definition or the creation and distribution of language families. Recent linguistic approaches have proposed that much of the surprising number and complexity of American languages is due to an original migration rhythm of “pulse and pause”—that is, periods of separation and rapid change followed by stability.

Nonetheless, the debate about the number and size of the migrations has not yet been resolved in the other sciences. Certain genetic evidence suggests a more elaborate three-migration model than originally proposed—an original separation of the population from its founding group in the northeast, a prolonged period of isolation, and then a rapid expansion into the Americas. But, more recently, a large-scale survey by Ragavan et al. argues that only one migration group crossed Beringia as early as 23000 B.P.E., remaining isolated for around 8,000 years in the Americas side of the Bering Straits and then expanding southward throughout the Americas during the next two centuries. This latest survey may not have resolved all of the issues. The supposed timing and direction of these migrations is still much in dispute, with no firm consensus regarding whether a single migration or multiple streams occurred, although the origin and dating of the first migrants has become less controversial.

19 See the model proposed by O’Connor and Kolipakam in “Human Migrations, Dispersals, and Contacts in South America,” 31.
20 Raghavan et.al., “Genomic Evidence.”
21 For a good review of the competing models of the number and direction of migrations, based on the genetic evidence, see O’Rourke and Jennifer A. Raff, “The Human Genetic
The size of the original migrations is also under debate. Some estimates assume that it involved 1,000 to 2,000 people, whereas others propose a much smaller band. How rapidly this founding group could expand across the two hemispheres has been estimated from demographic and anthropological data about known hunters and gatherers. Various mathematical models suggest that such a founding population, now estimated at well under 100 persons, could have reached the major regions of North and South America even before the end of the Pleistocene Ice Age, though current genetic studies cannot ascertain the number of migrating populations. Studies of the male-defined Y-chromosomal markers show no significant differences in origin or rates of change from the female-derived mitochondrial data, thus suggesting that both sexes experienced the same migration patterns.

The model featuring the northern ice-free corridor between the glaciers also faces a challenge from new archaeological research. There is little question that humans had become seaworthy by the time of their arrival in America. The latest evidence suggests that they did not wait for a break in the northern glaciers but bypassed the glaciers altogether in boats along the northwestern coast of North America. Furthermore, there may have been a common “kelp highway” along the coast from the Bering Straits that extended well below the glaciers with a common resource base of seals, sea otters, shellfish, seaweeds, and other easily available food, especially at key river estuaries. Thus, early migrators experienced no abrupt transition in their environment as they moved south and no drastic change in diet or foraging.


with these coastal settlements show that these early humans were small-game hunters as well as shellfish and seed gatherers who fully exploited their access to the sea, not the Clovis-type big-game hunters who now are thought to have inhabited a smaller area at a much later date. Accordingly, despite a few holdouts, most scholars now agree that the most recent genetic, linguistic, and geological information indicates that the Clovis culture was not foundational, as once proposed. New archaeological evidence also shows the existence of settlements along the entire Pacific coastline of America long before the Laurentide barrier had melted enough to open an ice-free land passage. Pre-Clovis sites have now been validated even in North America. Evidently, humans had begun to migrate by water from the Bering Straits region by c. 17000 B.P.E., reaching Patagonia by 14000 B.P.E., if not before.

This coastal migration, however, was just one part of the history of human migration in the Americas. Several subsequent


river and interior migration routes also emerged, with blockages along the way, and new continental to island movements would later occur in the Atlantic coastal region. All of these developments show up in the genetic data. These studies suggest that the people who remained farther north retained more genetic markers similar to those of Asian populations than did the southern native Americans, and that the Pacific coastal populations differed from the eastern interior ones. The Andean and Mesoamerican populations bear a marked genetic similarity, and their genetic differences from eastern South American groups betoken easier coastal migrations and more difficult interior travels. In the Andean area, dense populations based on the emergence of complex peasant societies tended toward homogenization of the gene pool. Indians from the Amazonian area, the central Brazilian plateau, and the Chaco plains show “higher rates of genetic drift and lower levels of gene flow, with a resulting trend toward genetic differentiation.” These genetic differences are evident in the linguistic data as well, though dating the evolution and correlation of distinct languages with the genetic and archaeological data has proven to be difficult.

Although scattered early sites of human occupation in South America date to the Pleistocene era (c. 14,000 B.P.), extensive settlement by humans over most of the continent is not evident until the post–ice Holocene period. By 11,000 B.P., groups of hunters and gatherers had arrived in the Colombian highlands, along most of the Pacific coast, and along the Atlantic region in the eastern


Brazilian highlands and southern Patagonia plains. The population in the Amazonian basin was still sparse. More permanent settlements collected near such rich food sources as coasts, rivers, estuaries, and highland basins. Some moderate big-game hunting is in evidence, but the South American continent had far fewer large mammals than did North America.

The megafauna (animals weighing more than 1 metric ton) and most of the other large animals (those weighing more than 44 kg) did not long survive the era of human settlement in South America. The megafauna became totally extinct by 6000 B.P.E., and 80 percent of the large animals, including horses and camels, had also disappeared. The mega-mammals (seventy-three species found in South America) appear to have been open-range animals that suffered from the loss of habitable areas due to changing climate conditions and possibly from hunting, which finally pushed them into extinction. The only survivors after 6000 B.P.E. were fourteen mammal species of moderate weight that made their homes in water, jungle, or isolated mountain areas. Whatever big-game hunting existed—the only record of which is in Patagonia—was undoubtedly far less important in South America than in North America. Small animals, fish, crustaceans, tubers, and nuts were

34 For a survey of early southern coastal Pacific fishing sites, see Philippe Béarez, Donald Jackson, and Noémy Mollaret, “Early Archaic Fishing (12,600–9,200 cal yr BP) in the Semi-arid North Coast of Chile,” Journal of Island & Coastal Archaeology, X (2015), 133–148. For the recent finding of a human skeleton dated at 11200 B.P.E. in the same area, see Donald Jackson, César Méndez, and Eugenio Aspillaga, “Human Remains Directly Dated to the Pleistocene-Holocene Transition Support a Marine Diet for Early Settlers of the Pacific Coast of Chile,” ibid., VII (2012), 363–377. The earliest well-studied site, dating from 11700 to 9800 B.P.E., is in the Amazon basin near the coast at the Cave of Pedra Pintada outside the city of Monte Alegre; it is famous for its rock paintings. The Pleistocene remains show that foragers there hunted turtles, fish, and small game and collected fruits and seeds. See Anna C. Roosevelt et al., “Paleoindian Cave Dwellers in the Amazon: The Peopling of the Americas,” Science, CCLXXII (1996), 373–384.


the basic food stock of early humans, but by 10000 B.P.E., agriculture and plant domestication was already underway in the central Andes and possibly the Brazilian eastern lowlands.  

The most systematic food gathering and herding cultures occurred along the Pacific coast and the Andean highlands. The many recently excavated Pacific coastal middens (or waste mounds) reveal that early humans fished along the coast and gathered edible mollusks. These coastal peoples eventually moved into the Andean highlands around 10000 B.P.E., just after the disappearance of ice from the northern and southern altiplano or high plateau, apparently domesticating llamas and alpacas by 6000 B.P.E. At the same time, stratified societies began to emerge in these Andean highlands and coastal valleys, exemplified by major irrigation works and permanent settlements. By 5000 to 4500 B.P.E., the first sedentary, complex societies developed along the Peruvian coast, marked by the construction of large monuments. One thousand years later, similar sites could be found in the Andean highlands. By 2900 B.P.E., the Andean area shows the first multi-region art designs with Chavín cultural forms appearing throughout the highlands and coastal valleys. All of these artifacts hint at the emergence of either pan-Andean religious centers or political empires.

Whatever these early multi-state formations may have been, imperial states that systematically engaged in warfare were emerging in western South America. The Moche civilization, which began on the northern Peruvian coast c. 1700 B.P.E., is considered one of the earliest such empires. The earliest highland states were Tiawanaku and Wari, arising during the second half of the first century A.D., both located near Lake Titicaca. From that time until the Spanish conquest, the coast and highlands of Peru were dominated by densely populated, ever-expanding states with complex class structures and professional armies. Most of these larger states

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38 Daniel H. Sandweiss, “Early Fishing Societies in Western South America,” in ibid., 150.
would eventually be incorporated into the Incan Empire, which dominated most of the western South American highlands and coast by the fifteenth century A.D. Archaeologists have studied the socio-economic and political evolution of the major states in the western part of the continent for more than a century. More recent studies have shown that the pattern of social and political evolution of eastern South America—the Atlantic Coast and in the Amazonian forests and interior floodplains—was considerably different. These new studies provide an entirely new vision of human evolution in the Americas.

At virtually the same time as the Pacific coast was being first occupied by humans, early foragers were settling various parts of the enormous Amazonian basin, the largest river basin in the world. Recent systematic studies of this region feature some of the most revolutionary aspects of the new South American archaeology. Foragers appear to have begun occupying the Mojos llanos (flood plains of eastern Bolivia) to the Amazonian estuary and the Amazonian parts of modern Peru, Ecuador, Colombia, and Venezuela to the Atlantic coastline (from the Guianas to the southeastern pampas and the Patagonian plains) between 11000 B.P.E. and 8500 B.P.E. The forests, rivers, and flood plains of the Amazon have shown themselves to be as important for early human settlement as were the areas on the Pacific coast.42 The first settlers were drawn to the rivers and coast because of the abundant supply of food, but they also used rock shelters whenever they were available on the coast or in the interior.43 The caves in the Monte Alégre in present day Pará, near the city of Santarem, reveal ceramics dated from 6000 B.P.E., among the earliest known ceramics in the Americas.44

42 Michael Heckenberger and Neves, “Amazonian Archaeology,” ibid., XXXVIII (2009), 253. Certain Brazilian and international scholars advance claims for much earlier human settlements in Amazonia based on analysis of the rock paintings and other artifacts mostly at sites in Piauí. At the moment, their time frame of 30,000 years or more has not found wide acceptance among archaeologists (see n. 29). See Niéde Guidon, “As ocupações pré-históricas do Brasil (excetuando a Amazônia),” in Manuela Carneiro da Cunha (ed.), História dos índios no Brasil (São Paulo, 1992), 37–52; more recently, G. M. Santosa et al., “A Revised Chronology of the Lowest Occupation Layer of Pedra Furada Rock Shelter, Piauí, Brazil: The Pleistocene Peopling of the Americas,” Quaternary Science Reviews, XXII (2003), 2303–2310.

43 More than 100 of these rock shelters have been studied. See Reanto Kipnis, “Early Hunter-Gatherers in the Americas: Perspectives from Central Brazil,” Antiquity, LXXII (1998), 584–585.

44 Roosevelt et al., “Paleoindian Cave Dwellers in the Amazon,” 373.
All along the coast were established communities of fishermen and shellfish gatherers who left major coastal, riverine, and underwater mounds or middens (sambaqui in Portuguese) that show long-term settlement. Not only were these local refuse mounds composed of shells, broken pottery, animal and fish bones, human bones, charcoal, and other refuse; they also contained human burials, hearths, and even habitation structures. They were always strategically located near rich sources of fish and mollusks. Nearly 1,000 such mounds have been registered along the 8,000 km of Brazilian coastline. The fifty smaller ones that lie along the interior rivers share a similar culture and time period. The remains of ocean fish bones in some of these interior riverine sambaqui appear to indicate settlement by coastal populations. The large coastal mounds from the central-southern coast of Brazil, as well as several in the northeastern coast of Pará and Maranhão, have been well studied. The community of fishermen, gatherers, and hunters at São Luís Maranhão, for example, established c. 6000 B.P.E., remained in existence until 900 B.P.E. Studies of hundreds of sambaquis reveal that most of them originated c. 5000 B.P.E. and persisted until 2000 B.P.E. Extensive excavations of skeletal remains in a lakeside sambaqui in southern Brazil found evidence of a relatively healthy population with excellent food resources and low levels of political violence.

None of these mound communities had walls, and several different excavations of shellfish mound dwellers in this period.

45 For the best description of these shellfish mounds, see Maria Dulce Gaspar, “Considerations of the ‘Sambaquis’ of the Brazilian Coast,” ibid., 592–593.
48 Central South Coast shellfish mounds also date from this period. See the latest results in T. A. Lima et al., “The Earliest Shellmounds of the Central–South Brazilian Coast,” Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms, CCXXIII (2004), 692. For the overall dating of the sambaqui culture, see Gaspar et al., “Sambaqui (Shell Mound) Societies of Coastal Brazil,” in Silverman and Isbell (eds.), Handbook of South American Archaeology, 324.
49 This finding is based on a study of eighty-nine individuals buried in the shellmound of Lagoa Camacho at Santa Catarina. See Mercedes M. M. Okumura and Eggers, “The People of Jabuticabeira II: Reconstruction of the Way of Life in a Brazilian Shellmound,” HOMO, Journal of Comparative Human Biology, LV (2005), 263–281.
show a lack of warfare wounds in surviving bones. Given their common features, the sabaqui communities probably shared a common culture and had considerable interaction, having little contact with inland hunters and gatherers or ceramic-producing peoples until 2000 B.P.E. Though generally small, some of the Brazilian sambaquis, especially those in the far south near Santa Catarina, are especially impressive; often measuring as much as 30 m high and 500 m long, they look more like well-constructed monuments than mere refuse dumps.

The entire western lowland of the eastern South American region was initially settled by small groups of semi-nomadic groups at the same time as the sambaquis appeared, in the late Pleistocene and early Holocene eras. Many of these groups set up camps along the rivers and in rock shelters. Given the resource base and the quality of soils, semi-nomadism appears to have remained the norm of these groups of foragers for a considerable time. Nevertheless, the art of these people was stunning. They left rock and cave paintings throughout the region, most of which dated from 3000 B.P.E. onward. Pottery became plentiful throughout the Amazonian lowlands between 4500 and 3500 B.P.E. By 4700 B.P.E., maize and manioc were being grown in this region; slash and burn agriculture was already widespread; and the basic language organization was in place. Between 4000 B.P.E. and 3000 B.P.E., the Tupi-Guarani, Carib, Arawak, and Jê had become the four separate major languages families spoken in the region.

51 Gaspar et al., “Sambaqui (Shell Mound) Societies of Coastal Brazil,” 323.
53 Marvin W. Rowe and Karen L. Steelman, “Comment on ‘Some Evidence of a Date of First Humans to Arrive in Brazil,’” Journal of Archaeological Science, XXX (2003), 1349–1351, seems to be the most complete analysis of the pigments in the cave paintings at Piaui. It rejects the findings of Shigueo Watanabe et al., “Some Evidence of a Date of First Humans to Arrive in Brazil,” ibid., 351–354. Nevertheless, data from teeth and other artifacts in these caves all seem to suggest Watanabe et al.’s much earlier dates.
languages, which quickly spread throughout the area, were to be the main languages encountered by the Europeans thousands of years later.  

Early nomadic humans also settled along the rivers in the Amazonian basin. These small communities hunted, fished the rivers, gathered seed, and even harvested domesticated and non-domesticated plants, slowly creating the “black earth” soils that were scattered throughout the Amazonian forests. These soils were unusually rich in nutrients because of the refuse heaps generated by these semi-sedentary groups. Other early groups of small mobile bands occupied the Pantanal region during this early period, living in both caves and the open plains. Two thousand years after the small mobile bands of forgers entered this huge western floodplain region, a new sedentary civilization emerged in most of this region. Communities of permanent agriculturalists who were also sophisticated builders became the norm beginning c. 2500 B.P.E.; many of these communities lasted for a century or more. In these open savanna flood lands of the eastern Amazonian basin (which extended to the Andean foothills), farming groups constructed circular villages, small platforms, and long raised causeways and canals that extended for many kilometers. They used these raised fields and causeways to keep themselves and their crops dry during the wet season, in the process creating a far richer soil than was normally available in these regions. These settled village agriculturalists also established islands of small forests in the savannas. Western Amazonia and the Bolivian Madeira river-basin region known as the llanos of Mojos probably have more than 1,000 of them. Acre alone has 281 of them dating from 2000 B.P.E.

This complex agricultural and aquatic culture slowly declined after a century, although some of its communities survived into the early Portuguese colonial period. Their constructions differed from region to region, but their ceramics were largely uniform. The existence of walled villages testifies that warfare was a major

aspect of Amazonian life.\textsuperscript{58} Moreover, the same raised field systems run throughout the western periphery of the Amazon along the borders of modern Colombia, Ecuador, and Peru, as well as northward into the Guianas and Venezuela.\textsuperscript{59} The area’s increasingly elaborate construction, population density, and multi-village organization fostered full-time specialists in various crafts and political entities, often called chiefdoms.\textsuperscript{60} But in sharp contrast to developments in the Pacific coastal valleys and Andean highlands during the first century A.D., these chiefdoms did not further develop into highly stratified states and empires, probably due to a combination of limited resources, a lower population density, and changing climatic conditions.

The most interesting aspect of these sedentary communities was their ability to manipulate their environments, challenging the idea that the tropical rain forest prior to 1500 was a pristine ecosystem, untouched by man. Archaeologists, geographers, and ecologists now see a large share of the Amazonian forest, especially the


southern and western fringe, as having been significantly changed by a relatively dense pre-Colombian population.\textsuperscript{61} Aside from their earthen structures throughout the flood plains of the western Amazonian, they created “black earth” zones within the tropical forests, using fire to burn vegetation and create settled villages. These rich agricultural areas, in regions otherwise poor in soil, represented accumulations of agricultural waste that served as fertilizer and formed unique “islands” throughout the rainforest. The complex ecological interaction between humans and their environment created new ecosystems.\textsuperscript{62}

For several centuries, these interior forest and plains dwellers created ever-more developed societies. By 1500 B.P., the Upper Xingu Valley (in Mato Grosso), at the southern end of the Amazonian tropical forest area, had permanently settled villages with earthen walls and thousands of inhabitants whose households radiated from a central plaza. Often located in open plains (várzea) on the edge of the tropical forest with good access to rivers, these villages based their economy primarily on fishing and manioc farming, the extensive plots for which were outside the town walls. The fact that 85 percent of the diet in these villages was comprised of cultivated plants demonstrates the importance of agriculture to the local economy. These plaza towns were from 20 to 50 hectares in size; their accompanying external gardens and roads could encompass an area as large as 250 km\textsuperscript{2}. Many of the larger plaza towns were connected to each other by road networks.\textsuperscript{63}


These advanced civilizations in the central and western regions of Brazil seemed to peak at 1000 A.D., slowly decline during the next few centuries, and largely disappear by 1500 A.D. Thus, neither the sambaqui communities, which had vanished earlier, nor the later mound-building cultures, created powerful states like those that emerged in the Andean region. Nevertheless, village agriculturalists and semi-nomadic hunters and gatherers could be found throughout Brazil when the Europeans arrived in the early sixteenth century; the coast, the floodplains, and the rivers were the most densely populated areas. The latest estimate of the population of Amerindians for the greater Amazonian area, which includes most of present-day Brazil, in 1500 is 5 to 6 million persons. The total estimated South American population in 1500 was 54 million persons. By comparison, the estimated number of Native Americans residing in the far less densely populated region of North America was 2 million. Central Mexico, with 14 million, and Andean Peru, with 12 million were far more densely populated than either open plains or forested lowland regions.

As this review essay shows, scholars from multiple disciplines generally agree about new models for the origin and dating of migration to the Western Hemisphere, replacing the rigid Clovis-first model that had dominated texts for fifty years. Even Clovis specialists, as the Smallwood and Jennings collection shows, have finally accepted the need to change traditional models. Although they have not fully incorporated the literature discussed herein, they have accepted the need to redefine the role of these big-game hunters even in the context of North American developments.


65 The best review of these widely differing numbers is found in Denevan, “Native American Populations in 1492: Recent Research and a Revised Hemispheric Estimate,” in *idem* (ed.), *Native Population of the Americas*, xxviii.


67 All of these estimates are from Denevan, “Native American Populations in 1492,” xxviii.
This new research has not resolved all of the questions relating to this migration; serious controversies still exist. But the development of the new field of genetic studies and the recent opening of major South American archaeological sites has resolved many older debates and has provided a far more nuanced and complex early history of mankind in the Western Hemisphere than existed before.