

ARCHAEOLOGY OF SOUTH AMERICA

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Summary

Hunters who entered the South American continent via the Isthmus of Panama had reached the Strait of Magellan by 11,000 years ago, probably having traveled along the eastern slopes of the Andes. An alternate route along the Pacific coast may have been followed by maritime populations and would account for human presence in south-central Chile by 13,000 years ago. By the very beginning of the Holocene, humans occupied nearly every part of the continent, including the Amazon Basin.

As the environment warmed during the early Holocene, ecozones changed. Some resources became scarce and others became more plentiful. The mastodons, horses, paleolamas, and giant ground sloths that had been hunted during the Pleistocene gradually became extinct. Increased rainfall expanded the extent of the tropical forests.

Mountain glaciers retreated making the higher reaches of the Andes accessible to animals and humans. Rising sea level remodeled the coastlines, creating conditions favorable to fishing and maritime hunting. Human populations throughout the continent gradually readapted to the changing conditions, inventing new technologies and developing new subsistence strategies. Only in the southern plains of the Pampas and Patagonia did life resembling that of the Pleistocene continue.

By the middle Holocene there were sedentary communities in the tropical latitudes, supported by agriculture and supplemented by fishing and hunting. Among the earliest domesticated plants were cotton and the bottle gourd, both important to the development of fishing economies. Staple food plants were represented mainly by root crops, manioc and sweet potatoes in the lowlands and potatoes in the higher elevations. Maize arrived from Mexico early in the middle Holocene but did not become a staple food until much later.

The first rumblings of Andean civilization began around 2500 BCE with the construction of monumental mounds and buildings on the Peruvian coast. Farming initially was of limited importance, but with the development of irrigation, production increased dramatically. The rich agricultural lands of the coastal valleys combined with the abundant sea resources soon supported a dense population, and the coast of Peru soon saw the development of chiefdoms, states and empires. Irrigation combined with pastoralism had a similar impact on the populations of the central highlands of Peru, where state development culminated in the Inca empire.

The northern Andes, the Caribbean region, and the Amazon region experienced similar developments. By the time of the arrival of the conquest, the tropical lowlands were heavily populated, especially along the waterways, and the first European explorers discovered large polities ruled over by a hierarchy of lords and chiefs.

1. Introduction

Humans first entered South America in the late Pleistocene via the narrow Isthmus of Panama. Having learned from the experience of migrating from Siberia to Alaska and colonizing North America, they were skilled hunters and foragers, capable of exploiting a broad range of food resources and adapting to a variety of environments. Although there have been suggestions that humans evolved on the South American continent, there is no evidence to support that claim. The highest primates native to the continent are represented by 53 monkey species, divided into two families, *Callithricidae* and *Cebidae*. There are no apes, nor have any fossil apes or fossilized pre-modern humans been discovered. By the end of the Pleistocene, humans could be found in every corner of South America, from Panama to the Strait of Magellan, from the Pacific shores to the mouth of the Amazon. They had adapted their subsistence strategies to the cool, arid conditions of the high Andean plains, as well as the hot, humid environment of the Amazon forests. In the succeeding millennia, largely independent of outside influence, the people of South America created complex societies, including an imperial state that in size and centralized control rivaled any of the pre-modern states known in the old world.

The westernmost part of South America is dominated by the Andes Mountains, exceeded in height only by the Himalayas among world mountain chains. Starting in the northeastern corner of the continent, the Andes run parallel to the Caribbean coast, turn southward in the northwestern corner, and from there extend in an unbroken chain all the way to Tierra del Fuego, the southernmost point. To the east of the Andes lies a vast lowland area drained by 3 complex river systems: the Orinoco in the north, the Amazon in the center, and the Río de la Plata in the south. The Atlantic coast of the continent is rimmed by an ancient upland landmass known as the Guiana Highlands north of the Amazon and the Brazilian Highlands south of the Amazon. The continental divide hugs the Pacific coast; only in far northern Peru and Ecuador is it more than 100 km. from the shore. The Andes effectively block Pacific weather from reaching the eastern lowlands, meaning that most of the interior of the continent is affected by weather emanating from the Atlantic.

The Panamanian land bridge between the South and North American continents was established about 3 million years ago. Prior to that, South America had been isolated for several million years, explaining why it contains a greater number of endemic species than any other continent. The land bridge permitted terrestrial animals to pass between the two continents for the first time, but because of its tropical environment, some animals adapted to a temperate environment were unable to cross over. Mastodons, camels, horses, deer and other herbivores migrated into South America. Some large mammals, however, were excluded, most notably the bison. After the extinction of the horse at the end of the Pleistocene, the gracile wild camelid, known as the guanaco, was the only herding herbivore on the grasslands of South America; neither herd size nor animal biomass, however, was comparable to the herds of bison found on the North American plains. The peoples of the Andes, however, did domesticate the camelids into two sub-species: the alpaca, exploited mainly for its wool, and the llama, used as a beast of burden.

1.1 Pleistocene Ecology

Unlike Eurasia and North America, where large parts of the landmasses were covered with glaciers during the Pleistocene, in South America glaciation was limited to the high mountain valleys of the Andes. Only in the southernmost mountains did the glaciers spill out onto the high plains of Patagonia. The vertically spaced environmental zones of the Andes were found at lower elevations than they are today and the grasslands of the high plains, situated mostly at elevations above 4,000 m., and which later supported a pastoral economy, were inaccessible for human exploitation until conditions began to warm toward the very end of the Pleistocene, ca. 13-14,000 years ago.

The lowlands of Amazonia were drier than today, the rainforest more restricted, and the savannah grasslands more extensive. The paleo-environmental data, however, are insufficient to determine the extent of these changes with any degree of exactness. At the time of maximum glaciation, ca. 18,000 years ago, sea levels were nearly 120 m. lower than today, exposing parts of the continental shelves. The most extensively exposed areas in South America were in the northwest, where the Isthmus of Panama was nearly 3 times its current width, along the northern and central coast of Peru, where the sea shore was more than 80 km. west of its current position, and from the central

coast of Brazil south to Patagonia. The lowering of sea level increased the gradients of the rivers, causing them to erode and deepen their channels. As the glaciers melted, sea level rose, establishing its modern level between 5-6,000 years ago. The formerly exposed sea shores were gradually submerged beneath the sea obscuring possible evidence of past coastal settlement. The rivers expanded their floodplains and began to fill in their channels, often creating swamps and lagoons in their lower courses.

1.2 Initial Peopling

Humans were present in far southern South America by 12,500 years ago, as attested at the site of Monte Verde in Chile. How many centuries or millennia before then they first arrived on the continent is a matter of debate among archaeologists. Sites in the Brazilian Highlands have yielded much earlier dates, but their association with cultural remains is in doubt. The pathway to the continent through Costa Rica and Panama has yet to yield evidence earlier than 11,000 years ago, causing some archaeologists to suggest that a maritime route was followed along the Pacific shore, the evidence for which would have been destroyed by the Holocene marine transgression.

More than 30 sites, distributed over almost all regions of the continent, have been dated to the period between 12,000 and 10,000 years ago. Patagonia was inhabited by this time, as were the Brazilian Highlands, the high Andean valleys and plateaus in Bolivia, Peru, Ecuador, Colombia and Venezuela. Coastal areas of Ecuador and far northern Peru, and central Chile also bear clear evidence of human occupation. The rain forests of Amazonia were thought to have remained unoccupied until the mid-Holocene, but recent discoveries suggest that humans were present by the termination of the Pleistocene.

The tools found at the earliest sites are crude stone objects—broken cobbles, flakes with little retouch. These are usually interpreted as expedient tools, manufactured for the purpose of making more effective tools out of bone or wood. That points, knives, scrapers were made from wood or bone is plausible considering the hunting and butchering activities that were carried out, but few convincing specimens have yet been recovered. The hunting and gathering strategies of the first immigrants is not well understood. Evidence from Monte Verde, in Chile, and Taima Taima, an early site in Venezuela, indicate that they were at least occasionally able to dispatch game as large as mastodons, but possibly only on the rare occasions when mastodons had been trapped in a bog or physically impaired. The day-to-day diet likely consisted of smaller game animals that could be trapped, and a broad range of plant foods, the collection of which required detailed knowledge of the local habitats. The latter constraint, which suggests that the migrants would have been reluctant to move into unfamiliar habitats, lends support to theories of an early wave of migration along the Pacific shores where ecological transitions may have been less abrupt than those of a trans-Andean interior route.

1.3. Paleo-Indians

“Paleo-Indians” refers to the earliest Americans and, therefore, should embrace the first migrants, as described above. The term has been used, however, to refer only to the earliest assemblages of stone tools that have stone spear points and other tools which

unequivocally could be said to have been shaped by the human hand. Paleo-Indians have also been associated with the hunting of big game, meaning that they were believed to have pursued the large herbivorous fauna of the Pleistocene, often referred to as mega fauna. In South America mega fauna comprised mastodon, giant ground sloth, giant armadillo, horse, and paleolama. The extinction of all but the llama is attributed by many archaeologists to the impact of the big-game hunters.

In both North and South America Paleo-Indians are said to have spread out rapidly over the game-rich areas. In the 1930's this theory was fostered by the discovery of diagnostic stone points with the remains of megafauna in caves near the Strait of Magellan. Most of the points have a broad stem that resembles a fishtail; hence, they are called fishtail points. Most of them also have a slender channel or flute, on one or both faces. Except for the shape of the bases, the fishtail-fluted points of South America resemble the Clovis points of North America, also found in association with Pleistocene mega fauna. Since point types with fluting are rare in the archaeological record and since both the Clovis and fishtail points dated to the late Pleistocene, archaeologists inferred that they belonged to a common tradition of big-game hunters that spread from North America to South America.

Some archaeologists still adhere to this theory, and see the fluted point tradition as representing either the first or the second wave of immigrants to South America. Recent discoveries of both Clovis-like fluted points and fishtail points from lower Central America have lent support, as have discoveries of fishtail points found over much of Argentina, Ecuador, Colombia, and coastal Peru. Conflicting evidence, however, raises other possible explanations. El Jobo points, distinctively different from the fluted-fishtail points, but as old or older, have been found at Taima Taima and Monte Verde. In highland Ecuador and northern Peru the Paijan point tradition is manifest at several sites, dating from the late Pleistocene through the early Holocene. And during the early Holocene, a variety of point types occur over much of the continent from the Peruvian Andes to the Brazilian Highlands. Before the earliest recorded fluted points occur in South America, then, it seems that there were already people inhabiting the continent who possessed the technological know-how necessary to make fluted points. Still, it seems incredible that fluting could have been invented independently several centuries apart on the North American plains and in Patagonia. If there is a direct historical connection between the two, it seems possible, as some archaeologists have proposed, that fluting was a technological innovation that diffused among people who already knew how to make bifacially flaked tools and not the result of a migration. This theory helps explain the greater formal variation among fluted points in South America as compared to those of the Clovis tradition. Whatever the true explanation, it is clear that humans were comfortably established in South America by the end of the Pleistocene and that they already displayed an array of cultural diversity.

1.4. Later Migrants

There is no compelling evidence of large scale migrations to South America following the early peopling of the continent in the late Pleistocene and early Holocene. It is highly probable, however, that small groups at times migrated from Central America to northwestern South America and vice versa, and it is more than probable that there was

repeated contact with Central America and Mexico throughout prehistory. At least some of that contact was achieved by maritime routes along the Caribbean and Pacific shores. Hypotheses regarding transoceanic contact with populations across the Atlantic and/or the Pacific are intriguing; the evidence in support of such crossings, however, is not robust.

1.5. Holocene Adaptations

A final warming trend began at the very end of the Pleistocene and continued for several millennia. Glaciers in the mountain valleys retreated to higher elevations, allowing plant and animal communities to follow suit. The retreat of the glaciers in Patagonia exposed a cool steppe to the east of the Andes and a network of fiords and islands along the Pacific side. The rising sea level caused shorelines to shrink gradually to their present locations.

In the process new habitats, soon to be exploited by humans, were created. Sedimentation at the mouths of streams and rivers created sandbars, which favored the development of lagoons colonized by mollusks, crustaceans, and fish. Lowered river gradients, in combination with increased runoff and rainfall, caused the Orinoco, Amazon, and La Plata river systems to overflow their banks and flood more extensive areas in the interior of the continent. Mineral-rich sediments were washed down from the Andes and deposited seasonally along the floodplains of the major rivers.

These riparian habitats supported communities of fish, turtles, reptiles, aquatic mammals, waterfowl, and rich soils with high agricultural potential, all of which soon attracted humans. Along the Pacific shore, following the rise of sea level, a northerly-flowing, cool ocean current developed, known as the Humboldt Current. As it flows deep along the shores of northern Chile and Peru, an upwelling of cool water brings nutrients to the surface, supporting one of the world's richest fisheries. The cool waters also chill the air, which, together with the rain-shadow effect of the Andes, reduces precipitation along the coast to a negligible amount. Hence, the northern Chilean and Peruvian coasts are among the driest regions in the world. Nearly one hundred small rivers descend the western face of the Andes, creating a series of linear oases along the coast. These oases, rich in irrigable agricultural land, account for the relatively high population density found along the Peruvian coast in Pre-Columbian times.

The rainforests expanded, shrinking the savannah grasslands. The forests now covered more than three fifths of the Amazon Basin, and extended up the eastern flank of the Andes to elevations exceeding 3500 m. above sea level. A dense tangle of cloud forest marked the ecological boundary between the drier highland landscape and the vast eastern lowlands.

The mega fauna, as noted before, became extinct. In the drier regions of the Andes and southern plains, wild camelids became the principal game animals. In the forested regions the tapir was the largest and most-prized animal hunted, but the peccary, distant relative to the Old World pig, occurred in larger numbers and was probably a more important dietary staple.

1.5.1. Early Holocene

Life seems to have changed very little on the steppes of Patagonia in the early Holocene. Horses, ground sloths and other large animals of the Pleistocene were no longer available, but the main economic focus, as revealed in the tool kits, continued to be the hunting of land game. Point styles changed, but they were still hafted to spears and used in conjunction with bolas stones to hunt guanaco and rhea (the South American ostrich). A variety of ground-dwelling rodents was also exploited.

A florescence of hunting and foraging is also evident in the Brazilian Highlands, very probably a continuance of Pleistocene adaptations to savannah habitats. On the far north coast of Peru and in southwestern Ecuador, where tectonic elevation of the coastline preceded the marine transgression, investigations have revealed the exploitation of sea foods. Hunting and collecting was carried out by highly mobile groups that traveled between the shoreline habitats and the inland hills and valleys, fishing, foraging, and hunting.

Sites in the Andean valleys reveal that humans were taking advantage of the more hospitable conditions and colonizing the high plateaus, as well as the valleys. In Panama charcoal residues in lake sediments suggest that humans were beginning to use fire to modify rainforest environments, a first step, perhaps, toward slash-and-burn agriculture.

1.5.2 Middle Holocene

By 8000 years ago, evidence of human settlement by the seaside increased dramatically. Immense shell middens, known as *sambaquis*, dot the Brazilian coast from Bahía to the mouth of the Amazon and along the shore of the lower Amazon several hundred km. inland. The forested islands and fiord coastlines of southern Chile were populated by maritime hunters, subsisting off of seals, sea lions, sea birds, and shell fish. The tool kits now included harpoon heads, fishing leisters, and bark removers. Bark removers indirectly indicate the manufacture of canoes. The desert coast of northern Chile and far southern Peru was inhabited by fisher-hunters who traveled between inland oases and the high cliffs along the shore. Fishhooks, made from shells and thorns, and composite sinker-hooks, made from bone, attest to a sophisticated hook-and-line fishing technology. Between 7 and 6,000 years ago permanent settlements were established along the central and southern coasts of Peru. Treatment of the dead included eviscerating corpses and inserting wooden supports and adding feathers, fibers and clay to preserve the tissue. The broadly based economies of northern Peru and Ecuador continued from the early Holocene, with the addition of some domesticated plants to the diet. The settlement systems in Ecuador, Panama, and in the northern lowlands of Colombia focused on a larger permanent or semi-permanent settlement, indicative of decreased mobility and increased territoriality.

In the Central Andes varying patterns of adaptation are evident, depending largely on the variable conditions of the ecologically complex setting. In well watered high plateaus, wild camelids, mainly vicuñas, were the main focus of the economy. At lower elevations in the valleys, small bands may have moved seasonally between different

environmental zones; deer were the main game animal. And in zones where the distances between the high plateaus and the valley bottoms were compressed, hunter-foragers moved periodically between the various ecological zones, intensively exploiting specific resources.

1.5.3 Late Holocene

When Europeans arrived in South America, most of it seemed like virgin territory, ripe for exploitation. In fact much of the landscape had felt the impact of human settlement. The Pacific watershed of Panama had been subject to periodic burning for nearly ten thousand years, leaving parts of it deforested and eroded. The arid southwestern corner of Ecuador also experienced pre-Colombian deforestation at the hands of humans. Dense populations had converted the natural ecology of the coastal Peruvian valleys into managed, irrigated, agricultural landscapes. The highland valleys were cultivated from bottom to top, many of them artificially terraced. The hunting zones of the high plateaus had become the grazing lands for llama and alpaca herds. Even the foreboding jungles of the Amazon Basin showed the impact of humans, who had selectively enhanced the densities of plants they found useful. Settlements on the scale of villages and towns were found throughout most of the tropical latitudes of South America, and in the Central Andes there were small cities. Extensive and intensive agriculture had been practiced for at least 4000 years.

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Biographical Sketch

J. Scott Raymond is a professor of archaeology at the University of Calgary. He completed his undergraduate studies at the University of California at Santa Barbara in 1966 and received his Ph.D. in anthropology from the University of Illinois in 1972. He began fieldwork in highland Peru in 1967 and since then, has directed field projects in the Upper Amazon, in the Guayas Basin and the coastal valleys of Ecuador. His publications include various journal articles, book chapters, and a monograph, as well as edited volumes on the archaeology of the northern Andes and the Formative cultures of Ecuador.