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Editors

Human-Environment Interactions

Current and Future Directions

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Chapter 16

Was Agriculture a Key Productive Activity in Pre-Colonial Amazonia? The Stable Productive Basis for Social Equality in the Central Amazon

Eduardo Góes Neves

Abstract Despite a long-standing debate on its intensity and economic role, it has been generally assumed that swidden or extensive agriculture was an important economic component for Amazonian pre-colonial tropical forest societies. However, the available data do not back such a claim. In the central Amazon, the archaeological record shows that the establishment of sedentary societies in the area is quite recent, going back to no longer than 500 BC. Despite good conditions of preservation, so far, no evidence of manioc cultivation has been found during a record of 2,000 years of human occupation. In other areas such as Marajó Island, at the mouth of the Amazon, no evidence of agriculture whatsoever has been found so far, despite the presence of artificial earth mounds and elaborated pottery. Such evidence, when put together, suggests that although plant domestication may have been very ancient in the tropical lowlands, the advent of predominantly agricultural-based economies was much more recent. It is proposed here that agriculture was much more an opportunistic activity based on the intense and sophisticated management with stone axes of gardens and forest under different stages of ecological succession than the pattern of extensive cultivation with metal axes or chain saws of the large manioc gardens known today. If true, the hypotheses have as a corollary that the emergence of the pattern of extensive manioc-based agriculture typical of the tropical forest results from demographic and technological changes brought by the European conquest.

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16.1 Introduction

It is widely accepted today that the occupation of the Amazon Basin is as old as the occupation of other parts of South America (Barse 2003; Meggers and Miller 2003; Roosevelt et al. 2002). This evidence contradicts hypotheses that proposed the occupation of tropical forests would not be possible by populations with economies not based on intensive agricultural food production (Headland and Bailey 1991; Roosevelt et al. 2002). It is also clear that the Amazon was also a stage for early cultural innovations in South America. Among these, there is independent production of pottery, found in shell mounds spread east of the mouth of the Amazon river, with dates going back to ca. 3,500 BC (Roosevelt 1995; Simões 1981). Other sites, located in the lower Amazon, may have even earlier pottery, dating back to 6,000 BC (Roosevelt 1995; Roosevelt et al. 1991), although their chronological context is not totally clear, and it is unclear whether they were an independent innovation that developed earlier in the Amazon than in the rest of the continent (Meggers 1997).

At any rate, there is good ground to affirm that the Amazon Basin was a stage for early cultural development in South America, in some cases preceding other areas. However, by the time of the arrival of the first European colonizers, in the early sixteenth century, highly diversified patterns of social and political organization were described across the continent. Among such plethora, there were centralized states, powerful chiefdoms, and bands of highly mobile foragers. In the central Amazon, early chroniclers describe densely occupied settlements under the leadership of paramount chiefs who could mobilize individuals dispersed over different villages in a multitiered hierarchy resembling chiefdoms. The archaeological data of some areas in the Amazon support such early colonial reports (Heckenberger et al. 2003, 2008). The explanation of the history of the development of the different social formations prevailing in South America in the sixteenth century has been the major task of the archaeology done in the continent for the last century. Why did comparatively more centralized and hierarchical social formations develop in areas such as the central Andes, the Peruvian coast, and parts of northern South America and apparently did not develop elsewhere in the continent in places such as the Amazon? This question is almost as old as Amazonian archaeology itself, and several kinds of explanations, ranging from materialistic- to ideological-based hypotheses, have been presented to answer it. Other authors, on the other hand, propose that Amazonian pre-colonial social formations were indeed centralized and hierarchical, being comparable to other areas of the world where states or empires developed.

In the long history of occupation of the Andes and adjacent areas, one sees the alternation of horizons of cultural or political integration by intermediate horizons of dispersed, localized, or autonomous political groups. In the Amazon, a similar pattern can be visualized albeit not with such widespread distribution. Different from the Andes, however, one sees in the Amazon an amazingly wide distribution of distinct languages and linguistic families without major physical barriers such as

deserts or high mountain ranges. In this chapter, I will suggest that, in the Amazon, great linguistic diversity may be used as a proxy to understand the process of plant and landscape domestication that happened in the early and mid-Holocene. The argument will be further expanded, as I will also propose that great linguistic diversity be used as an indicator of political fragmentation and decentralization across the Amazon.

16.2 Language Dispersals and the Expansion of Agriculture in Tropical Lowland South America

In lowland South America, the association between patterns of language distribution and the expansion of ethnic groups in the past was initially proposed, almost 100 years ago by Max Schmidt. Erland Nordenskiöld, in his brief but insightful synthesis of Amazonian archaeology (1930), took that correlation further, proposing an association between the wide distribution of incised-modeled ceramics decorated with bird heads, found from Trinidad, in the Antilles, to the delta of the Paraná River. For him, such wide distribution resulted from the fact that, in lowland South America, the three major river basins—Orinoco, Amazon, and Paraná—are all geographically integrated.

It was Donald Lathrap, however, who more elegantly formulated a series of hypotheses proposing the association of the patterns of distribution of languages from the Arawak and Tupi families to agricultural expansions in the past. Together with his former graduate students José Brochado and José Oliver, Lathrap, influenced by Schmidt, Nordenskiöld, and Carl Sauer, suggested that the central Amazon would have been an early center of population growth and dispersal in the American continent (Brochado 1984; Lathrap 1970, 1977; Oliver 1989). For these authors, such dispersals resulted from a process of population growth and agricultural colonization of the fertile floodplains of the Amazon Basin leading eventually to the occupation of other alluvial and non-alluvial settings in South America. Perhaps, the great merit of this so-called cardiac hypothesis has been the fact that it proposed an actual mechanism for diffusion. In this case, diffusionism was not employed as an explanatory mechanism whose causes were unknown. Rather, the expansion of people, languages, and ceramics was seen as a result of population growth of well-adapted agricultural groups colonizing contiguous areas in alluvial settings. Lathrap's brand of diffusionism was in many ways similar to the "demic diffusion hypothesis" proposed by Ammerman and Cavalli-Sforza (1984) to explain the distributions of languages and genetic frequencies in the European Neolithic.

Lathrap's work focused more on the dispersal of peoples who spoke languages from the Tupi-Guarani, Arawak, and Pano linguistic families. For him, such population and language dispersals would be correlated to the expansion of ceramics of the polychrome tradition, in the case of Tupi-Guarani and Arawak, and of the

Cumancaya tradition in the case of the Pano family. Later studies in the central Amazon, after the publication of Lathrap's original hypothesis, verified that the archaeological record of the area did not match his expectations (Heckenberger et al. 1998; Neves 2006). Moreover, the correlation of ceramic complexes, or material culture in general, and language groups has been severely criticized by the processual approach of the 1960s to the 1980s, rendering such kind of archaeology almost obsolete for some.

The problem with this criticism, however, is that such perspective was retaken in a series of works done in different parts of the world, most notably the Pacific (Kirch 2000) and the European Neolithic (Anthony 2007; Renfrew 2000). Such approach, denominated in the "farming-language dispersal hypothesis" (FLDH), proposes that the distribution of some of the most widespread language families today result from demographic dispersals resulting from the adoption of farming by different populations of the world. Thus, the dispersal of the Lapita complex of objects, including ceramics, in Melanesia and eastern Polynesia would correlate to the early expansion of Austronesian speakers in the area. In the same way, the expansion of Linearbandkeramik pottery in Europe would correlate to the expansion of early farmers coming from Anatolia and similarly with Bantu languages in Sub-Sahara or the Arawakan colonization of the insular Caribbean. All these cases demonstrate that the FLDH is a powerful paradigm in archaeology today, recycling some of the cherished themes of cultural-historical archaeology—such as the use of diffusionism as an explanatory mechanism or the correlation between the distribution of languages and groups of artifacts—that were almost abandoned by archaeology.

For several reasons, the archaeology of lowland South America could provide a good testing ground for FLDH. Such an attempt, however, was never taken. Among the reasons calling for this testing is that the area has one of the widest distributions of languages and linguistic families in the world. For instance, while most contemporary European languages belong to a single language family, the Indo-European, there are in lowland South America at least four large families with continental-scale distributions—Arawak, Tupi-Guarani, Carib, and Gê—together with several other families with large regional distributions, such as Pano and Tukanoan, and several isolated languages apparently with no established connection with other language families in the area. Another reason for testing the strength of FLDH in lowland South America stems from the fact there has never been large state-like social formations in the area. It is known that these social formations can have a skewing effect in the distribution of languages on a continental scale, such as what happened with Quechua in Andean South America or Latin in Europe. So, whichever were the means for language dispersal in lowland South America, the development of the state was not one of them.

In order to test the FLDH, a series of assumptions have to be accepted. First, one needs to be willing to accept that there is, to some measure, a positive correlation between language variability and the variability in the archaeological record. In other words, since languages cannot be excavated and since there were no writing systems known in pre-colonial Amazonia, one could use the variability

in the archaeological record as a proxy for language variability in the past. Such assumption, although necessary to address the questions raised here, is extremely complex. Since at least the 1960s, there have been many case studies demonstrating that there is no universal correlation between language and material culture. Such studies have indeed generated some of the major theoretical changes undergone by Anglo-American archaeology in the period: the development of the processual and post-processual approaches.

Moreover, in the particular case of Amazonia and northern South America, the ethnographic and ethnohistorical literature is full of evidence that in the sixteenth century, and in some areas until the present, local indigenous groups were regionally integrated in multiethnic networks including specialized production and exchange of goods, the mobilization for warfare, and the periodic condensation into hierarchical chiefdom-like social formations. These social formations were multilingual, sometimes with the development of *lingua francas* or pidgins, despite patterning in material culture generated by exchange networks. It is likely that many of the Amazonian social formations in the 500 years that preceded the European conquest had this general structural pattern (Neves 2008).

How, then, can archaeologists working in the lowland South American tropics, where ceramic artifacts and their distribution patterns are the primary archaeological record, establish a long-term history of indigenous peoples before the arrival of the Europeans? The answer to this question may rest in the identification of the historical contexts where positive correlations between the variability in the archaeological record and languages could be stronger. Which contexts could these be? First, there are the cases of colonization of previously empty areas (Renfrew 2000). This was, for instance, what happened in western Polynesia, where an association between the Lapita complex, identified by patterns in the archaeological record including rock-stamping pottery, and a branch of the Austronesian language family was established (Kirch 2000). Another potential context for this correlation could be the initial decades or centuries of occupation of a previously settled area by external populations arriving with a new technology or a different political, religious, or ideological system (Renfrew 2000). This is what happened in the insular Caribbean with the early colonization of Arawak-speaking groups bringing with them Saladoid pottery and settling in ring-shaped villages dating back to ca. 500 BC (Petersen 1996; Rouse 1992). This was also the case of the colonization of the Atlantic shore of eastern Brazil by the Tupinambá Indians who spoke a language of the Tupi-Guarani family and are associated with sites bearing a distinctive pottery with polychrome decoration. These groups, who arrived in the area around the beginning of the Christian era or even earlier, completely replaced the shell-mound builders who had lived there for many millennia, in some cases since the beginning of the Holocene. In both cases, the replacement can be explained by the fact that the newcomers brought with them a different technology—agriculture. In the particular context of the Tupinambá, there was also a political system strongly based on warfare, captive taking, and cannibalism that was firmly associated with the expansion of these groups.

Turning back to the Amazon, it could, in light of the previous discussion, be possible to identify a historical context where a stronger correlation between ancient languages and patterns in the archaeological record could be established. In most of the Amazon, such context developed in the period ranging from ca. 1,000 BC to AD 500. This was the time when a true cultural explosion happened in the area, marked by the replacement in some areas of long-established lifestyles from the early Holocene by a basic general pattern of economic and social organization that prevailed until the arrival of the Europeans and in some cases until today. In accordance with FLDH, these changes were probably brought by the expansion of agricultural-based societies over areas previously occupied by societies with economies based on a wide range of resources, including the cultivation of domesticated plants, fishing, collecting, and agroforestry. Contrary, however, to what was verified in Europe, Polynesia, and Sub-Saharan Africa, one does not see in tropical lowland South America the prevalence of the expansion of one language family over wide expanses. Rather, what one sees is a mosaic-like pattern with several language families and many small families or isolated languages distributed on a continental scale.

16.3 Domestication, Agriculture, and Climatic Changes in the Late Holocene

The explanation for this pattern can be sought in two factors: first, in an important distinction that has to be made between domestication and agriculture in the archaeology of tropical lowland South America and second, in the potential correlation between climatic and social changes starting around AD 1,000 in this area. I suggest that plant domestication and forest management started quite early, at the beginning of the Holocene, in tropical lowland South America. Such practices involved the replanting of seedlings and the cultivation in house gardens of economically useful plants, including medicines and other kinds of drugs. Overall landscape domestication can be defined as the "conscious process by which human manipulation of the landscape results in changes in landscape ecology and the demographics of its plant and animal populations, resulting in a landscape more productive and congenial for humans" (Clement 1999: 190). During this period, however, plant cultivation never quite became the major source of resources for the populations settled in this area. This is inferred from the small frequency, and in some cases even the absence, in the archaeological record of evidence of large and sedentary settlements across the Amazon dating prior to ca. 1,000 BC. The exceptions come from Marajó Island at the mouth of the Amazon, where large Ananatuba-phase settlements date back to ca. 1,200 BC (Schaan 2004; Simões 1969); the lower Tapajós River at the lower Amazon, where ring-shaped villages dating from 1,400 BC were identified (Gomes 2008); and the upper Madeira Basin close to the current borders of Bolívia and Brazil, where there is evidence of continuous occupation throughout the Holocene, in what seems to be the longest continuous sequence known for the Amazon (Miller 1992, 1999).

Elsewhere in the Amazon, one sees, from ca. 1,000 BC onward and in many cases already in the Christian era, what appears to be the sudden evidence of human occupation after long intervals in the mid-Holocene with no or very scant signs of human occupation (Neves 2008). These changes may be correlated to more mobile societies with economies focused on, and opportunist exploitation of, natural resources being replaced by societies with fully sedentary lifestyles based on economies more dependent on agriculture or the intensive management of natural resources such as fish banks or aquatic corrals adjacent to villages. A major consequence of such replacement was a considerable increase in archaeological visibility. All of the currently known signs of landscape transformation in the Amazon date from this period (Neves and Petersen 2006). Among them are the artificial earth mounds of Acre and Marajó Island (Meggers and Evans 1957; Roosevelt 1991; Schaaf 2004, 2008), the anthropic and fertile dark soils known as *terras pretas* (Neves et al. 2003; Petersen et al. 2001), the large sites at the mouth of Tapajós River (Gomes 2002), the cluster of large villages connected by roads in the upper Xingu Basin (Heckenberger et al. 2003, 2008), the ring villages of central Brazil (Wüst and Barreto 1999), and so forth.

The fact that these distinct events happened in sequence, and almost simultaneously, at least from a long-term perspective, in the first millennium AD, calls for a common causal explanation for them. The point to be made here is that these different places or regions were so directly or indirectly connected to each other that any major changes in terms of social and political organization in one area could have had implications in terms of political organization in the other ones. The historical record of the Amazon has some examples of it, provided that one is comparing contexts of state-based societies in the early colonial era with non-state societies in the pre-colonial area. It is known, for instance, that in the eighteenth century, the establishment of the English, Dutch, and French at the Guianese Coast and the Portuguese in the central Amazon generated a series of conflicts among indigenous groups that were located far away from the settlements of these European powers (Dreyfus 1993). It is likely that these conflicts did not happen randomly but that they profited from previous networks of trade and even warfare among the same groups.

One should, however, turn to other sources of evidence to try to explain the sudden changes in the archaeological record of the Amazon visible from ca. 1,000 BC onward. The figure of 1,000 BC is somewhat arbitrary, but it may help to provide a benchmark against which one could establish a comparison with previous periods. One such source could be the paleoclimatic record. It may be useful to verify whether there were distinctive climatic or ecological changes happening prior to this period that could be associated to the social transformations verified in the archaeological record. The point here is not to search for causal relations between climatic changes and social changes but to check whether there could be a correlation between these phenomena. The search for these correlations is, however, problematic. The paleoecological record of the Amazon is still poorly known: The traditional methods of paleopalynology, for instance, which privilege the coring of fossil lakes, isolated from the main stream of rivers, left the main floodplain of the

Table 16.1 Climate changes in the Amazon Basin

Area	Evidence	Chronology (cal years BP)	Source
Middle Caquetá River (Western Amazon)	Drying	11,500–4,700	Behling et al. (1999)
	Increase in rainfall	3,000	Berrío (2002)
Loma Linda (Eastern Colombia)	Increase in rainfall	3,600	Behling and Hooghiemstra (2000)
Porto Velho-Humaitá Transect (SW Amazon)	Drying	9,000–3,000	Freitas et al. (2001)
Rio Beni, Bolivia (SW Amazon)	Forest expansion	2,000	Burbridge et al. (2004)
Titicaca Lake	Increase in humidity	2,000	Baker et al. (2001)
BR-174, Manaus (Central Amazon)	Drying	7,700–3,000	Piperno and Becker (1996)
Caxiuanã (Eastern Amazon)	Increase in rainfall	2,700	Behling and Lima da Costa (2000)
Caeté Estuary (Eastern Amazon)	No mangrove vegetation	5,900–2,800	Souza-Filho et al. (2008)
Estuary (Eastern Amazon)	General decrease in mangrove species	5,600–3,600	Behling (2002)
Estuary (Eastern Amazon)	Reduced discharge of the Amazon River	8,000–5,000	Toledo and Bush (2008)
	Resume of sedimentation in Amazonian floodplain	1,710	

Amazon and its adjacent areas unsampled. This situation is beginning to change now, and new methods, such as the search for carbon isotopes in stable organic matter of soils, are applied. Accordingly, sampling for fossil pollens is also being done directly from soil or alluvial lakes as well. These limitations notwithstanding, it is possible to compile the available literature to verify whether climatic changes are visible in the transition from the middle to the late Holocene. There was a trend toward a general increase in humidity and of forest expansion in different parts of the Amazon starting ca. 1,500 BC. The nature of these changes is not well known, but it is likely that one is dealing here with drastic transitions from, say, parkland savanna open areas to close, tall-canopy equatorial forests (Table 16.1).

What is important for the argument presented here is that these ecological changes may have created conditions for the spread of the kind of economic strategies later denominated as “tropical forest pattern” across the whole of the Amazon. Such pattern, initially described in *Handbook of South American Indians* (Lowie 1948), would have as one of its major characteristics the slash-and-burn cultivation of manioc in itinerant gardens. Indeed, manioc cultivation is so widespread today in the lowland tropics that it is hard to imagine agriculture without it in those areas. The paleobotanical data seem to back that claim, since there is evidence that manioc was already under cultivation along Rio Porce in the tropical northern Andes of Colombia, ca. 7,000 years ago.

Interestingly enough, however, there is so far little, if any, direct evidence of pre-colonial manioc cultivation in the Amazon. The study of chipped stones from griddles of the upper Orinoco area of Venezuela has shown that these artifacts were used for the grating and processing of a number of roots and tubers, including *Dioscorea* (Perry 2005). In the central Amazon, despite good conditions of preservation, so far, no evidence of manioc cultivation has been found during a record of 2,000 years of human occupation. Moreover, in areas such as Marajó Island, no evidence of agriculture has been found so far, despite the presence of artificial earth mounds and elaborated pottery (Schaan 2008). Such evidence, when put together, suggests that although plant domestication may have been very ancient in the tropical lowlands, the advent of predominantly agricultural-based economies was much more recent. The data also show that even in these latter cases, it was likely that agriculture was much more an opportunistic activity based on the intense and sophisticated management of gardens and forest under different stages of ecological succession than the pattern of extensive cultivation with metal axes or chain saws of large manioc gardens known today (Denevan 1996).

If this is true, alternations from more agricultural to more hunter-gathering lifestyles were quite common in the past, and, more important, the emergence of the pattern of reliance on extensive manioc-based agriculture consolidated in the literature as “the” tropical forest pattern resulted from the demographic and technological changes brought by the European conquest. Based on these considerations, it is probably better to denominate such tropical forest pattern more as “agroforestry” than as “agriculture.” Agroforestry can be described as the combination of mixed strategies that include the cultivation of domesticated plants in gardens and the management, in areas of fallow or in other places dispersed through the forest. Agroforestry is, in a way, opportunistic, since it profits from areas already opened in the forest, connected by paths, old gardens, or large trees felled by the wind to establish new cultivation areas (Clement 1999). Agroforestry is also intensive in the sense that it invests a lot of time and energy in the tending or cultivation of the gardens or individual trees over longer periods. The technology involved in these agroforestry systems demanded few instruments, among them stone axes and digging sticks. As important as these tools was the knowledge of the forest and its plants by the Indians. The combination of opportunism and intensive care and use of stone axes probably resulted in a redundancy of cultivation and occupation in the same spots in single regions, creating “anthropic islands” in a sea of forests. This was the case of the central Amazon, where there is evidence of long-term occupation of single sites with spans of several centuries, generating *terras pretas* in the process (Arroyo-Kalin 2008; Neves and Petersen 2006).

If agroforestry was opportunistic, the structure and composition of gardens and managed areas also change a lot across the Amazon. The scant evidence available so far tends to support this hypothesis: In the central Amazon, there is so far no evidence of cultivation of large gardens, not even of manioc, in the lower Tapajós area; on the other side, the dispersal of large areas of the so-called *terras mulatas*—dark brown soils of human origin but not associated with artifacts such as pottery—

suggests that these areas were used as gardens. In the upper Xingu, Heckenberger (2008) has demonstrated through ethnographic analogy that manioc was the staple that sustained the dense settlements of the area at the transition from the first to the second millennia AD.

The upper Madeira Basin, next to the current border between Brazil and Bolivia, provides an interesting case study where a long-term trend can be identified. Botanical evidence suggests that this area was the initial center of domestication of manioc and the peach palm (*Bactris gasipaes*), the only fully domesticated palm in Amazonia. This is also the area where the oldest-known evidence for sedentary occupations in the Amazon, going back to ca. 2,500 BC, has been identified. This evidence is supported by the presence of strata of anthropically created terras pretas with that age (Miller 1992, 1999). Finally, this is the place where one of the longest-known uninterrupted sequences has been identified in Amazonia, spanning almost the whole Holocene (Miller 1992). It is thus likely that the upper Madeira was a center of cultural innovation and the development of a particular agroforestry system based on the cultivation of manioc and peach palms, among other plants, throughout the Holocene. Interestingly, the linguistic data also suggest that this area was the center of origin of the Tupi stock. As research progresses in the Amazon, it is likely that other such core areas generating particular agroforestry systems with long-term sequences in the Holocene also will be identified. Interestingly, the expansion of the upper Madeira system, attested by the expansion of sites with ceramics from the polychrome tradition, dates from the middle to the end of the first millennium AD.

As already mentioned, lowland South America has a remarkable linguistic diversity. There is no single linguistic family that dominates the area on a large scale in the same way as the Indo-European language in Europe or Bantu in Sub-Saharan Africa. Such diversity probably resulted from a conjunction of these factors:

- Agroforestry systems of opportunistic and variable nature developed in the area, without the prevalence of one system over the other.
- The climate changed in the transition from mid- to late Holocene, which probably triggered a stronger reliance on these diverse agroforestry systems and the establishment of large sedentary settlements across the area.
- No social formation associated with a particular language was strong enough to politically spread itself on a large scale.

The remainder of this chapter will present data from the central Amazon that builds on the above argument. I will suggest that, in the central Amazon, the alternation between political centralization and fragmentation mirrors, at a local scale, the same overall pattern of linguistic and cultural diversity, or fragmentation, verified across the Amazon. The underlying explanation for these distinct phenomena rests in the opportunistic use of an ample resource base, in the case of the central Amazon in a setting where natural resources are abundant and relatively predictable, coupled with an easily available technological complex. Such factors prevented the emergence and reproduction of institutionalized political centralization.

16.4 Complexity and Abundance in Pre-colonial Amazonia: A View from the Central Amazon Basin

Research done during the last decade in the central Amazon may help to illuminate long-term dynamics of political centralization and fragmentation that could be used as reference for other cases in the Amazon. Human occupation of the central Amazon has been characterized by the alternation of long-term episodes of stability interrupted by what seems like abrupt events of rapid change. This pattern can be associated with different sources: Gaps in the early part of the chronology may be associated with mid-Holocene climatic change, whereas the changes seen around the early second millennium AD are associated with the replacement of ethnic groups in the area. A regional survey allowed for the identification of around 100 archaeological sites in an area located between the cities of Manaus and Coari. This number, by no means an underestimation of the total number of sites occurring in the area, is a sample resulting from three different regional projects: the Central Amazon Project, the Archaeological Survey of the Coari-Manaus Pipeline, and the PIATAM environmental assessment project. The historical reconstruction presented here results from the excavation and mapping of 14 sites: Dona Stella, Açutuba, Laguinho, Hatahara, Lago Grande, Osvaldo, Pilão, Antonio Galo, Lago do Limão, Jacuruxi, Nova Esperança, Lauro Sodré, São Paulo II, and Perpétuo Socorro. It shows a trend of continuous and long-term occupation of the area from ca. 500 BC to ca. AD 1,500. During this period, there were noticeable changes in settlement size and shape, as well as in patterns of ceramic decoration, allowing for the establishment of a chronology comprising four distinct components: Açutuba phase from ca. 400 BC to AD 400, Manacapuru phase from ca. AD 400 to AD 900, Paredão phase from ca. AD 700 to ca. AD 1,250, and Guarita phase from ca. AD 900 to AD 1,500.

The regional chronology shows that there are interpolations among the occupations: at least of 200 years between Manacapuru and Paredão and more than 300 years between Paredão and Guarita. Such interpolations in the sequence show that people making different pottery and occupying villages of different shapes lived not far from each other, in some cases during several decades, in the first millennium AD in the central Amazon. Such was, for instance, the case of Osvaldo and Lago Grande sites, located less than 10 km from each other, adjacent to the complex of lakes that compose the floodplain of the Solimões (Amazon) River. Osvaldo is a single-component Manacapuru-phase site occupied during the seventh century (Chirinos 2007; Neves et al. 2004), whereas Lago Grande is a multicomponent site with a long Paredão-phase occupation dating from the end of the seventh century to the beginning of the eleventh century (Neves and Petersen 2006). The small but constant amount of Manacapuru shards on Lago Grande and vice versa on Osvaldo indicates at least two different possibilities: first, that there was trade in pottery associated with these contemporary occupations and second, that these local groups were regionally integrated in patrilocal exogamous regional systems not unlike those verified today in areas such as the northwest Amazon (Jackson 1983).

Together with the evidence of trade or exogamy, or both, Manacapuru- and Paredão-phase sites also share another distinctive feature: a general ring or horse-shoe shape (Moraes 2007). Ring sites are quite common in the archaeology and ethnography of central Brazil, where they appear around the eighth century AD (Wüst and Barreto 1999). Such sites or villages are normally associated with Gê-speaking groups such as the Kayapó and Bororo, described in the first half of the twentieth century by the likes of Curt Nimuendajú and Claude Lévi-Strauss, although the introduction of this pattern in the area probably resulted from the cultural influence of Arawak groups arriving from the west (Heckenberger 2002). Regardless of their history in central Brazil, ring villages were not generally known archaeologically or ethnographically in the Amazon. The archaeological data now being uncovered show that such patterns prevailed in the central Amazon in the second half of the first millennium AD.

Manacapuru- and Paredão-phase sites were sedentary and quite large. They are associated with *terras pretas*, also known as anthropic dark earths (ADEs). These soils, which are quite fertile and sought after by farmers today, were formed through the deposition of slow-burning charcoal, food residues, and other organic remains in long-term, stable occupations. ADE sites have deposits more than 200 cm deep, densely packed with ceramic remains. They also have features such as artificial mounds made by the piling of soil and pot shard strata. Some of these mounds reach more than 3 m in height and 20 m in length. The functions of these artificial mounds are not yet clear, but it is plausible that they were built as platforms for houses or longhouses. Their construction required in some cases the mobilization of labor, involved in digging, carrying, and piling of soil, and the accumulation of pot shards. In this sense, they can be considered monumental, but there is nothing in them that indicates large-scale planning or engineering. A potential explanation is that these structures were built in events of feasting with the collective participation of individuals of different communities who would contribute labor, beer, and other products or services.

For the argument of this chapter, the evidence presented so far can be hypothetically interpreted in the following way: Manacapuru- and Paredão-phase societies were regionally integrated into exchange networks that included trade and exogamy. Despite differences in pottery, the sharing of a basic village layout shows that such a regional pattern could probably include other commonly shared traits in material culture in, for instance, featherwork or basketry. Regional systems such as this were described historically or ethnographically in areas such as the northwest Amazon, the upper Xingu Basin, the middle Orinoco Basin, and the lower Antilles. Such systems are normally multiethnic, although they tend to be associated with Arawak-speaking groups (Heckenberger 2002; Hornborg 2005). One of their defining trends is that such regional systems did not allow for the emergence of permanent or stable regional hierarchies.

Around the early first millennium AD, one notices visible changes in the occupation history of the central Amazon. The most visible of these changes correspond with a rupture in the ceramic sequence, where Paredão ceramics disappear to have been replaced by occupations with Guarita ceramics. Guarita pottery is remarkably

different from both Paredão and Manacapuru ceramics: They display black and red on white polychrome decoration, which places them among the so-called Amazon polychrome tradition (APT). APT sites are found throughout the Amazon Basin, from Marajó Island to the upper Amazon Basin in Peru, Ecuador, and Colombia. Initially, their center of origin was supposed to be located at the foothills of the Andes (Evans and Meggers 1968), then in the central Amazon (Brochado 1984; Lathrap 1970), but at the moment, the oldest evidence of polychrome tradition ceramics comes from the upper Madeira Basin, near the current border of Brazil and Bolivia. Polychrome occupations in the central Amazon are superficial and normally placed on top of previous occupations of the Paredão or Manacapuru phase. The distribution of diagnostic shards shows that their area of dispersion within sites is smaller than that of preceding occupations, indicating a decrease in settlement size. Conversely, APT sites tend to be more dispersed and more regionally spread than with the preceding occupations (Lima 2003). Their occupation span is also smaller, never reaching the many decades or even centuries of continuous occupation found among preceding occupations.

Given the continental scale of the distribution of APT sites, virtually covering an area from the foothills of the Andes all the way to the mouth of the Amazon, albeit with localized regional gaps, one should expect a large measure of variability in terms of site size, density, and length of occupation. It is therefore possible that the pattern seen in the central Amazon could not apply to what is verified upstream in the Amazon River. Indeed, this is what was verified by the first Europeans who traveled down the Amazon in the early fifteenth century. These early chroniclers reported the presence of large sites regionally integrated into hierarchical social formations led by paramount chiefs.

At any rate, in the central Amazon, the social and cultural changes brought about the local replacement of Paredão-phase occupations by Guarita-phase (polychrome tradition) occupations did not bring any visible changes in terms of increase in political centralization or social hierarchy. To the contrary, if any changes happened, they were toward political decentralization and decrease in settlement size.

16.5 Discussion

The long-term patterns emerging from the data of the central Amazon allow for the discussion of a series of topics pertinent to South American archaeology. Among those topics are the development of the formative and the emergence of political centralization.

In what relates to the formative, one is faced with what may be the most important question of South American archaeology: Why did populations, derived from probably small initial groups of colonizers sometimes toward the end of the Pleistocene, take such different political and social paths during the Holocene? The available data show that some of the most important cultural innovations on the continent, such as pottery manufacture and plant domestication, started earlier in

the tropical lowlands than in other areas. However, the development of settled life with a stronger reliance on agriculture seems to have developed much later in the Amazon than elsewhere in South America. How do we account for this apparent paradox?

The other question is the emergence of political centralization: The data from the central Amazon show a clear trend toward population growth and visible landscape modifications starting around 500 BC. Associated with such trends are clear signs of sedentary life, sometimes in large settlements reaching areas of many hectares. There is nothing, however, in the archaeological record that shows the development of marked regional hierarchies, wealth accumulation, or other traits that could be linked with the long-term production and reproduction of institutionalized social inequalities.

Traditionally, those processes have been interpreted by arguments of environmental limitations: lack of soil nutrients, lack of animal protein, unfavorable climatic conditions, or the right staple to support complex polities. Maybe the time has arrived to flip those arguments upside down and look at such processes in a different way. Instead of limitation, it could well be that important factors may have provided the material setting for the political processes discussed here. There is an abundance of resources along the large Amazonian rivers and their main tributaries. Even the present major upstream Amazonian cities, such as Manaus with almost 2,000,000 people, are daily provisioned by fish caught in the central Amazon. It is clear that current levels of exploitation are not sustainable and that new technologies, unavailable prior the twentieth century, have been introduced. Still, anyone familiar with the main Amazonian floodplain is well aware of the wealth of resources, mostly animal protein, to be found there. It may well be that such wealth of resources accounts for one peculiar fact related to the long-term history of the interplay of plants and people in the Amazon: Many species of palms have been managed since the beginning of the Holocene, but only one palm species, *Bactris gasipaes* (peach palm, chonta, peijibaye, or pupunha), has been fully domesticated. It can be argued that the lack of domestication means that there was no selective pressure for domestication, since resources were abundant enough to be managed in the wild or in domestic settings.

16.6 Concluding Remarks

This chapter started with the premise that early cultural developments in South America, such as plant domestication and pottery making, started as early, if not earlier, in the tropical lowlands as in the Andean area, traditionally seen as the major single center of cultural development in the continent. However, after this initial burst, developments in the lowlands seemed to stall, whereas in the central Andes, one sees, already in the late Archaic, the construction of monumental structures indicating the emergence of institutionalized social hierarchies. In the tropical lowlands, on the other hand, the archaeological record of the middle Holocene is

characterized by gaps, followed by a cultural and demographic explosion around the beginning of the Christian era.

It has been suggested here that such gaps probably stem from poor archaeological visibility resulting from climatic change toward drier conditions in the middle Holocene. It is likely as well, however, that mid-Holocene populations of the Amazon had mixed economies marked by the cultivation of domesticated plants but also by the management of wild resources. Such strategies may have contributed to increased mobility and hence diminished archaeological visibility.

The noticeable changes in demography and settlement patterns visible after the beginning of the Christian era were probably associated with the establishment of climatic conditions similar to the ones verified in the Amazon today. From this time on, in the central Amazon and elsewhere, occupations became sedentary and permanent, urban clusters developed in some areas, and visible signs of landscape change became abundant. Interestingly though, such changes are not associated with the rise of intensive agriculture or, in some cases, with the development of institutionalized social hierarchies. For instance, in the central Amazon, the long-term archaeological record shows signs of political equality and not the development of centralized chiefdoms. Traditionally, such factors would have been interpreted as the result of adaptations to poor or limiting environmental conditions. It has been proposed here that the opposite may have happened: The abundance of resources and the technology to exploit and manage them, readily available and difficult to control at the institutional level, may have set the material conditions that prevented institutionalized social hierarchies from emerging and reproducing themselves.

If these arguments are correct, the Amazonian formative can be seen as a long-term process that lasted through a large part of the Holocene, only to be interrupted by the arrival of the Europeans in the sixteenth century. Does this mean that social evolutionary categories have no heuristic value for Amazonian archaeology? The answer is probably no, but it could be that the archaeological record of the Amazon may help us to use other benchmarks to evaluate social development or complexity. After all, what is preferable, to work compulsorily building monumental structures and maintaining irrigation channels or to roam freely in the semiwilderness where an abundance of resources is available?

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