

Ecology, Ceramic Chronology and Distribution, Long-term History, and Political Change in the Amazonian Floodplain

EDUARDO GÓES NEVES

INTRODUCTION

In the sixteenth and seventeenth centuries AD, when the first Europeans ventured into the Amazon, they described the presence of settlements placed along the rivers, sometimes so large that one would have to travel several miles to pass by their full extent. On those settlements, according to the sources, one would find paramount chiefs who commanded vast areas, including other settlements, and were able to mobilize large numbers of warriors. In some places settlements were surrounded by palisades, further evidence that warfare was fairly common at the time. Other chroniclers also speak of the beauty of the pottery, which they compare favorably to the pottery of Málaga (Papavero, Teixeira, Overal and Pujol-Luz 2002; Porro 1993, 1994).

Five hundred years later, much of what we know about the ways of living of the settled societies along the floodplains of the Amazon and its major tributaries still comes from early colonial reports. Thus, much of their pre-colonial history is still marred in speculations: were these powerful chiefdoms that descended from groups that occupied those settings continuously for thousands of years (Carneiro 1995; Lathrap 1970; Roosevelt 1991a)? Or were these reports merely ideological propaganda aimed at securing funds in Europe for other forays in this vast area (Meggers 1993–95)? It will be a while before a coherent picture of the archaeology of the Amazonian floodplain emerges despite a noticeable increase in first-hand archaeological research in the archaeology of the area starting in the early 1990s (Erickson 2000, 2005a, 2005b; Gomes 2002, 2005; Guapindaia

Handbook of South American Archaeology, edited by Helaine Silverman and William H. Isbell. Springer, New York, 2008

2001; Heckenberger 2000, 2005; Heckenberger, Petersen and Neves 1999; Heckenberger et al. 2003; Lima, Neves and Petersen 2006; Mora 2003; Neves, Petersen, Bartone and Silva 2003; Neves, Petersen, Bartone and Heckenberger 2004; Petersen, Neves and Heckenberger 2001; Morales 1998; Roosevelt 1991a; Roosevelt et al. 1991, 1996; Roosevelt, Douglas and Brown 2002; Schaan 2001a, 2004).

Evidence accumulated during recent decades shows that the history of human occupation of the Amazon floodplain is more complex than can be subsumed by disputes employing typological, social evolutionary categories such as tribe versus chiefdom. The data also show that the role of environmental forces in the explanation of past human dynamics was perhaps exaggerated by previous scholars, and that social or political variables could have been as important as ecological adaptation in some contexts. Today scholars are achieving a more historical-based, particularistic focus that is needed before further attempts at generalizations can be successful.

This paper intends to examine the available archaeological evidence of the social formations that occupied the Amazonian floodplain from ca. 500 BC to AD 1500. It is based on work done in different South American countries, but it will have a strong focus on the Brazilian Amazon due to the availability of new information for this area, the comparatively larger size of the Amazon basin in Brazil, and the fact that this is my own area of active research. In the Brazilian Amazon, as in other Amazonian countries, the possibility of doing large-scale fieldwork is severely limited by logistical problems such as cost of transport, site visibility, access to Indigenous lands and the increasing danger posed by drug trafficking and guerilla warfare (Oyuela-Caycedo and Bonzani 2005: xviii; Politis 1996). On the other hand, there is a noticeable increase in large-scale regional projects related to contract archaeology, mostly from mining, hydroelectric and pipeline construction, normally in areas located away from the main Amazonian floodplain. Although much of the data remain unpublished, in the few cases that are reported the publications have brought new and insightful information on cultural sequences of poorly known areas (Miller et al. 1992).

THE AMAZONIAN FLOODPLAIN

The focus on the floodplain as a differentiated area in the cultural history of the Amazon builds on a long and illustrious tradition in anthropology that divides the Amazon basin in two general ecological areas: the várzeas, or floodplains, and the terras firmes, or uplands (Lathrap 1968a; Meggers 1996; Moran 1993: 26; Roosevelt 1980). That tradition goes back at least to Erland Nordenskiöld's early synthesis of Amazonian archaeology (Nordenskiöld 1930). In it, Nordenskiöld called attention to the fact that, in lowland South America, the three major river basins—from north to south: Orinoco, Amazon and Paraná (Figure 1.2)—are directly or indirectly connected, creating a network that would have allowed the movement of people throughout the continent. Nordenskiöld's insight holds some culture-historical truth (Heckenberger 2002), but most importantly, it laid a methodological foundation for differentiating between fluvial-oriented versus hinterland settlements in Amazonia, in terms of size, density and length of occupation. Fluvial in this case means those occupations related to first, second or even third order streams. Nordenskiöld's idea was subsequently used by Lowie (1948) in his definition of the tropical forest culture type. For Lowie, one of the key features of socio-political organization characteristic of the type was emphasis on fluvial occupation (Lowie 1948: 1). Finally, based on Nordenskiöld and Lowie, as well as

on the work of cultural geographer Carl Sauer (1969: 21–23), Donald Lathrap was the first archaeologist to explicitly propose that human occupation of the Amazon would be directly conditioned by access to aquatic resources, mostly as regards demographic growth and the emergence of social inequality (Lathrap 1968a: 62). For Lathrap, drastic ecological differences between river or lake-oriented versus hinterland-oriented settlements, especially in access to animal protein, would have a direct influence on the duration, density and size of settlements in pre-colonial Amazonia. In this model, the abundance of fish, mammals, reptiles and waterfowl in fluvial settings would provide a stable and predictable source of food resources, providing conditions for long-term population growth and sedentary settlements. Hinterland occupations, on the other hand, would be limited to small size and short time span due to the relatively low availability and unpredictable nature of resources in those settings (Lathrap 1968b).

Following Lathrap's work it became accepted among archaeologists and cultural anthropologists that in the Amazon, fluvial-oriented settlements would be consistently larger and occupied for much longer periods than hinterland settlements. The problem, however, is that not much research has been done on hinterland settings, due to the usual logistical problems inherent to working in the Amazon. Every once in a while, though, evidence from hinterland settings shows that, although valid at a general level, Lathrap's hypothesis probably simplifies a more complex pattern. This is the case, for instance, in the geometric-shaped earthworks recently found in the upper Acre basin (Pärssinen, Ranzi, Saunaluoma and Siiriäinen 2003) or in the upper Xingu basin in Brazil (Heckenberger 2005; Heckenberger et al. 2003). These are areas located far from the major channel of the Amazon, but it is clear that similar research in comparable places will show that important floodplain environments exist, even though far removed.

The term "Amazonian floodplain" is employed here to designate those areas placed immediately adjacent to first, second and third order rivers, always downstream from the rapids that mark the transition from the greater Amazonian plain to the Andes in the west, and to the Brazilian and Guiana plateaus in the south and north. They are settings that normally lie less than 100 masl, even when very far from the Atlantic Ocean. For instance, the city of Iquitos, in the Peruvian Amazon, which lies roughly 3,400 km from the mouth of the river, is only 100 masl. The Amazon itself forms nearby, where its two major upper tributaries—the Marañón and Ucayali rivers—meet after flowing northward from the Central Andes. From there the Amazon flows eastward until it reaches the Atlantic Ocean close to the city of Macapá, in Brazil.

It is common that rivers in the Amazon basin change their names when crossing national borders or even after joining other rivers. The Amazon River itself is a good example: it has this name when it flows through Peru and Colombia, after the Marañón and Ucayali rivers meet. Then, after it enters Brazil, the Amazon is known as Solimões until it joins the Río Negro, in central Amazonia. After that, it is known again as Amazon until its mouth. The same happens with the Putumayo-Içá, the Caquetá-Japurá and the Gauinía-Negro. In the text, I will use these regional names.

The Amazon River and all of its large tributaries that have headwaters in or near the Andes of Bolivia, Peru, Ecuador and Colombia are white water rivers. These rivers contain sediment eroded during rainy seasons and sediment from snow-melt in mountainous catchment areas. The Andes are a recent geological formation. As a result, the floodplains of white-water rivers are typically fertile, although their agricultural cycle is limited by the length of the dry seasons and the unpredictability of the flood regimes (Meggers 1996). More important for human occupation, these rivers and floodplains support a rich wild life,

including fish, mammals, fowl and reptiles that were a reliable source of protein for the people settled along and around them.

White water rivers are active, and as a result their channels are constantly being rebuilt by both erosion and deposition. One visible manifestation of that process is the development of ox-bow lakes whose different stages are in fact ancient stretches of river cut off from the main channel, to eventually become lakes and swamps. Lathrap (1968a) has shown how along the Ucayali River this pattern of erosional secession had important consequence for dating archaeological sites. Older sites are normally located away from the present-day course of the river, next to swamps or ox-bow lakes. The intense erosive action of rivers can also lead to the destruction of archaeological sites. One good example is the site of Miracanguera, located in the central Amazon, close to the city of Itacoatiara, which was identified and partially excavated by the botanist Barbosa Rodrigues in the 1880s (Barbosa Rodrigues 1892: 2). Forty years later, when visited by Curt Nimuendajú in the 1920s, the site had disappeared, having been carried away by the Amazon River (Nimuendajú 2004: 160–161).

Besides white water rivers, there are two other broad categories of rivers in the Amazon basin: clear water and black water rivers. Clear water rivers run from geologically old catchment areas, such as the Guiana Plateau in the north, and the central Brazilian Plateau in the south. Their sediment load is much smaller than white water rivers, and consequently their floodplains are comparatively less productive. Among them are the Uatumã, Nhamundá-Trombetas, Tapajós, Xingu and Tocantins rivers. Black water rivers are probably the most common in the Amazon basin. However, with the exception of the Río Negro, black water rivers are normally small to medium in size, at least in Amazonian terms, being tributaries of larger, white or clear water rivers. Black water rivers have their catchment areas in geologically old settings, swamps or in areas of poor, sandy and well-drained soils. Their black color results from the dissolution of tannic acids from the decomposing litter on the ground. As a consequence, black water rivers are considerably less productive for humans than clear or white water rivers.

Discussion of the occupation of Amazonian floodplains presented here includes the alluvial plains of white, clear and black water rivers, although black and clear water rivers do not form classic várzeas, since the term applies only to the nutrient-rich floodplains of white water rivers (Moran 1993: 24–31). It also includes data from areas where the flood regime depends more on the annual pluvial cycle than on changes in river level, such as Marajó Island, located at the mouth of the Amazon, and the Llanos de Mojos in the Bolivian Amazon. The archaeology of the Orinoco River and the Guianas are not discussed at length here (see Chapters 13, 16, 17 and 23 in this volume).

CHRONOLOGICAL AND REGIONAL PATTERNS

The earliest known accepted evidence of human occupation in the Amazonian floodplain comes from Pedra Pintada cave, located in Monte Alegre, on the north bank of the lower Amazon. It is a sandstone cave where excavations done in the early 1990s revealed evidence of human occupation dating back to ca. 9200 years BC (Roosevelt et al. 1996, 2002). At Pedra Pintada, the abundance of plant and small faunal remains suggest a diversified economy rather than specialized big-game hunting. The same picture emerges from the sites located in the Araracuara area, in the Caquetá river in Colombia where the abundance of palm remains also suggests a diversified, non-specialized economy dating back

to ca. 7000 years BC (Mora 2003). In the lower Jamari River, a tributary of the upper Madeira River located close to the present-day city of Porto Velho, Miller et al. (1992) have identified a long sequence that covers the whole Holocene, with the early dates going back to 6800 BC. At the Dona Stella site, in the central Amazon, ongoing excavations have found bi-facial lithic artifacts, including projectile points, possibly dating to 5700 BC (Neves 2003). In the Carajá plateau of eastern Amazonia, located between the Xingu and Tocantins Rivers, excavations done in rock shelters have also produced evidence of human occupation dating back to the early Holocene (Magalhães 1994). The fact that these sites are located at places far away from each other—and in some cases away from the large rivers—demonstrates that different parts of the Amazonian floodplain were already occupied by the early Holocene. Also from Pedra Pintada and from the fluvial shell mound of Taperinha, located downstream from modern-day Santarém, Roosevelt has excavated grit-tempered pottery dating to the sixth and fifth millennia BC (Roosevelt 1995; Roosevelt et al. 2001, 2006). Confirmed by slightly later dates obtained for shell-tempered pottery from the Mina phase, excavated at maritime shell mounds on Atlantic coast east of the Amazon mouth (Roosevelt 1995; Simões 1981), they are the earliest dates for ceramic production in the Americas.

Based on Lathrap's influential "cardiac model," which proposed that the Amazonian floodplain was continuously and densely occupied since the mid-Holocene (Lathrap 1970a, b; Lathrap and Oliver 1987), there has been a tendency to imagine demographic pressure along the floodplain as early as 3,000 years ago (Hornborg 2005; Oliver 2001). However, the available archaeological data are not supportive of this idea (Heckenberger, Neves and Petersen 1998; Neves and Petersen 2006). To the contrary, the data show that, with the exception of the already mentioned upper Madeira basin (Miller et al. 1992) and the lower Amazon (Meggers and Danon 1988; Roosevelt 1991a; Schaan 2001a, 2004), signs of human occupation during that time are quite scanty. For instance, in the central Amazon—Lathrap's putative center of early cultural development in lowland South America—evidence of human occupation from 5700 to 500 BC is absent, despite the identification of more than 100 archaeological sites in a 900 km² research area (Neves 2003). At Peña Roja, on the Caquetá River, despite early dates showing occupation of the area ca. 9200 years BP there is a hiatus during the mid-Holocene, interrupted only around the Christian era (Cavelier, Herrera, Morcote and Mora 1995: 27; Herrera, Bray and McEwan 1980–81; Mora 2003: 91–92, 126; Mora, Herrera, Cavelier and Rodríguez 1991). A third example comes from the Santarém area. There, after the above-mentioned occupations with early ceramics at Pedra Pintada and Taperinha dating from ca. 6000 and 5000 BC, there is also a hiatus which is only interrupted much later on, with sites of the Pocó phase dating to 100 BC (Hilbert and Hilbert 1980), despite the recent discovery of occupations in the lower Tapajós with dates back to 1800 BC to 1200 BC (Gomes 2005: 231). In this area, however, there are also gaps between these early occupations and later occupations from the Christian era.

How should we interpret these hiatuses? Do they mean that the Amazon basin was scarcely occupied during the mid-Holocene? Is there a taphonomic bias resulting in the destruction or poor visibility of sites dating from this interval, possibly related to intensive soil erosion (Mora et al. 1991: 41–43)? Can these apparent hiatuses be correlated to climatic change events? Given the modest amount of research in the Amazon we are still far from answering these questions, but it is likely that all of these factors contribute to the current picture. Among the archaeologists working in the Amazon, Meggers has been the most forceful in pursuing positive correlations between climatic change—mostly supposedly related to

ENSO episodes—and gaps in the regional sequences (Meggers 1977, 1979, 1982). The problem is that, at the time, little research had been completed on Holocene climatic patterns. Data from pollen records (Absy and van der Hammen 1976; Baker et al. 2001; Behling and Hooghiemstra 2000; Behling and Lima da Costa 2000; Behling, Berrío and Hooghiemstra 1999; Behling, Keim, Irion and Nunes de Mello 2001; Berrío 2002; Burbridge, Mayle and Killeen 2004; Haffer 2001; van der Hammen 2001; van der Hammen and Hooghiemstra 2000), carbon isotopes in stable organic matter (Freitas et al. 2001) and hydrology (Aalto et al. 2003) show that the mid-Holocene could have been drier than the present, with a potential impact on the distribution and frequency of plant species without, necessarily, the development of open savanna vegetation and forest refuges proposed earlier (Meggers 1977, 1979). An alternative is also to propose that climatic variation at the time was probably more significant than previously thought, with a potential impact for human occupation. In the lower Xingu river a Mina phase fluvial shell mound with ceramics dating from 2000 BC has its basal strata under water, even during the dry season, which is interpreted as evidence that it accumulated during a time of drier conditions, when the water level was lower than today (Perota and Botelho 1992). At Chambira, in the upper Amazon, a ceramic assemblage composed by vessels with restricted forms, single and double spouts and small mouth diameters dating from 1500 BC to AD 1 has been interpreted as a technology adapted to minimizing evaporation at a time of drier climatic conditions (Morales 1998).

If the still tenuous evidence for drought during the mid-Holocene holds, it is likely that many of the archaeological sites from this time are today either destroyed, under water or even buried by tons of alluvial sediment. Conversely, one needs also to consider the possibility that drought and its subsequent changes on water level and forest cover may have had direct impacts on human occupation of the Amazon during that time. Traditionally, supposed reduction of the forest into refuges during the Holocene has been interpreted as conducive to human expansion into the Amazon (Meggers 1977). **The archaeological and climatic data from the mid-Holocene suggest the opposite: human occupation surged only after current tropical climatic and ecological conditions were reached about 1000 BC. From this time on, one again sees strong and unequivocal signs of settlements in the floodplains and adjacent areas, a pattern that becomes clearer and stronger after the onset of the Christian era.**

CULTURAL CHRONOLOGIES AND SOCIAL CHANGE IN THE FIRST AND SECOND MILLENNIA AD

The earliest signs of change in the patterns of social and political organization in the Amazonian floodplains are visible from ca. 2500 BC, with the first evidence of anthropogenic dark earths (ADEs) or terras pretas on the Jamari River, in the upper Madeira basin (Miller et al. 1992). The inception of the Ananatuba phase about 1400 BC marks the first sign of large sites on Marajó Island sites (Meggers and Danon 1988; Meggers and Evans 1957; Schaan 2004; Simões 1969). A little later, from 700 BC to AD 400, in the Upano basin of the Ecuadorian Amazon, at the Sangay site, a group of artificial mounds forming anthropomorphic figures when seen from the air was built and occupied (Rostain 1999).

From what is currently known, however, these seem to be isolated phenomena since no corresponding developments are seen at the same time elsewhere in the Amazon. It is rather later, from around the beginning of the Christian era on, that a widespread and visible pattern of population growth, site aggregation and noticeably anthropogenic landscape

changes become visible throughout the area (Neves and Petersen 2006; Petersen et al. 2001). These changes are matched, in the archaeological record, by the sudden appearance, at different times and places, of large sites with deep stratified ceramic deposits associated with anthropogenic dark soils (Kern et al 2003; Neves et al. 2003, 2005; Petersen et al. 2001); artificial earthworks (Pärssinen, Ranzi, Saunaluoma and Siiriäinen 2003) such as raised fields and causeways (Denevan 1966, Erickson 2000); large villages surrounded by moats and connected by road networks (Heckenberger 2005; Heckenberger et al 2003); artificial residential and funerary mounds associated with elaborate pottery (Meggers and Evans 1957; Roosevelt 1991a, 1996; Schaan 2001a, 2004); quasi-urban settlement systems also are associated with elaborate pottery, polished stone statuettes and long-ranging trade networks (Gomes 2002; Nimuendajú 2004; Roosevelt 1999); and the construction of circular megalithic structures (Nimuendajú 2004).

Most of these developments are organized into a cultural chronology first outlined almost fifty years ago. It divided Amazonian ceramics into four wide horizons, from older to younger, based on their decoration and paste: Zoned-Hachured, Incised Rim, Polychrome and Incised-Punctated (Meggers and Evans 1961, 1983). The cultural historical reconstitution embedded in this chronology is no longer valid, since it proposed that all of the horizons had their origin outside of the Amazon, either in the Andes or in northern South America, which is not the case. The chronology has also been revised, given that it originally proposed a shallow span for each of the horizons, which was later proven to be wrong, and hence the horizons are now classified as traditions (Meggers and Evans 1983; Roosevelt 1991; Schaan 2001b: 157). Finally, further work has shown that there are earlier complexes not identified in the early 1960s, such as the Mina phase ceramic-bearing shell mounds of the Atlantic shore (Roosevelt 1995; Simões 1981), and even earlier ceramics from the lower Amazon, in the sites of Taperinha and Pedra Pintada cave (Roosevelt 1995; Roosevelt et al. 1991). Now these earlier components must be added to the chronology. These problems notwithstanding, the backbone of the sequence retains utility warranting continued use (Lima et al. 2006). Ideally it would be interesting if data on ceramic chronology could be matched by more information on things such as settlement patterns, site occupation chronology, intra-site spatial patterns and so forth, but this is not available in the vast majority of cases (Schaan 2005). That was the case, for instance, of the Manacapuru phase in the central Amazon, for which an earlier component was recently recognized, the Açutuba phase, based on chronological, contextual and formal patterns (Lima et al. 2006). Again, criticism of previous work needs to be tempered by the recognition that field work in the Amazon is complex and expensive: distances are vast and in many cases sites are hidden under the forest or bush.

The earliest ceramics of the New World appear to have been produced in the Amazon (Roosevelt 1995; Roosevelt et al. 1991). The evidence comes from the Pedra Pintada cave, located near the city of Monte Alegre in the lower Amazon, where 8000-year-old ceramics were recovered (Roosevelt 1995). From the Taperinha shell mound, located across the Amazon River from Pedra Pintada, 7000-year-old ceramics were also found (Roosevelt 1995). Beyond the Taperinha shell mound, dates for early ceramics were also obtained from other shell mounds in the lower Amazon, the estuary zone and the Guianese shore: on the Xingu river (Perota and Botelho 1992), the Jauari River (Hilbert 1968), along the Atlantic shore east of the mouth of the Amazon (Simões 1981) and in Western Guiana (Williams 1997: 344). This pattern indicates an association between the early pottery and fluvial and maritime shell mounds of Amazonia (Roosevelt 1995). The problem is that these early ceramic complexes are different from each other: at Pedra Pintada and Taperinha one sees

sand temper and plastic decoration, whereas in the early occupations at the Jauari site (Castalia phase), the lower Xingu and the Atlantic shore (Mina phase), and Western Guiana (Hosororo creek – Mina phase) plastic decoration is absent and shell is the tempering material. If the dates and dated contexts are correct, these differences might indicate two distinct early pottery-making traditions in the Amazon: one, more localized and without further developments, was characterized by the Mina phase ceramics found in both riverine and maritime shell mounds. The other, with an emphasis on plastic decoration, shares common features with other known early complexes in northern South America (Meggers 1997).

The presence of two distinct unrelated early ceramic complexes in the lower Amazon could explain the large formal and technological differences between Mina and Zone-Hachured ceramics. At the Jauari site, a shell mound located on the lower Amazon, Hilbert (1968) found two distinct ceramic assemblages: one of them, belonging to the Castalia phase and composed by shell tempered bowls, can be associated with the Mina phase, whereas the other, belonging to the Jauari phase, has decorative patterns and cauxí (a fresh water sponge) temper, which is characteristic of the Zone-Hachured Tradition. Even if there was a connection between earlier Taperinha and later Mina and Castalia phase ceramics, one is dealing here with at least a 1,500-year-long gap between them. Jauari phase sites have not been dated, but other Zoned-Hachured sites belonging to the Ananatuba phase have. These are sites located on Marajó island, dating back to 1400 BC (Meggers and Danon 1988; Schaan 2001a; Simões 1969). Of course, the gap may result from poor archaeological visibility and lack of fieldwork, but the sudden appearance of Zone-Hachured sites after a long chronological hiatus seems not to be restricted to the lower Amazon and Marajó Island alone.

About the first millennium AD, ceramic-bearing sites seem to appear rather suddenly after long hiatuses in regional sequences (Herrera, Bray and McEwan 1980–81; Hilbert and Hilbert 1980; Lima et al. 2006). The changes visible in the archaeological record from the beginning of the Christian era onwards cannot be associated with any of the ceramic traditions discussed here. Indeed, during most of the first millennium AD one sees throughout the Amazon, at least from the point of view of ceramics, a picture of cultural diversity marked by the simultaneous development of distinct phases or traditions in different places. At Marajó Island for instance, mound building is clearly associated with the Marajoara Phase (Polychrome Tradition), which lasted from the fourth to the thirteenth centuries AD (Meggers and Evans 1957; Roosevelt 1991a; Schaan 2004). Around the same time, in the central Amazon, one sees, from the fifth century AD on, the formation of large sites from the Manacapuru Phase (Incised Rim Tradition) associated with anthropogenic dark earths (ADEs) (Neves et al. 2003; Petersen et al. 2001). These are very fertile soils, highly sought after by current Amazonian farmers, that result from both unintentional and intentional management in the pre-Hispanic past (Glaser et al. 2004; Lehmann et al. 2003; Smith 1980; Woods and McCann 1999). In the central Amazon, ADEs are interpreted as the result of input into the soil of slow burn charcoal and organic waste from household activities in a context of sedentary occupations. They can, therefore, be seen as an indicator of social and demographic change, marking the inception of long-term occupation or of large settlements in the area (Neves and Petersen 2006; Petersen et al. 2001). A similar pattern seems to have occurred with other Incised Rim Tradition sites of the Japurá-Caquetá river, associated with the Japurá phase of Brazil and Colombia, dated from AD 600 to 800 (Herrera, Bray and McEwan 1980–81; Hilbert 1968).

Since the early 1960s there has been a strong debate on the chronology, origins, spread and ethnic meaning of sites with Incised-Rim ceramics. In the initial formulation

these were supposed to derive from older complexes in northern South America (Meggers and Evans 1961), reinforced by the identification, in the lower Magdalena River of Colombia, of sites with ceramics decorated by incision and modeling with dates going back to ca. 4000 BC (Meggers 1997; Oyuela-Caycedo 1995; Oyuela-Caycedo and Bonzani 2005). This hypothesis was criticized by scholars working in different parts of lowland South America, for whom Incised Rim ceramics represented an ancient and local development in the central Amazon (Lathrap and Oliver 1987; Rouse 1985, 1992). The proponents argued that populations expanded from the central Amazon due to demographic growth based on an effective economy combining agriculture and the exploitation of aquatic fauna. Pottery-making groups moved up the Río Negro and down the Orinoco River towards the Caribbean mainland. The resulting archaeological manifestation of this process is seen in the Barrancoid series sites along the lower and middle Orinoco and western Guiana (Lathrap 1964, 1970a, b; Lathrap and Oliver 1987). In this formulation, the Barrancoid series would be a derivation from earlier Incised Rim complexes from the central Amazon. However, the available data do not support this claim. Barrancoid sites in the lower Orinoco are consistently older than Incised Rim sites along the Amazonian floodplain (Barse 2000; Boomert 2000; Gassón 2002; Hilbert 1968; Lima et al. 2006). On the other hand, the similarity among some Barrancoid and Incised Rim ceramics are too strong to be overlooked (Boomert 2000; Evans and Meggers 1968; Hilbert 1968). These include single and double line parallel incisions and modeled decoration around the rims or on labial flanges on the vessels. Maybe the best way to account for this is to accept Lathrap's identification of a connection between Barrancoid and Incised Rim ceramics, but reject his historical hypothesis about its central Amazonian origin, and instead accept Meggers' (1997) hypothesis that early Amazonian and lower Orinocan complexes derive from an initial center of ceramic production in northern Colombia.

Archaeological research in the central Amazon is at last revealing information about historical changes that go beyond ceramic chronology. For example, from the seventh to the eleventh centuries AD, ring-shaped sites associated with ceramics belonging to the Paredão Phase appear (Donatti 2003; Moraes 2006; Neves 2003). Ring villages in lowland South America are ethnographically associated with the Gê speaking peoples from the central Brazilian Plateau (Wüst and Barreto 1998) or with the first Arawak speakers in the Caribbean (Heckenberger 2004; Petersen 1996), but, with the exception of Paredão Phase sites, they are unknown along the Amazonian floodplain (Myers 1973). In the second half of the first millennium AD one also sees the establishment of long lasting regional systems in the central Amazon, based on the presence of Manacapuru ware in contemporary Paredão sites and vice-versa (Donatti 2003; Moraes 2006), and interaction that could have been based on trade and marriage, as described ethnographically among today's Tukanoan Indians of the northwestern Amazonia (Jackson 1983).

If, in the central Amazon, the first millennium AD was characterized, on one hand, by the flourishing of distinct local cultural traditions, and on the other, by a concomitant pattern of population growth and increase in sedentary lifestyles throughout the Amazon, the advent of the second millennium AD marked profound changes that are clearly visible in the archaeological record. Those changes relate to a process that can be interpreted as the emergence of a wide cultural patterning characterized by a replacement of sites of the Incised Rim and other local traditions by sites of the Polychrome Tradition, and also by the gradual expansion of the Polychrome Tradition over a vast area, from the lower Amazon almost to the Andean piedmont in Colombia, Ecuador and Peru. The ethnic and political processes behind the Polychrome expansion are not clear. Brochado

(1984) interpreted the archaeological record as the correlate of agricultural and demographic expansion of Tupi speaking populations over the floodplains of the Amazon and its major tributaries, from a central Amazonian origin center. Meggers (Meggers et al. 1988), on the other hand, has noticed how most of the sites of the Polychrome Tradition tend to be found downstream of the rapids that mark the geological transition from the Amazonian floodplain and the surrounding Guiana and central Brazilian plateaus to the south and north.

Polychrome ceramics share a series of common features that render them distinct. Among them there is the use of painted decoration with motifs in red and/or black over a white slip. Plastic decorative techniques, such as incision, excision, grooving and modeling are also found. In the central and upper Amazon, polychrome vessels tend to be tempered with crushed and burned tree barks (*caraipé*) whereas on Marajó Island grog is the preferred antiplastic. Study of the timing and direction of the polychrome expansion has been a focus of research since the 1950s. Initially it was proposed that it had an Andean or circum-Caribbean origin (Evans and Meggers 1968; Meggers and Evans 1957). As better chronologies became available the hypothesis of an external origin was abandoned and a central Amazonian origin was proposed (Brochado 1984; Lathrap 1970a; Lathrap and Oliver 1987; Oliver 1989). However, the hypothesis of a central Amazonian origin is not supported by the available chronologies for that area (Heckenberger et al. 1998; Hilbert 1968; Neves 2003). Along the main channel of the Amazon, the earlier polychrome sites are related to the Marajora phase, found on Marajó Island and the adjacent mainland, with dates going back to the fifth century AD (Meggers and Danon 1988: 248; Roosevelt 1991a: 313–314; Schaan 2001b: 157), but it is only after AD 750 that dates are more frequent and display a smaller standard deviation (Boomert 2004: 259). This provisional picture may change if earlier dates are confirmed for the upper Madeira basin where polychrome ware, related to the so-called Jamari or Jatuarana Phase, has been (briefly) reported with dates clustering around the beginning of the Christian era (Miller et al. 1992). If these dates are confirmed, we will have to infer a southern Amazonian connection between the upper Madeira and the Marajó Island sites.

By the twelfth and thirteenth centuries AD, most of the floodplains of the Amazon/Solimões were occupied by villages of different size where polychrome ware was produced. The available data show a clear pattern in the dates: older in the upper Madeira, old in Marajó Island and consistently more recent as one moves upstream from the lower to the upper Amazon (Brochado and Lathrap 1982; Evans and Meggers 1968; Heckenberger et al. 1998; Herrera, Bray and McEwan 1980–81; Hilbert 1968; Meggers and Evans 1983; Neves 2003; Neves and Petersen 2006; Schaan 2001b, 2004; Simões 1974; Simões and Kalkmann 1987; Simões and Lopes 1987). Can the polychrome expansion be correlated with a single ethnic or linguistic component as proposed by Lathrap, Brochado and Oliver? There is no single answer, but it appears that by the late 1400s Amazonian social formations were multi-ethnic (Hornborg 2005; Whitehead 1994), similar to what one sees today in such different areas as the upper Xingu (Heckenberger 2005) and the northwest Amazon (Chernela 1983; C. Hugh-Jones 1979; Jackson 1983). In that sense, one would not find a simple correlation between the polychrome expansion and a single linguistic group in late precolonial times. On the other hand, there is mounting evidence across the world that correlates demographic expansion – and the corresponding expansion of material culture and genes – with the advent of agriculture (Bellwood 2001). From this comparative perspective, the match among variables is stronger in cases of expansions into areas previously unoccupied, or in situations where the expanding population brings with it a different

technology enabling the exploitation of new niches as, for instance, agriculture in areas previously occupied by hunter-gatherers (Renfrew 2000).

If the above hypothesis is valid, then a correlation between early polychrome expansion and the expansion of agriculture can be postulated; the earliest dates for polychrome sites come from the upper Madeira basin, the same area that genetic evidence suggests as the center for manioc domestication, *Manihot esculenta* (Olsen and Schaal 1999) as well as the peach palm, *Bactris gasipaes* (Clement 1999). Indeed those initial polychrome sites of the upper Madeira have the earliest ADE sites currently known in the Amazon. If ADEs, as proposed above, are formed in contexts of sedentary occupation, being therefore markers of social and economic change, and also since, together with polychrome ware, the earliest ADEs are found in the upper Madeira, it can be argued that early polychrome expansion is correlated with the expansion of manioc and peach palm farming, by Tupi speaking populations from the upper Madeira basin beginning about 2,500 years ago.

The problem is that, unlike sub-saharan Africa, Europe or Polynesia, there was not one but at least two major waves of linguistic expansion in the Amazon: one of Arawak and the other of Tupi-Guarani families. If the Bellwood-Renfrew hypothesis is correct, one can expect that these different expansions result from the expansion of two different sets of crop complexes. In the same way, the apparently late establishment of sedentary agricultural life across the Amazon indicates that, although food production systems in tropical northern South America area may date from the early Holocene (Gnecco and Aceituno 2004), the transition to a full dependence on agriculture was much later, dating to the beginning of the Christian era (Piperno and Pearsall 1996: 8).

The acceptance of a southwestern origin for the Polychrome Tradition may also help resolve another puzzle of Amazonian archaeology: the fact that there are no signs of polychrome sites in the lower Tapajós, Nhamundá or Trombetas rivers, an area where most of the known sites have ceramics of the Incised-Punctated Tradition. They are highly elaborated ceramics decorated by painting and, most notably, by modeling with zoomorphic and anthropomorphic motifs as well as incision (Gomes 2002, 2005; Nimuendajú 1949, 2004; Roosevelt 1999). The preferred temper is cauxí. These sites are associated with a small but significant corpus of anthropozoomorphic stone statuettes (McEwan, Barreto and Neves 2001; Nimuendajú 2004; Nordenskiöld 1930) and little anthropomorphic or zoomorphic lithic amulets known as *miraquitãs* that have a wide distribution through the Amazon and northern South America (Boomert 1987). Incised-Punctated sites can be quite large, as it is the case of the site now under the modern city of Santarém (Roosevelt 1999). In the lower Tapajós river, Woods and McCann (1999) found archaeological sites with ADEs surrounded by fairly large areas of anthropogenic soils not associated with cultural remains. These areas, called “terras mulatas” are interpreted as records of former agricultural intensification and soil management in a context of large, sedentary occupations (Woods and McCann 1999).

The area of largest density of sites with incised-punctated ceramics lies between the modern cities of Parintins and Santarém. Within that area, at least two distinct complexes can be identified: to the east are sites with so-called Tapajós ceramics, clustered around Santarém; to the west there are sites with Kondurí ceramics, clustered around the Trombetas river. In the chronology of Meggers and Evans (1961), the Incised-Punctated Tradition was classified as recent, appearing after the Polychrome Tradition. Of course, following the pioneering research by Curt Nimuendajú in the 1920s (Nimuendajú 2004), a surprisingly small amount of fieldwork has been done in the area (Gomes 2002, 2005; Hilbert 1968; Hilbert and Hilbert 1980; Roosevelt 1999; Roosevelt et al. 1991, 1996). However,

the available chronological data indicate that Meggers and Evans' scheme is basically valid on this matter, since the inception of the Incised-Punctated Tradition dates from the end of the first millennium AD, that is, later than the earliest polychrome sites elsewhere in the Amazon (Gomes 2005; Roosevelt 1999). Polychrome sites, as already mentioned, have a wide distribution throughout the Amazonian floodplain, from Marajó island to the foothills of the Andes. The only place along the floodplains where sites of the tradition are not found is precisely the Santarém area. There, incised punctuated sites overlap older occupations from the Pocó phase, dating from 100 BC to AD 200 (Hilbert and Hilbert 1980), and not polychrome sites as it would be expected.

As with many other matters in Amazonian archaeology, there are no clear data on the early history of the Incised-Punctated Tradition. These ceramics share a basic pattern of incised and modeled decoration found in the earliest complexes throughout northern South America, going back to the pottery of San Jacinto 1, Puerto Hormiga and Valdivia (Meggers 1997; Oyuela-Caycedo 1995; Oyuela-Caycedo and Bonzani 2005), the Malambo Tradition of northern Colombia (Angulo 1981), the Incised Rim Tradition of the Amazon and the Barranoid series of the Orinoco River (Gasson 2002). They do not represent a rupture with these earlier complexes. The closest similarities with the Incised-Punctated Tradition are found with the ceramics of the Arauquinoid series of the middle Orinoco (Zucchi 1985), coastal Surinam and coastal French Guiana (Rostain and Versteeg 2004: 239). In the middle Orinoco, cauxí-tempered ceramics of the Arauquinoid series date from AD 400 to 1400 (Zucchi 1985). In the Guianese coastal plain, the dates are a little later, starting around AD 600 but also continuing until the arrival of the Europeans (Rostain and Versteeg 2004).

The Santarém area, the middle Orinoco and the coastal plain of Surinam and French Guiana lie roughly equidistant from the Guiana plateau, a region predominantly occupied by Carib-speaking groups today. This has led authors to suggest that both the Arauquinoid series and the Incised-Punctated Tradition are local manifestations, from the late first millennium AD onwards, of a radiation of Caribs towards the Guyanese coast, the middle Orinoco and the lower Amazon (Brochado and Lathrap 1982; Zucchi 1985). Along the Amazonian floodplain, Incised-Punctated ceramics are restricted to a radius of roughly 300km with its center at Santarém, and being surrounded both upstream and downstream by occupations related to the Polychrome Tradition. To the south of Santarém, sites of the Incised-Punctated Tradition are not known. This, together with the alleged similarities with the Arauquinoid series of the middle Orinoco River and Guianas, matches the hypothesis of a northern origin in the Guyana plateau correlated with the Carib expansion. As with other parts of the Amazonian floodplain, the Santarém area was densely occupied at the onset of European colonization. The relative wealth of reports about this area and the Tapajó Indians who occupied it indicate some measure of political centralization, including roads, settlement hierarchy, labor specialization and the presence of a nobility (Nimuendajú 1949, 2004; Roosevelt 1999). Signs of political centralization are, however, absent in the Arauquinoid sites of the Guianese coastal plain, where archaeological sites are small and monumental architecture is lacking (Rostain and Versteeg 2004: 239). In the middle Orinoco, on the other hand, between AD 600 and 800 there was an increase in the size and density of archaeological sites of the Arauquinoid series probably related to the adoption of maize cultivation (Zucchi 1985: 33). Maize agriculture has also been described by early European chroniclers in the Santarém area. Although there are no direct paleobotanical data to confirm it, research done with terras pretas in the Santarém area has uncovered large extensions of anthropogenic soils, in one case with 120ha, which could

have been used for agriculture (Woods and McCann 1999: 12). As with other areas, more research is needed with Incised-Punctated sites in order to determine the extent to which the archaeological record matches early colonial reports.

The Tapajó Indians, settled along the major Amazonian floodplain, were easily accessible to Europeans traveling up and down the river, but in more remote areas the impact of European colonization was strong as well. In the upper Xingu basin, more than 1,000 km south of the Amazon floodplain, the archaeological record shows signs of population decrease and settlement abandonment starting in the sixteenth century AD, and most likely related to the indirect spread of infectious diseases (Heckenberger 2005: 74). These declines were preceded by several centuries of population growth and settlement accretion whose signs became visible after ca. AD 800 (Heckenberger 2005: 87–88, 103). Between AD 1250 and 1350 large earthworks were built, including ditches surrounding villages, sometimes paired settlements, and linear mounds placed at the margins of plazas or alongside causeways (Heckenberger 2005: 78). From these features it can be inferred that there was a degree of social complexity within the communities.

At the mouth of the Amazon, the establishment of European outposts such as Belém and Cayenne also had a strong impact in what seems to have been one of the most culturally diverse areas of pre-colonial Amazonia. This diversity is attested by the flourishing of several distinctive, although correlated, ceramic complexes in an area ranging from Marajó Island towards what is currently eastern Surinam beginning in the fifth century AD (Guapindaia 2001). Associated with these complexes one finds cave burials in zoomorphic and anthropomorphic urns in the Maracá area (Guapindaia 2001), artificial burial chambers, stone alignments and also cave burials related to Aristé pottery (Nimuendajú 2004; Meggers and Evans 1957; Chapter 16 in this volume). The people who made these ceramics were probably the ancestors of the Arawak-speaking Palikur and Lokono Indians, who currently live at the edge of the coastal plain in Surinam, French Guiana and the northern Amapá state in Brazil.

CHIEFDOMS IN THE AMAZONIAN FLOODPLAIN

There has been a heated debate for years over the existence of chiefdoms in pre-Columbian Amazonia (Carneiro 1995; Drennan 1995; Heckenberger 2003; Lathrap 1968a, 1970a; Meggers 1993–1995; Neves 1999; Roosevelt 1980, 1991b, 1999; Stahl 2002; Viveiros de Castro 1996; Whitehead 1994). If they were indeed chiefdoms, how was power financed and transmitted? Where were the political boundaries among these polities and how did they change over time? What was the role of warfare, long-distance trade and labor exploitation in the constitution of these social formations? Finally, how were hierarchies materialized in groups of objects and monumental architecture? Surveying the academic exchange, it is fair to state that the debate has been based on scant archaeological data, a few sixteenth and seventeenth century reports, and a lot of speculation. This is no one's fault for the underdevelopment of Amazonian archaeology leaves room for it. New data from several areas where intensive research has been conducted during the last ten years, some of it yet not fully published, provides a basis for the construction of a model that moves away from typological discussion in terms of old evolutionary stages.

This new scenario is based on the premise that late pre-colonial societies of the Amazonian floodplain were cyclical, with alternating periods of political centralization and

decentralization, the latter inferred from events of settlement abandonment and regional population decline. For instance, in the early sixteenth century AD, there was, in the Santarém area, what seems to have been a highly centralized chiefdom based on long-distance trade (Nimuendajú 2004), intensive agriculture (Woods and McCann 1999), and the production and circulation of sophisticated pottery (Gomes 2002) centered around a quasi-urban settlement (Roosevelt 1999). Something similar seems to have happened in the upper Xingu as well, far away from the main Amazonian floodplain (Heckenberger 2005).

In other areas, such as Marajó Island, the peak of political centralization, represented by mound building, happened earlier, around the eleventh and twelfth centuries AD. By the early sixteenth century AD, the social formation that generated the mounds had already collapsed.

On the other hand, along the Guianese shore evidence of political centralization that might be compatible with chiefly social formations is lacking: settlements were not large, they were occupied for short intervals and there is no sign of settlement hierarchy or monumental architecture (Boomert 2004; Rostain and Versteeg 2004).

A closer look at the archaeology of the central Amazon may help to better understand these cycling processes. Research verifies that the peak of population density and human occupation happened from the fifth to the eleventh centuries AD (Neves 2005; Neves and Petersen 2006). During this time, large and dense sedentary occupations generated the anthropogenic dark soils (ADEs) associated with artificial mounds. After this interval archaeological sites get smaller, with good evidence for short occupation spans. This process of change, also marked by the constructions of defensive structures, such as moats around sites, is probably associated with the beginning of Polychrome Tradition occupations in the area (Neves 2006). Interestingly, some of the abandoned sites are located in very productive settings, such as high bluffs overlooking the fertile Amazonian floodplain, but they were only scantily, if ever, reoccupied after the eleventh century AD (Neves and Petersen 2006).

FINAL THOUGHTS

Clearly, as more detailed regional research is accumulated for the Amazon a more diversified picture emerges. As elsewhere in the world, pre-colonial Amazonian social formations had their own particular historical trajectories. The challenge for the future of Amazonian prehistory is to focus on these particular histories without losing sight of the need for comparative analyses with other areas of the world.

ACKNOWLEDGMENTS This paper builds upon many years of archaeological research in Amazonas state, Brazil. I would like to thank my colleagues of the Central Amazon Project for their friendship and the stimulating research atmosphere. Manuel Arroyo-Kalin, Helena Pinto Lima and Claide de Paula Moraes read and commented on earlier drafts of this chapter, although they probably will not agree with the final result. Finally I thank Carlos Augusto “the Brick” da Silva, Mike Heckenberger and the late Jim Petersen, cherished friends whose scientific curiosity and knowledge will always be a source of inspiration.

REFERENCES

- Aalto, R., L. Maurice-Bourgoin, T. Dunne, D. Montgomery, C. Nittrouer and J. Guyot, 2003, Episodic sediment accumulation on Amazonian flood plains influenced by El Niño/Southern Oscillation. *Nature* 425: 493–497.
- Absy, M. L. and T. van der Hammen, 1976, Some palaeoecological data from Rondonia, southern part of the Amazon Basin. *Acta Amazonica* 6 (3): 293–299.
- Angulo, Carlos, 1981, *La Tradición Malambo*. Fundación de Investigaciones Arqueológicas Nacionales, Banco de la República, Bogotá.
- Baker, P. et al., 2001, The history of South American tropical precipitation for the last 25,000 years. *Science* 291: 640–643.
- Balée, William A., 2000, Antiquity of traditional ethnobiological knowledge in Amazonia: the Tupí-Guaraní family and time. *Ethnohistory* 47 (2): 399–422.
- _____, and D. Moore, 1994, Language, culture, and environment: Tupí-Guaraní plant names over time. In *Amazonian Indians from Prehistory to the Present: Anthropological Perspectives*, edited by Anna C. Roosevelt, pp. 363–380. University of Arizona Press, Tucson.
- Barbosa Rodrigues, João, 1892, Antiguidades do Amazonas – A Necrópole de Mirakanguéra, *Vellozia – Contribuições do Museu Botânico do Amazonas*, vol. II: 1–40.
- Barse, William, 2000, Ronquín, AMS Dates, and the middle Orinoco sequence. *Interiencia* 25 (7): 337–341.
- _____, 2003, Holocene climate and human occupation in the Orinoco. In *Under the Canopy: The Archaeology of Tropical Rain Forests*, edited by Julio Mercader, pp. 249–270. Rutgers University Press, New Brunswick.
- Behling, Hermann and Henry Hooghiemstra, 2000, Holocene Amazon rainforest-savanna dynamics and climatic implications: high-resolution pollen record from Laguna Loma Linda in eastern Colombia. *Journal of Quaternary Science* 15 (7): 687–695.
- _____, and M. Lima da Costa, 2000, Holocene environmental changes from the Río Curuá records in the Caxiuana region, eastern Amazon basin. *Quaternary Research* 53: 369–377.
- _____, J. C. Berrío and H. Hooghiemstra, 1999, Late Quaternary pollen records from the middle Caquetá river basin in the central Colombian Amazon. *Palaeogeography, Palaeoclimatology, Palaeoecology* 146: 193–213.
- _____, G. Keim, G. Irion, and J. Nunes de Mello, 2001, Holocene environmental changes in the central Amazon basin inferred from Lago Calado (Brazil). *Palaeogeography, Palaeoclimatology, Palaeoecology* 173: 87–101.
- Bellwood, Peter, 2001, Early agriculturalist population diasporas? Farming, languages and genes. *Annual Review of Anthropology* 30: 181–207.
- Berrío, J. C., 2002, Synthesis of the paleoenvironmental changes in the Colombian lowlands. In *Late Glacial and Holocene Vegetation and Climatic Change in Lowland Colombia*, organized by J. C. Berrío, pp. 219–231. University of Amsterdam, Amsterdam.
- Boomert, Arie, 1987, Gifts of the Amazons: “green stone” pendants and beads as items of ceremonial exchange in Amazonia and the Caribbean. *Antropológica* 67: 3–54.
- _____, 2000, *Trinidad, Tobago and the Lower Orinoco Interaction Sphere*. Cairi Publications, Alkmaar.
- _____, 2004, Koriabo and the Polychrome Tradition: the late prehistoric era between the Orinoco and Amazon mouths. In *Late Ceramic Age Societies in the Eastern Caribbean*, edited by A. Delpuech and C. Hoffman, pp. 251–266. Archaeopress/BAR International Series 1273, Paris Monographs in American Archaeology, 14. Oxford.
- Brochado, Jose, 1984, An Ecological Model of the Spread of Pottery and Agriculture into Eastern South America. Ph.D. dissertation. Department of Anthropology, University of Illinois, Urbana-Champaign.
- _____, 1989, A expansão dos tupi e da cerâmica da tradição policrômica amazônica. *Dédalo* 9 (17–18): 41–47.
- _____, and Donald W. Lathrap, 1982, Chronologies in the New World: Amazonia. Unpublished manuscript edited by José R. Oliver (1999).
- Burbridge, R., F. Mayle and T. Killeen, 2004, Fifty-thousand-year vegetation and climate history of Noel Kempff Mercado National Park, Bolivian Amazon. *Quaternary Research* 61: 215–230.
- Carneiro, Robert, 1995, The history of ecological interpretations of Amazonia: does Roosevelt have it right? In *Indigenous Peoples and the Future of Amazonia: An Ecological Anthropology of an Endangered World*, edited by Leslie Sponsel, pp. 45–70. University of Arizona Press, Tucson.

- Cavelier, I., C. Rodriguez, L. Herrera, G. Morcote and S. Mora, 1995, No solo de caza vive el hombre: ocupación del bosque Amazónico, Holoceno temprano. In *Ambito y Ocupaciones Tempranas de la America Tropical*, pp. 27–44. Fundación Ergaie – Instituto Colombiano de Antropología, Bogotá.
- Chernela, Janet, 1993, *The Wanano Indians of the Brazilian Amazon: A Sense of Space*. University of Texas Press, Austin.
- Clement, C., 1999, 1492 and the loss of Amazonian crop genetic resources I: the relation between domestication and human population decline. *Economic Botany* 53 (2): 188–202.
- Colinvaux, P., 1987, Amazon diversity in light of the paleoecological record. *Quaternary Science Reviews* 6: 93–114.
- , 2000, Paradigm lost: Pleistocene environments of the Amazon Basin. Continued Forest Cover in Perpetual Flux, Part 2. *The Review of Archaeology* 22 (1): 20–31.
- , P. De Oliveira and Mark Bush, 2000, Amazonian and neotropical plant communities on glacial time-scales: the failure of the aridity and refuge hypotheses. *Quaternary Science Reviews*: 141–169.
- Costa, F. W. S., 2002, Análise das Indústrias Líticas da Área de Confluência dos Rios Negro e Solimões. Dissertação de Mestrado apresentada ao Programa de Pós-Graduação em Arqueologia Brasileira do Museu de Arqueologia e Etnologia da Faculdade de Filosofia, Letras e Ciências Humanas da Universidade de São Paulo.
- Denevan, William, 1966, *The Aboriginal Cultural Geography of the Llanos de Mojos of Bolivia*. Ibero-Americana, 48. University of California Press, Berkeley.
- , 1992, Stone versus metal axes: the ambiguity of shifting cultivation in the prehistoric Amazonia. *Journal of the Steward Anthropological Society* 20: 153–165.
- Drennan, Robert, 1995, Chiefdoms in northern South America. *Journal of World Prehistory* 9 (3): 301–340.
- Erickson, Clark L., 2000, An artificial landscape-scale fishery in the Bolivian Amazon. *Nature* 408: 190–193.
- , 2003, Historical ecology and future explorations. In *Amazonian Dark Earths: Origins, Properties, Management*, edited by J. Lehmann, D. Kern, B. Glaser, and W. I. Woods, pp. 455–500. Kluwer Academic Publishers, Dordrecht.
- Donatti, P., 2003, A arqueologia da margem norte do Lago Grande, Iranduba, Amazonas. Unpublished M.A. thesis. Programa de Pós-Graduação em Arqueologia, Museu de Arqueologia e Etnologia da Universidade de São Paulo.
- Evans, Clifford and Betty J. Meggers, 1968, *Archaeological Investigations on the Río Napo, Eastern Ecuador*. Smithsonian Contributions to Anthropology, vol. 6. Smithsonian Institution Press, Washington, D.C.
- Freitas, H., L. Pessenda, R. Aravena, S. Gouveia, A. Ribeiro and R. Boulet, 2001, Late Quaternary vegetation dynamics in the southern Amazon basin inferred from carbon isotopes in soil organic matter. *Quaternary Research* 55: 39–42.
- Gassón, Rafael A., 2000, Quirípas and mostacillas: the evolution of shell beads as a medium of exchange in northern South America. *Ethnohistory* 47 (3–4): 581–609.
- , 2002, Orinoquia: the archaeology of the Orinoco river basin. *Journal of World Prehistory* 16 (3): 237–311.
- Glaser, B. and W. I. Woods (eds.), 2004, *Amazonian Dark Earths: Explorations in Space and Time*. Springer Verlag, Berlin.
- Gomes, D., 2002, *A Cerâmica Arqueológica da Amazônia: Vasilhas da Coleção Tapajônica MAE-USP*. Imprensa Oficial SP/Editora da Universidade de São Paulo, São Paulo.
- , 2005, Análise dos Padrões de Organização Comunitária no Baixo Tapajós: O Desenvolvimento do Formativo na Área de Santarém, PA. Unpublished Ph.D. dissertation. Programa de Pós-Graduação em Arqueologia, Museu de Arqueologia e Etnologia, Universidade de São Paulo.
- Gnecco, Cristóbal and Javier Aceituno, 2004, Poblamiento temprano y espacios antropogénicos en el norte de Suramérica. *Complutum* 15: 151–164.
- and Santiago Mora, 1997, Late Pleistocene/early Holocene tropical forest occupations at San Isidro and Peña Roja, Colombia. *Antiquity* 71: 683–690.
- Haffer, J., 2001, Hypotheses to explain the origin of species in Amazonia. In *Diversidade Biológica e Cultural da Amazônia*, edited by I. C. Vieira, et al., pp. 45–118. Museu Paraense Emílio Goeldi, Belém.
- Herrera, Leonor, Warwick Bray and Colin McEwan, 1980–81, Datos sobre la arqueología de Araracuara (Comisaría del Amazonas Colombia). *Revista Colombiana de Antropología* XXIII: 184–251.
- Heckenberger, Michael J., 2002, Rethinking the Arawakan diaspora: hierarchy, regionality, and the Amazonian Formative. In *Comparative Arawakan Histories: Rethinking Language and Culture Areas in the Amazon*, edited by Jonathan Hill and Fernando Santos-Granero, pp. 99–122. University of Illinois Press, Urbana.
- , 2003, The enigma of the great cities: body and state in Amazonia. *Tipití* 1(1): 27–58.

- _____, 2005, *The Ecology of Power: Culture, Place, and Personhood in the Southern Amazon, AD 1000–2000*. Routledge, New York.
- _____, Eduardo G. Neves, and James B. Petersen, 1998, De onde surgem os modelos? As origens e expansões Tupi na Amazônia Central. *Revista de Antropologia* (USP) 41 (1): 69–96.
- _____, James B. Petersen and Eduardo G. Neves, 1999, Village permanence in Amazonia: two archaeological examples from Brazil. *Latin American Antiquity* 10 (4): 353–376.
- _____, A. Kuikuro, U. T. Kuikuro, J. C. Russell, M. Schmidt, C. Fausto, and B. Franchetto, 2003, Amazonia 1492: pristine forest or cultural parkland? *Science* 301:1710–1714.
- Hilbert, P., 1968, *Archäologische Untersuchungen am Mittlern Amazonas*. Dietrich Reimer Verlag, Berlin.
- _____, and K. Hilbert, 1980, Resultados preliminares de pesquisa arqueológica nos rios Nhamundá e Trombetas, baixo Amazonas. *Boletim do Museu Paraense Emilio Goeldi*, NS: 75.
- Hornborg, A., 2005, Ethnogenesis, regional integration, and ecology in prehistoric Amazonia: towards a systemic perspective. *Current Anthropology* 46 (4): 589–620.
- Hugh-Jones, Christine, 1979, *From the Milk River: Spatial and Temporal Processes in Northwest Amazonia*. Cambridge University Press, Cambridge.
- Hugh-Jones, Stephen, 1995, Inside-out and back-to-front: the androgynous house in northwest Amazon. In *About the House: Lévi-Strauss and Beyond*, edited by Janet Carsten and Stephen Hugh-Jones, pp. 226–252. Cambridge University Press, Cambridge.
- Jackson, Jean, 1983, *The Fish People: Linguistic Exogamy and Tukanoan Identity in Northwest Amazonia*. Cambridge University Press, Cambridge.
- Kern, D. et al., 2003, Distribution of Amazonian Dark Earths in the Brazilian Amazon. In *Amazonian Dark Earths: Origins, Properties, Management*, edited by J. Lehmann, D. Kern, B. Glaser, and W. I. Woods, pp. 51–76. Kluwer Academic Publishers, Dordrecht.
- Lathrap, Donald W., 1964, An alternative seriation of the Mabaruma phase, northwestern British Guiana. *American Antiquity* 29 (3): 353–359.
- _____, 1968a, Aboriginal occupation and changes in river channel on the central Ucayali, Peru. *American Antiquity* 33 (1): 62–79.
- _____, 1968b, The “hunting” economies of the tropical forest zone of South America. In *Man the Hunter*, edited by Richard Lee and Irven DeVore, pp. 23–29. Aldine, Chicago.
- _____, 1970a, *The Upper Amazon*. Thames and Hudson, London.
- _____, 1970b, Review of Archäologische Untersuchungen am Mittlern Amazonas, by P. Hilbert. *American Antiquity* 35 (4): 499–501.
- _____, 1977, Our Father the Cayman, Our Mother the Gourd: Spinden revisited or a unitary model for the emergence of agriculture in the New World. In *Origins of Agriculture*, edited by Charles A. Reed, pp. 713–751. Mouton, The Hague.
- _____, and José R. Oliver, 1987, Agüerito: el complejo policromo mas antiguo de América en la confluencia del Apure y el Orinoco (Venezuela). *Interciencia* 12: 274–289.
- Lehmann, Johannes, Dirse C. Kern, Bruno Glaser, and William I. Woods (eds.), 2003, *Amazonian Dark Earths: Origin, Properties, Management*. Kluwer, Dordrecht.
- Lima, H. P., E. G. Neves and J. B. Petersen, 2006, A fase Açutuba: um novo complexo cerâmico na Amazônia Central. *Arqueologia Suramericana/Arqueologia Sul-Americana* 2 (1): 26–52.
- Lowie, Robert, 1948, The tropical forests: an introduction. In *Handbook of South American Indians*, vol. 3, edited by Julian H. Steward, pp. 1–56. Bulletin 143, Bureau of American Ethnology, Smithsonian Institution, Washington, D.C.
- McEwan, Colin, Christiana Barreto, and Eduardo G. Neves (eds.), 2001, *Unknown Amazon: Culture in Nature in Ancient Brazil*. British Museum Press, London.
- Magalhães, M., 1994, *Arqueologia de Carajás: a presença pré-histórica do homem na Amazônia*. Companhia Vale do Rio Doce, Rio de Janeiro.
- Maslin, M. et al., 2000, Paleoreconstruction of the Amazon River freshwater and sediment discharge using sediments recovered at Site 942 on the Amazon Fan. *Journal of Quaternary Science* 15 (4): 419–434.
- Meggers, Betty J., 1977, Vegetational fluctuation and prehistoric cultural adaptations in Amazonia: some tentative correlations. *World Archaeology* 8 (3): 287–303.
- _____, 1979, Climatic oscillation as a factor in the prehistory of Amazonia. *American Antiquity* 44 (2): 252–266.
- _____, 1982, Archaeological and ethnographic evidence compatible with the model of forest fragmentation. In *Biological Diversification in the Tropics*, edited by Ghilleen Prance, pp. 483–496. Columbia University Press, New York.

- _____, 1993–95, Amazonia on the eve of European contact: ethnohistorical, ecological, and anthropological perspectives. *Revista de Arqueologia Americana* 8: 91–115.
- _____, 1996, *Amazonia: Man and Culture in a Counterfeit Paradise* (2nd ed.). Aldine, Chicago.
- _____, 1997, La cerámica temprana en América del Sur: invención independiente o difusión? *Revista de Arqueologia Americana* 13: 7–40.
- _____ and J. Danon, 1988, Identification and implications of a hiatus in the archaeological sequence on Marajó Island, Brazil. *Journal of the Washington Academy of Sciences* 78 (3): 245–253.
- _____ and Clifford Evans, 1957, *Archaeological Investigations at the Mouth of the Amazon*. Bulletin 167, Bureau of American Ethnology, Smithsonian Institution, Washington, D.C.
- _____, 1961, An experimental formulation of horizon styles in the tropical forest of South America. In *Essays in Pre-Columbian Art and Archaeology*, edited by Samuel K. Lothrop, pp. 372–388. Harvard University Press, Cambridge.
- _____, 1983, Lowland South America and the Antilles. In *Ancient South Americans*, edited by Justin Jennings, pp. 287–335. W. H. Freeman, San Francisco.
- _____ and E. Miller, 2003, Hunter-gatherers in Amazonia during the Pleistocene-Holocene transition. In *Under the Canopy: The Archaeology of Tropical Rain Forests*, edited by Julio Mercader, pp. 291–316. Rutgers University Press, New Brunswick.
- _____, O. Dias, E. Miller and C. Perota, 1988, Implications of archaeological distributions in Amazonia. In *Proceedings of a Workshop on Neotropical Distribution Patterns*, edited by P. Vanzolini and W. Heyer, pp. 275–294. Academia Brasileira de Ciências, Rio de Janeiro.
- Miller, Eurico, et al., 1992, *Arqueologia nos Empreendimentos Hidrelétricos da Eletronorte. Resultados Preliminares*. Eletronorte, Brasília.
- Mora, Santiago, 2003, *Early Inhabitants of the Amazonian Tropical Rain Forest: A Study of Human and Environmental Dynamics*. Latin American Archaeology Reports, No. 3. University of Pittsburgh, Pittsburgh.
- _____, L. F. Herrera, I. Cavalier and C. Rodríguez, 1991, *Cultivars, Anthropogenic Soils and Stability: A Preliminary Report of Archaeological Research in Aracuaara, Colombian Amazon*. Latin American Archaeology Reports, No. 2. University of Pittsburgh, Pittsburgh.
- Moraes C., 2006, *Levantamento Arqueológico das Áreas de Entorno do Lago do Limão, Iranduba, Amazonas*. Unpublished M.A. thesis. Museu de Arqueologia e Etnologia, Universidade de São Paulo.
- Morales, Daniel, 1998, Chambira: una cultura de sabana árida en la Amazonía peruana. *Investigaciones Sociales* 2 (2): 61–75.
- Moran, Emilio F., 1993, *Through Amazonian Eyes: The Human Ecology of Amazonian Populations*. University of Iowa Press, Iowa City.
- Myers, Thomas, 1973, Toward the reconstruction of prehistoric community patterns in the Amazon basin. In *Variation in Anthropology* edited by Donald W. Lathrap and Jody Douglas, pp. 233–252. Illinois Archaeological Survey, Urbana.
- Neves, Eduardo G., 1995, Village fissioning in Amazonia: a critique of monocausal determinism. *Revista do Museu de Arqueologia e Etnologia da Universidade de São Paulo* 5: 195–209.
- _____, 1998, Twenty years of Amazonian archaeology in Brazil. *Antiquity* 72: 625–632.
- _____, 1999, Changing perspectives in Amazonian archaeology. In *Archaeology in Latin America*, edited by Gustavo Politis and Benjamin Alberti, pp. 216–243. Routledge, London.
- _____, 2001, Indigenous historical trajectories in the upper Rio Negro basin. In *Unknown Amazon: Culture in Nature in Ancient Brazil*, edited by Colin McEwan, Christiana Barreto, and Eduardo G. Neves, pp. 266–285. British Museum Press, London.
- _____, 2003, *Levantamento arqueológico da área de confluência dos rios Negro e Solimões, Estado de Amazonas: Continuidade das escavações, análise da composição química e montagem de um sistema de informações geográficas*. Relatório enviado à Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP)
- _____, 2005, O lugar dos lugares: escala e intensidade das modificações paisagísticas na Amazônia central pré-colonial em comparação com a Amazônia contemporânea. *Ciência e Ambiente* 31: 79–91.
- _____, 2006, Warfare in precolonial Amazonia: when Carneiro meets Clastres. In *Warfare in Cultural Context: Practice Theory and the Archaeology of War*, edited by Axel Nielsen and William Walker. University of Arizona Press, Tucson.
- _____ and James B. Petersen, 2006, Political economy and pre-Columbian landscape transformations in Central Amazonia. In *Time and Complexity in Historical Ecology: Studies in the Neotropical Lowlands*, edited by William Balée and Clark Erickson, pp. 279–309. Columbia University Press, New York.

- _____, J. B. Petersen, R. N. Bartone, and C. A. da Silva. 2003. Historical and socio-cultural origins of Amazonian dark earths. In *Amazonian Dark Earths: Origins, Properties, Management*, edited by J. Lehmann, D. Kern, B. Glaser and W. I. Woods, pp. 29–50. Kluwer Academic Publishers, Dordrecht.
- _____, J. B. Petersen, R. N. Bartone, and M. J. Heckenberger, 2004. The timing of terra preta formation in the central Amazon: archaeological data from three sites. In *Amazonian Dark Earths: Explorations in Space and Time*, edited by B. Glaser and W. I. Woods, pp. 125–134. Springer Verlag, Berlin.
- Nimuendajú, Curt, 2004, *In Pursuit of a Past Amazon: Archaeological Researches in the Brazilian Guyana and in the Amazon Region* (A posthumous work compiled and translated by Stig Rydén and Per Stenborg), edited by Per Stenborg. Etnologiska Studier 45, Göteborg.
- Nordenskiöld, Erland, 1930, *L'Archéologie du Bassin de l'Amazone*. Ars Americana, vol. 1, Paris.
- Oliver, José, 1989, The Archaeological, linguistic and ethnohistorical evidence for the expansion of Arawakan into Northwestern Venezuela and Northeastern Colombia. Ph.D. dissertation. Department of Anthropology, University of Illinois, Urbana.
- _____, 2001, The archaeology of forest foraging and agricultural production in Amazonia. In *Unknown Amazon: Culture in Nature in Ancient Brazil*, edited by Colin McEwan, Christiana Barreto and Eduardo G. Neves, pp. 50–85. British Museum Press, London.
- Olsen, K. and B. Schaal, 1999, Evidence on the origin of cassava: phylogeography of *Manihot esculenta*. *Proceedings of the National Academy of Sciences* 96: 5586–5591.
- Oyuela-Caycedo, Augusto, 1995, Rock versus clay: the evolution of pottery technology in the case of San Jacinto 1, Colombia. In *The Emergence of Pottery: Technology and Innovation in Ancient Societies*, edited by William K. Barnett and John Hoopes, pp. 133–144. Smithsonian Institution Press, Washington, D.C.
- _____, and R. Bonzani, 2005, *San Jacinto 1: A Historical Ecological Approach to an Archaic Site in Colombia*. University of Alabama Press, Tuscaloosa.
- Pärssinen, M., A. Ranzi, S. Saunaluoma and A. Siiriäinen, 2003, Geometrically patterned ancient earthworks in the Rio Branco region of Acre, Brazil: new evidence of ancient chiefdom formations in Amazonian interfluvial *terra firme* environment. In *Western Amazonia - Amazonia Ocidental. Multidisciplinary Studies on Ancient Expansionistic Movements, Fortifications and Sedentary Life*, edited by M. Pärssinen and A. Korpisaari, pp. 97–133. Renvall Institute Publications 14. University of Helsinki, Helsinki.
- Papavero, N., D. Teixeira, W. Overal and J. R. Pujol-Luz, 2002, A “Relación” de Frei Gaspar de Carvajal. In *O Novo Éden: A Fauna da Amazônia Brasileira nos Relatos de Viajantes e Cronistas desde a Descoberta do Rio Amazonas por Pinzón (1500) até o Tratado de Santo Idelfonso, com transcrição dos principais textos*, pp. 20–4. Museu Paraense Emílio Goeldi, Belém.
- Perota, C. and W. Botelho, 1992, “Sambaquis” de Guará, variations climatiques pendant l’Holocene, In *Évolution des littoraux de Guyane et de la Zone Caribé Méridionale pendant de Quaternaire*, edited by M. T. Prost, pp. 379–395. Editions de l’ORSTOM, Paris.
- Petersen, James B., 1996, The archaeology of Trants, Montserrat, Part 3. Chronological and settlement data. *Annals of the Carnegie Museum* 65: 323–361.
- _____, Eduardo G. Neves and Michael J. Heckenberger, 2001, Gift from the past: terra preta and prehistoric Amerindian occupation in Amazonia. In *Unknown Amazon: Culture in Nature in Ancient Brazil*, edited by Colin McEwan, Christiana Barreto and Eduardo G. Neves, pp. 86–105. British Museum Press, London.
- Piperno, Dolores and Peter Becker, 1996, Vegetational history of a site in the central Amazon basin derived from phytolith and charcoal records from natural soils. *Quaternary Research* 45: 202–209.
- _____, and Deborah Pearsall, 1996, Background of tropical agricultural origins. In *Tropical Paleoethnobotany*, edited by Deborah Pearsall and Dolores Piperno, pp. 1–38. Academic Press, New York.
- Politis, Gustavo, 1996, *Nukak*. Instituto Amazónico de Investigaciones Científicas – SINCHI, Bogotá.
- Porro, A., 1993, *As Crônicas do Rio Amazonas. Notas etno-históricas sobre as antigas populações indígenas da Amazônia*. Vozes, Petrópolis.
- _____, 1994, Social organization and political power in the Amazon floodplain: the ethnohistorical sources. In *Amazonian Indians from Prehistory to the Present: Anthropological Perspectives*, edited by Anna C. Roosevelt, pp. 79–94. University of Arizona Press, Tucson.
- Renfrew, Colin, 2000, At the edge of knowability: towards a prehistory of languages. *Cambridge Archaeological Journal* 10 (1): 7–34.
- Roosevelt, Anna C., 1980, *Parmana: Prehistoric Maize and Manioc Subsistence along the Amazon and Orinoco*. Academic Press, New York.
- _____, 1991a, *Moundbuilders of the Amazon: Geophysical Archaeology on Marajó Island, Brazil*. Academic Press, San Diego.

- _____, 1991b, Determinismo ecológico na interpretação do desenvolvimento social indígena da Amazônia. In *Origens, Adaptações e Diversidade Biológica do Homem Nativo da Amazônia*, organized by Walter Neves, pp. 103–141. Museu Paraense Emílio Goeldi, Belém.
- _____, 1994, Amazonian anthropology: strategy for a new synthesis. In *Amazonian Indians from Prehistory to the Present: Anthropological Perspectives*, edited by Anna C. Roosevelt, pp. 1–29. University of Arizona Press, Tucson.
- _____, 1995, Early pottery in the Amazon. Twenty years of scholarly obscurity. In *The Emergence of Pottery. Technology and Innovation in Ancient Societies*, edited by William K. Barnett and John Hoopes, pp. 115–131. Smithsonian Institution Press, Washington, D.C.
- _____, 1996, Paleoindian cave dwellers in the Amazon: the peopling of the Americas. *Science* 272: 373–384.
- _____, et al., 2002, The migrations and adaptations of the first Americans: Clovis and pre-Clovis viewed from South America. In *The First Americans, The Pleistocene Colonization of the New World*, edited by N. Jablonski, pp. 159–235. Memoirs of the California Academy of Sciences, Number 27, San Francisco.
- _____, et al., 1991, Eighth millennium pottery from a prehistoric shell midden in the Brazilian Amazon. *Science* 254: 1621–1624.
- Rostain, Stéphen, 1991, *Les Champs Surlevés Amerindiens de la Guyane*. Centre ORSTOM de Cayenne, Cayenne.
- _____, 1999, Occupations humaines et fonction domestique des monticules préhistoriques d'Amazonie équatorien. *Société Suisse des Américanistes*, Bulletin 63: 71–95.
- _____, and Aad Versteeg, 2004, The Araquinoid Tradition in the Guianas. In *Late Ceramic Age Societies in the Eastern Caribbean*, edited by A. Delpuech and C. Hoffman, pp. 233–250. Archaeopress/BAR International Series 1273, Paris Monographs in American Archaeology 14. Oxford.
- Rouse, Irving, 1985, Arawakan phylogeny, Caribbean chronology, and their implications for the study of population movement. *Antropologica* 63–64: 9–21.
- _____, 1992, *The Tainos: Rise and Decline of the People Who Greeted Columbus*. Yale University Press, New Haven.
- Sauer, Carl O., 1969, *Seeds, Spades, Hearths and Herds: The Domestication of Animals and Foodstuffs*. The MIT Press, Cambridge, MA.
- Schaan, Denise, 2001a, Into the labyrinths of Marajoara pottery: status and cultural identity in an Amazonian complex society. In *The Unknown Amazon. Culture in Nature in Ancient Brazil*, edited by Colin McEwan, Christiana Barreto and Eduardo G. Neves, pp. 108–133. British Museum Press, London.
- _____, 2001b, Os Dados Inéditos do Projeto Marajó. *Revista do Museu de Arqueologia e Etologia da Universidade de São Paulo* 11: 141–164.
- _____, 2004, The Camutins Chiefdom. Ph.D. dissertation. Department of Anthropology, University of Pittsburgh, Pittsburgh.
- _____, 2005, Uma janela para a história pré-colonial da Amazônia: olhando além – e apesar – das fases e tradições. Paper presented at the 13th meeting of the Brazilian Archaeological Society.
- Simões, M., 1969, The Castanheira site: new evidence on the antiquity and history of the Ananatuba phase. *American Antiquity* 34 (4): 402–410.
- _____, 1974, Contribuição à arqueologia dos arredores do baixo rio Negro. *Programa Nacional de Pesquisas Arqueológicas* 5: 165–200. Publicações Avulsas do Museu Paraense Emílio Goeldi, No. 26.
- _____, 1981, Coletores-pescadores ceramistas do litoral do Salgado (Pará). *Boletim do Museu Paraense Emílio Goeldi*, Nova Série, No. 78: 1–31.
- _____, and A. Kalkmann, 1987, Pesquisas arqueológicas no médio Rio Negro (Amazonas). *Revista de Arqueologia* 4 (1): 83–116.
- _____, and D. Lopes, 1987, Pesquisas arqueológicas no baixo/médio Rio Madeira (Amazonas). *Revista de Arqueologia* 4 (1): 117–134.
- Smith, N., 1980, Anthrosols and human carrying capacity in Amazonia. *Annals of the Association of American Geographers* 70 (4): 553–566.
- Stahl, Peter W., 2002, Paradigms in paradise: revising standard Amazonian prehistory. *The Review of Archaeology* 23 (2): 39–51.
- van der Hammen, T., 2001, Ice-age tropical South America: what was it really like? *Amazoniana* XVI (3/4): 647–652.
- _____, and H. Hooghiemstra, 2000, Neogene and Quaternary history of vegetation, climate, and plant diversity in Amazonia. *Quaternary Science Reviews* 19: 725–742.
- Viveiros de Castro, E., 1996, Images of nature and society in Amazonian ethnology. *Annual Review of Anthropology* 25: 179–200.

- Whitehead, Neil, 1994, The ancient Amerindian polities of the Amazon, the Orinoco, and the Atlantic Coast: a preliminary analysis of their passage from antiquity to extinction. In *Amazonian Indians from Prehistory to the Present: Anthropological Perspectives*, edited by Anna C. Roosevelt, pp. 33–53. University of Arizona Press, Tucson.
- Williams, D., 1997, Early pottery in the Amazon: a correction. *American Antiquity* 62 (2): 342–352.
- Woods, W. I. and J. M. McCann, 1999, The anthropogenic origin and persistence of Amazonian dark earths. *Yearbook of the Conference of Latin American Geographers* 25: 7–14.
- Wüst, Irnhild and Christiana Barreto, 1999, The ring villages of central Brazil: a challenge for Amazonian archaeology. *Latin American Antiquity* 10 (1): 3–23.
- Zucchi, Alberta, 1985, Evidencias arqueológicas sobre posibles grupos de lenguas Caribe. *Antropológica* 63–64: 23–44.