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University of Illinois at Urbana-Champaign PH.D. 1984

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AN ECOLOGICAL MODEL OF THE SPREAD OF POTTERY AND AGRICULTURE INTO EASTERN SOUTH AMERICA

BY

JOSÉ JOAQUIM JUSTINIANO PROENZA BROCHADO

Lic., Universidade Federal do Rio Grande do Sul, 1963

THESIS

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Anthropology
in the Graduate College of the
University of Illinois at Urbana-Champaign, 1984

Urbana, Illinois

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UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

THE GRADUATE COLLEGE

SEPTEMBER 1984

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AN ECOLOGICAL MODEL OF THE SPREAD OF POTTERY AND AGRICULTURE INTO EASTERN SOUTH AMERICA

José Joaquim Justiniano Proenza Brochado, Ph.D.
Department of Anthropology
University of Illinois at Urbana-Champaign, 1984
(Donald W. Lathrap)

Archaeological research in Eastern Brazil in the late 1960s has resulted in a vast number of named ceramic complexes whose significance and interrelationships have remained unclear. Not even Willey in his massive synthesis of South American prehistory manages to force coherence on these problems. I have applied a series of operationally sound reduction methods to this data set and produced a rather simple picture.

By 3000 B.C. two simple ceramic styles, each derived from the Central Amazon, appear at the mouth of the Amazon and on the Rio de La Plata Estuary. These two simple styles founded traditions that spread slowly as trait unit intrusions into established preceramic complexes. Ultimately, these two traditions covered most of Eastern South America. Early in the Christian era, a distinctive variant of the Northern tradition spread explosively as a series of site unit intrusions. One of the most startling features of the thesis is that this latter expansion can be linked conclusively to the expansion of Gê speaking peoples and that this expansion was so relatively late.

Within the Christian era, two branches of full-blown Amazonian culture invade Eastern South America, showing the same two-pronged attack noted above. Early in the Christian era, Guarani culture was well established in Southern Brazil. By 500 A.D. Tupinambá culture, as

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an attennuated version of Marajoara culture, appeared in Northeastern Brazil. The eastward expansion of Guarani culture into Southern Brazil was slow and wave-like, enveloping broad tracts of contiguous territory. The southward expansion of Tupinambá culture was rapid and linear, moving along the narrow coastal strip. These two prongs of outward colonizations finally collided, south of Rio de Janeiro, 500 years before the arrival of the Europeans.

A mapping of the precisely defined ecological niches preempted by each of these outward population expansions indicates their differing agricultural systems. A diachronic study of the rates of territorial expansion and the amounts of territory encompassed offers our only window on Tupian paleodemography over the last 4000 years; computer modeling is probably the only way to achieve refined estimates of population growth.

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"Quid referam quales olim celebrare solebant
Potando cantus? quantis clamoribus auras
Replebant; quali depicta membra colore;
Quam variis avium vestiti corpora pennis?"

"Para que lembrar os cantos que outrora entoavam em suas bebedeiras? os gritos com que altroavam os area medonhamente? as cores com que pintavam os membros? as penas variegadas com que enfeitavam os corpos?"

("What good to remember the songs in their drunkenness? the horrible shouts that shaked the air? what colors they painted their members, the variegated feathers with which they adorned their bodies?")

F. Joseph de Anchieta S.J. in De gestis Mendi de Saa, Praesidis in Brasilia gloating over the destruction of the Tupinambá by Mem de Sá, First Portuguese Governor General of Brazil.

"Não está morto quem peleia . . ."

("He is not dead, who is still fighting back . . .")

Gaucho proverb

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This study is dedicated with

respect and gratitude to the late

Clifford Evans

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ACKNOWLEDGMENTS

Coming from the backwoods, as I did, it was a privilege for me to walk in wonder, for the first time in my life, through the gardens of Academia where, even if I was not spared the strife, I was allowed to behold the full bloom of the flowers of knowledge. Therefore, as my Tupinambá and Guarani after leaving Amazonia have felt forever to be East of Eden, I myself shall ever feel to a degree, banished.

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I wish to thank my advisor, Prof. Donald W. Lathrap. Nothing that passes through his hands remains unchanged, and I will never be able to show how much I am indebted to him, as a teacher and as a friend.

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CHAPTER 1

INTRODUCTION AND STATEMENT OF THESIS

In this thesis I would like to contribute something toward the hope that the Pre-Columbian histories of the future will offer a more integrated and meaningful picture than mere descriptions of cultural forms and their arrangement in geographical and chronological frames of reference. Therefore, the first thing to be considered here is that the archaeology of Eastern South America has to be viewed as the prehistory of the historic aboriginal populations. If no relations are established between ceramic traditions and styles and the peoples who made them, something very important has been utterly lost. Accordingly, ethnographic connotations should not be shunned but instead deliberately sought.

In this regard I will demonstrate here that what has been described as the Regional Traditions of Eastern Brazil (Brochado et al. 1969; PRONAPA 1970; Willey 1971:434) are the ceramics made by the earlier inhabitants of Eastern South America, such as the Ancient East Brazilians, some Macro-Gê and the Charrua. What has been improperly described as the "Tupiguarani" Tradition constitutes two extensions of the Amazonian Polychrome Tradition into Eastern South America and therefore ought to be split in two subtraditions that represent the ceramics made by two distinct Tupian groups, the Guarani and the Tupinambá, with totally different histories over the last 2000 years.

With this in mind, what I believe I have achieved here is to demonstrate that the historic ethnic distributions are precisely mapped

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by the distribution of archaeological materials representing distinct traditions. Accordingly, the model presented accounts for the positions of all major indigenous groups at the time of the Conquest. I have been sometimes able to accomplish this in fine detail, as in the case of the relative positions occupied by the Caingang, the Charrua, and the Guarani in Southern Brazil. An adequate data base clarified rather than blurred the operation of the models in those situations where the archaeological data was more extensive.

Not everyone realizes that in Eastern South America we are dealing with a ceramic sequence comparable in length only to those of Amazonia and the Lower Magdalena, which are the longest known in the New World (Brochado and Lathrap 1980; Figures 6 and 12). The great time depth involved permits us to reconstruct prehistoric changes in the territories occupied by the different ethnic groups. Therefore, my second task will be to explain how the historic groups came to occupy their relative positions, that is, to sketch a demographic history of Eastern South America.

In the first place I will emphasize the probability of a great deal of population stability in Eastern South America, as demonstrated by continuities in lithic traditions over long periods of time. The stability of lithic traditions from their initial appearance to the time of historic contact suggests that some of the groups may have been evolving in situ from as early as 15,000 B.C. Therefore, the linguistic differentiation among this earliest stratum of languages should be very marked and indeed perhaps never fully demonstrable. These considerations lead me to suggest some modifications in current

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linguistic classifications. Following Lathrap (pers. com. 1983), I will use the term Ancient East Brazilian for those groups of languages whose relationship to each other or to Gê has not been demonstrated. These include Purí-Coroado, Botocudo, Chiquito, Borôro, Nambicuara, Carajá and Huarpe. I will use the term Macro-Gê for Caingang, Cariri and Gê-proper, because their relationship is demonstrable and their north-to-south expansion in more recent times will be described here. Because they have expanded from near the Amazonia-East Brazil boundary in the last 6,000-7,000 years (i.e., 4,000-5,000 B.C.) one might expect as much or more relationship with Arawakan-Tupí-Guarani as with the constituents of Ancient East Brazilian. A recent cursory inspection by Troike (pers. com. 1983) suggests that this is indeed the case.

Therefore, the Ancient East Brazilians were already in place from the earliest times and the Macro-Gê languages probably started to spread as early as 5000 B.C. or perhaps even before.

Other indigenous groups, such as the Guarani and the Tupinambá are culturally Amazonian, and from that point of view Eastern South America is an extension of Amazonia. However, instead of the complexity of the linguistic distribution characteristic of Amazonia, the bulk of Eastern South America--represented by the uplands covered by savannas and, in Southern Brazil, by mixed broadleaf-coniferous forests--was occupied mostly by peoples speaking either Ancient East Brazilian or Macro-Gê languages, while the peripheral regions were occupied by peoples speaking other unrelated languages. For instance, the coastal plains and the floodplains of the Paraná-Paraguay and Uruguay systems were settled by Tupí-speakers, while the Pampean and Chacoan lowlands were

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occupied by Guaycuruan-speakers (see Figure 1 for the best estimate of the distribution of Guarani speakers at the time of Contact).

The model presented here owes very much to such intellectual structures as those proposed by W. Schmidt (1939, 1942) and A. Métraux (1928a) on distributional grounds alone, as well as to Menghin's (1955-1956, 1957, 1960, 1962), Susnik's (1975) and Lathrap's (1962, 1970a, 1972, 1977b) models, which combine, in increasing degrees, ethnohistoric distributions, archaeological data and assumptions about the differential demographic behavior of groups with progressively more productive economic systems.

In this thesis my starting point will be, therefore, to establish the historical connections between ceramic traditions and the languages spoken by those indigenous groups who were making pottery from contact times into the Colonial period and even in some cases, up to the present day. I then work backwards in time to prehistoric connections between those ceramic traditions and the lithic industries that preceded them, and have arrived at the ecological model being explicated in this dissertation to account for the spread of pottery and agriculture into Eastern South America.

On the basis of the present distribution of ceramic materials I will argue that all the pottery found throughout the whole of Eastern South America is related to only four ceramic traditions:

1. The Pedra do Caboclo Tradition, related to the Ancient East Brazilians and the Caingang (Macro-Gê), with the Aratu Subtradition representing the Gê-proper.

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2. The Palo Blanco Tradition, related to the Proto-Guaycurúans with the Vieira Subtradition representing the Charrúa; the Entrerríana Style representing the Querandí and the Style of the Ribereños plásticos representing the Chaná;
3. The Amazonian Polychrome Tradition representing the Tupians, with the Guarani and the Tupinambá pottery as subtraditions;
4. The Urú Tradition related to the Carajá.

In the first place I argue that the Pedra do Caboclo and Palo Blanco traditions are directly derived from two foci of ceramic development, characterized by extremely simple globular forms. These are located, respectively, at the mouth of the Amazon River system (Mina) and on the estuary of the Río de La Plata-Palo Blanco (Figures 4, 6, 10, and 12).

In their discussion of the Amazonian chronologies Brochado and Lathrap (1980) hypothesize that all of the ceramics of Lowland South America must converge to a single, extremely simple ceramic tradition, and in this argument they follow Linné's (1925, 1932) observation based on purely distributional grounds.

The location of Mina and Palo Blanco pottery at the mouth of the two major river systems of South America suggests that these traditions are expressions of an earlier very simple Amazonian tradition. It was Linné who first predicted that such pottery would eventually be found at the base of all Amazonian ceramic sequences.

The beginning dates of before 3,000 B.C. for both the Mina and Palo Blanco ceramic traditions indicate that this simple Amazonian ceramic tradition should be found long before that time at the node of connected

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waterways of South America in Central Amazonia, perhaps as early as 5000 B.C. In terms of the spread both of intensive agriculture and ceramic technology, Eastern Brazil is clearly peripheral to the Amazon basin, and precisely because it is on the periphery the development from simple to more elaborate pottery is better observed here than in Amazonia, where most earlier sites are buried under the alluvium, or have been destroyed by erosion.

Taking the four ceramic traditions in the order I have outlined above I will demonstrate the following:

1. Spreading from the mouth of the Amazon river system with antecedents in the Mina Tradition (3700-3500 B.C.), an early wave of ceramic expansion appears first in Northeastern Brazil by ca. 700-1,000 B.C. at the beginning of what I will call the Pedra do Caboclo Tradition. These ceramics appear, in terms of present evidence, to have passed through the stabilized Ancient East Brazilian populations (excepting the Gê-proper and the Cariri) showing a pattern of progressive diffusion and spreading as far south as the Caingang-speakers, at the southernmost extremity of the Brazilian Uplands.

   As a later development within this northern foci of the Pedra do Caboclo Tradition we have the Aratú Subtradition, whose expansion, beginning before A.D. 700, clearly represents the southward colonization of the Gê-proper and Cariri. These peoples, expanding southward as far as the Rio Grande Valley, overran most of the East Brazilian groups that had adopted the earlier forms of the same Pedra do Caboclo Tradition.

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Another even later development is the Uru Tradition. The southernmost limit of the expansion of that tradition was reached ca. A.D. 1,000, and it clearly represents the southward colonization of the Carajá.

2. To the south, the first simple ceramics belong to a tradition that has its earliest recognizable member in the shell-ridges of Palo Blanco, where its beginnings have been dated ca. 3000 B.C. Here I will argue that in addition the tradition should extend along the length of the Paraná-Paraguay river system. The simplest version of this tradition, the Vieira Subtradition, can be traced up to the historic Charrúa. In terms of present evidence this pottery diffused through the stabilized proto-Charrúa populations radiating throughout the lowlands of the Lower Paraná and Lower and Middle Uruguay, as well as on the adjacent coast, as far north as the foot of the southern section of the Brazilian Uplands. It also diffused southward into the Pampa area. Moreover, it now appears that all of the early ceramics of Lowland Bolivia, the Paraguayan Chaco, and Northeastern Argentina represent offshoots from this same basic tradition. Branches of the elaborate form of this ceramic tradition, which do seem to relate to the distribution of Guaycurúan-speakers, penetrated northeastward and, as I will demonstrate, in its Panoan form, greatly modified the Guarani ceramic subtradition, as the proto-Guarani passed through Eastern Bolivia.

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3. Finally, I will demonstrate that the later and more elaborate ceramic traditions of Eastern South America can be related either to the Guarani ceramic subtradition or, in a strict sense, to the Tupinambá, and both subtraditions can be shown to have diverged from a tradition datable to no later than ca. 1,500 B.C. in the region around the mouth of the Madeira in Central Amazonia (Brochado and Lathrap 1980). Here, too, the mechanism of spread was outward colonization or, otherwise stated, site-unit intrusion, beginning sometime before A.D. 500 for the Tupinambá in Northeastern Brazil, and probably even earlier, no later than A.D. 100 for the Guarani in Southwestern Brazil. The patterns shown by their occupations can be explained by the fact that the intensive Amazonian agricultural system they brought with them could be duplicated only in the fertile <u>várzeas</u> found along the major rivers of the interior and on the lower courses of the shorter coastal rivers. Most of the soils on the uplands are too poor to sustain this kind of agriculture, whereas in Southern Brazil, even if there are good soils, the uplands reach to 1000 m elevation and the climate is too cold, for instance, for manioc cultivation. Therefore the Ancient East Brazilians and the Macro-Gê could follow there their own subsistence practices, which are well adapted to the upland environment. Nevertheless, because the circumscribed rich soil in the floodplains of many rivers constitute a desirable ecological niche, their possession was fiercely contested by different indigenous groups, and the same can be said of the coast, both because of the soils and the marine resources. The tension between the three distinct

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cultural patterns, represented respectively by the Ancient Eastern Brazilians and Macro-Gê, the Guaycuruan and the Guarani and Tupinambá, was as important in Eastern Soouth American prehistory as that between the terra firme and the varzea.

All these successive spreads of pottery and, by extension, peoples were achieved by the same two-pronged pattern of expansion out of Central Amazonia; one arm always moving down-river and out of the mouth of the Amazon, then southwards around the coast, while the other arm moved first up the the Madeira-Guaporé and then down the Paraná-Paraguay river system, and afterwards some distance north again, along the coast. In all these instances the two arms of diffusion met midway in Southern Brazil, between the Jacuí and the Rio Grande, along boundary lines running from the coast to the interior (Figures 1, 2, 4, 10, 15, 17, 21, and 22).

If I am permitted to use a metaphor here, the Brazilian Upland surrounded by the two arms of the outward expansion of the Guarani and Tupinambá was held between the jaws of the cosmic Amazonian cayman (Figures 21 and 22). Or I could also say that the Tupians living outside of Amazonia were, from a ecological point of view, living East of Eden.

Several other points should be emphasized. The fit between expansion models based on linguistic data and those based on ceramic data is nearly perfect, and is not due to any form of circular reasoning. The intent of the study is not purely chronological because the economic patterns inferred from the several vessel form sets are

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validated as one examines the ecological niches colonized by the outwardly expanding groups carrying these traditions or subtraditions. Finally, the results as viewed over the whole of East Brazil are almost certainly a better indication of overall rates of population growth than localized fine-grain studies in which there is no attempt to control population increase due to in-migration or, and more importantly, population loss due to out-migration.

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CHAPTER 2

GEOGRAPHICAL BACKGROUND

The area I am here describing as Eastern South America (Figure 1) represents roughly 1/4 of the continent and includes two enormous watersheds. Its southern section is drained by the Paraná-Paraguay and Uruguay river systems, which debouch through the Río de La Plata into the Atlantic. Its northern section is drained by the São Francisco, but also included are the basins of the relatively short coastal rivers that drain directly to the ocean.

The core of the area is the upland of the East Brazilian Shield conventionally divided into the Northeastern, Central, Eastern, and Southern sections. Drainage is centrifugal; the enormous block of very old and much eroded metamorphic rocks of the shield is roughly triangular. The southeastern side constitutes most of the Brazilian coast, and drains directly to the Ocean, the southwestern side faces the Paraguay Valley and the rivers drain to the Paraná-Paraguay river system, while the northern side faces the Amazon valley and the rivers flow to the Amazon river system.

The highest elevations--around 1,000 m--are nearer the coastal zone and from them the uplands slope down gradually inland. Therefore, extended mountainous zones are found only in the coastal strip, most of the rest being an undulating plateau with different levels set off by steep escarpments and isolated mountain ranges.

Lowlands extend in every direction around this elevated core. To the east there is the narrow coastal zone, which in Eastern and Southern

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Brazil is set off by the steep escarpments of the shield, but in Northeastern Brazil widens inland up the broader valleys of the coastal rivers. To the south and west steep escarpments abut the flat Pampas and the lowlands of the Middle Paraná, Paraguay and Guaporé, that is, the Chaco and Bolivian Llanos. To the north the uplands decrease in elevation and almost imperceptibly merge with the Amazonian Lowlands.

The weathering of the old rocks of the Brazilian Shield produces mainly sand; therefore soils are thin and poor even in the river floodplains. However, some sections of the shield were covered in the Tertiary by extensive flows of volcanic rocks. The largest area thus covered lies in Southern Brazil in the watersheds of the Upper Uruguay and Upper Paraná, to the Paranaiba. Progressively smaller patches appear farther north in Southern Goias, and even as far north as on the last steps of the shield at the beginning of the lower courses of several right bank tributaries of the Amazon, such as the Tocantins and Xingu. In contrast with the old rocks of the shield, the weathering of these volcanic rocks produces relatively fertile, deep, soils. These soils, locally described as terra roxa, provide the space where, in modern times, most of the agricultural land is concentrated. This is also where, in the interior, population is more dense. These same expanses of terra roxa as far north as Southern Graias, are also where most of the ancient Guarani population was concentrated (Figures 1 and 13).

In the reconstruction of the environment I will make use of the data about climate and vegetation summarized from: Andrade (1964), Alonso (1968), Azevedo (1960:269-280, 511-520 and maps), Bernardes

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(1960:497-509 and map), Cabrera (1953, 1971), Camargo, Benema, and Silva (1966: map II-5), Domingues and Whately (1966: map II-3), Eidt (1968), Galvao (1966: map II-9, 1967), Hueck (1972a, 1972b map), Lamego (1946), Lima (1966: map II-11), Magnanini (1956: map 4, 1960:349-360 map, 1965), Mann (1968), Monckhouse (1969), Monteiro, (1963a:15-79, 1963b:117-169), Moreno (1961), Nimer (1966: map II-7, 8, 1968), Rizzini and Maia (1964), Romariz (1960:361-372 and map, 1963:170-191, 1964:485-536), Santos (1966: map II-10), Sauer (1948), Silva (1960:197-208 and map), Simoes (1960:255-268 and map), Teixeira Guerra (1960:181-196 and map), and Trewartha et al. (1961 and map).

Mean annual temperatures are lowest at the top of the southern and eastern sections of the uplands (14 to 18 degrees Celsius) and from there they increase in every direction, except southward. At the beginning of the Amazonian plain, mean annual temperatures are as high as 24 degrees, and in Northeastern Brazil higher than 26 degrees. Along the coast temperatures progressively decrease southward from 24 degrees in Northeastern Brazil, to 16 degrees at the Río de La Plata estuary.

Climbing to the uplands from the Amazonian plain the average annual amount of rainfall diminishes progressively from 2,500 mm to 1,000 mm or less; for instance, in some areas on the interior of Northeastern Brazil, it is as low as 350 mm. On the higher elevations near the coast, and on the coastal escarpments, the amount of rain increases again, reaching 1,750-2,500 mm; the same happens in the southern section of the uplands, subjected to the regimen of the middle latitudes. South of the uplands, in the Pampas area, rainfall decreases again reaching only to 650 mm on the Río de La Plata estuary. The average number of

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rainy days varies throughout the area from more than 200 along the coastal escarpments, to less than 70 in the interior of Northeastern Brazil.

The interior of Northeastern Brazil has a tropical hot and dry, semi-arid climate--Bsh, following Koppen's classification--characterized by higher mean monthly temperatures (26 to 27 degrees) only 350 mm to 750 mm of rain, concentrated in a few months in summer (Bshw), or fall (Bshw') and a dry season of 5 to 11 months.

Most of the uplands have a hot and humid climate (Aw in Koppen's classification), characterized by a mean temperature above 18 degrees in any month, from 750 mm to 1,500 mm of rain, and a winter dry season of 3 to 5 months, which is called a savanna climate.

The coastal zone of Northeastern Brazil, influenced by the intertropical front, has a hot but semi-humid climate (Aw' and Aw").

The coast of Northeastern and Eastern Brazil, influenced by the Polar Atlantic front, has a hot and humid climate, receiving from 1,500 mm to more than 2,000 mm of rain, with a very short summer dry season of only 2 months or less (Aw' or As) or without a dry season (Am), which is called a monsoon or rainforest climate.

The higher areas in Eastern Brazil have an humid mesothermal or upland subtropical climate, with short winter dry season and hot summers (Cwa) or cool summers (Cwb).

In the southern section of the uplands, and on the lowlands that stretch to the Río de La Plata, the climate is humid, mesothermal or subtropical, characterized by mean monthly temperatures between 14 and 24 degrees, from 1,000 mm to more than 2,000 mm of rain, and there is no

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dry season. At the lower elevations and along the coast summers are hot (Cfa). At the top of the uplands the climate is characterized by cool summers and relatively cold winters (Cfb).

In Northeastern and Eastern Brazil summer mean maximum temperatures range from 22 degrees in the higher areas of the uplands to more than 34 degrees on the interior of the Northeastern region. Winter mean minimum temperatures vary from less than 11 degrees to more than 23 degrees, following the same pattern. Variations in the mean temperature range annually from less than 3 to more than 7 degrees. The warmest month varies between September and February. The average number of rainy days varies from more than 200 to less than 70, most of the rain falling in summer, in which case the driest month is June or August. In the southern part rainfall is concentrated in winter-spring, sometimes beginning in fall or in spring-summer.

If we follow, instead, Gaussen's bioclimatic classification, most of Northeastern and Eastern Brazil has a climate described as xeric, because temperatures are always positive and there is a dry season of variable length. Xeroquimenic climates, hot tropical, with winter dry season (4) predominate over the area, the most widespread being the thermoxeroquimenic, where the temperature of the coolest months is above 15 degrees, and biologically dry periods range from 3 to 4 months (4cTh) to 5-6 months (4bTh) to 7-8 months (4aTh). The coastal zone of Northeastern Brazil has a xerotheric climate, with a summer dry season, and from 1 or 2 to 7 or 8 biologically dry months (3dTh, 3cTh, 3bTh, and 3aTh). The interior has hemieremic climates (hot, subdesert) with winter dry season and 9 to 11 biologically dry months (2b and 2c).

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The uplands have subthermaxeric transitional climates, with only 1 or 2 dry months, xerothermic indexes between 0 and 40 (4dTh and 4dTh'), where at the highest elevations the temperature of the coolest month is below 15 degrees (4dMes and 4cMes).

Because Northeastern and Eastern Brazil have been subdivided in more climatic-vegetative zones than Amazonia, West-Central, or Southern Brazil, the natural vegetation of the former geographic regions is difficult to describe, not only because so little is known about the extent and character of the former vegetation cover of the entire area, but because there is disagreement as to its characterization by different phytogeographers (e.g., Lima 1969:map II-11; Hueck 1972a, 1972b map), and vegetation zones are hard to map because they are intermixed in a patchwork pattern.

Generally speaking, tropical wet-and-dry savannas (cerrados and caatingas) cover about 60% of the area, being concentrated on the interior, while to the east the vegetation zones form strips that are parallel to the coast. The strips constitute a gradation from the xerophytous vegetation of the interior to the humid vegetation of the coast.

In Northeastern Brazil these strips are composed first of mangrove swamps (mangue), or coastal psamophytous vegetation, near the seashore. Moving inland the coastal lowlands are covered by a tropical rainforest called hileia bahiana, and the coastal escarpments support another kind of rainforest called mata atlântica. Farther inland there is another transition strip of subhumid forests (agreste) and behind it the tablelands (chapadoes) are covered by vast expanses of tree and thorn savannas (caatingas).

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The largest single portion of Northeastern and Eastern Brazil is covered by caatingas (37%) including deciduous thorny forests (caatinga arborea) as well as dense or scattered brushwood caatingas. Their boundaries coincide with that of the semiarid climate (BSh). Long dry seasons in which the rains are irregularly distributed often result in prolonged periods of draught. Trees are low and bushy, with very small leaves that they shed during the dry season. The thorny trees and bushes are scattered on a stony soil, together with clumps of cactacea and bromeliacea.

Many times the caatingas resulted from the degradation of the subtropical mesophylous forest or of the tropical xeromorphic forest (cerradão) that before covered the hillsides on the headwaters of the and the top of the tablelands (chapadoes). Mangroves stretch along the shores, but became scattered south of the Tropic of Capricorn.

The hileia bahiana covers only about 5% of the area, that is, part of the tertiary coastal tablelands from Rio Grande do Norte southward to the Lower Rio Doce, which are characterized by sandy soils and a high water table. This evergreen forest is rich in species, with trees up to 30-35 m tall, dense underbrush, many tree ferns and palm trees, and vines and epyphites. It has been compared by many phytogeographers to the terra firme rainforests of Amazonia, their occurrence in Northeastern Brazil being explained by the high constant temperatures and the heavy rainfall along the coast. Most of the hileia bahiana has already been destroyed by large plantations.

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Semidry forests (agreste) occupy intermediary zones between the humid hileia bahiana and mata atlântica and the dry caatingas of the interior, and are composed of trees 15-20 m tall, with slender trunks and conical tops tangled with vines.

Small patches of mesophylous forests at the higher elevations, tree savannas (cerrado and cerradoes) and open grasslands (campo), as well as gallery forests along the rivers, can be found scattered all over Northeastern Brazil, making the overall picture even more complicated.

In Eastern Brazil, after the strips of mangrove or beach vegetation, the hileia bahiana gives way to the mata de restinga. After the mata atlântica there is first a wide strip of mesophylous forest, which is succeeded by enormous expanses of cerrados, that is, tree savannas, which cover about 23% of the total area. The western and southern boundaries of the cerrado closely coincide with the line that encloses areas with a dry season of more than three months. The eastern boundary is the line that encloses areas with a dry season of more than six months, and from thence the cerrado merges with the drier caatinga vegetation. Therefore, the climate of the cerrado is hot and subhumid. Mean annual temperatures range from 22-24 degrees in the southwest, to 25-26 degrees in the northeast. Forty-five to fify-five percent of the 1,000 m to 2,000 mm of rain falls in only three months of summer: from December to February in the southern section, from February to April in the northern section. The cerrado vegetation is composed of two distinct levels: one arboreal, of small isolated trees, and the other herbaceous, with scattered clumps of grasses and shrubs. Trees are three to five meters tall, characteristically contorted, with thick bark

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and very large, leathery or hairy leaves. With regard to the distribution of trees, cerrados vary from open parkland savannas (cerrado ralo) to real forests (cerradão) composed, however, of the same species. Many trees shed their leaves at the end of the dry season. Amidst the cerrados, large patches of subhumid forests (cerradão) are found at the highest elevations as well as patches of open grasslands and gallery forests on the bottomlands. The cerrados and the gallery forests are the habitat of the Gê peoples; therefore, its northern boundary coincides with that of the spread of the Aratu Subtradition (Figure 7).

Mesophylous forests cover 19% of the area. They occupy intermediary zones between the humid forests: mata atlântica and subtropical forest, and the cerrados of the interior. They are related to a continental climate with dry and wet seasons and some trees shed their leaves, which is why they are described as subdeciduous. Large trees, 25 m to 30 m tall, are entangled with vines and a lush undergrowth.

The mata de restinga cover less than 1% of the area. It is said to represent a southern variant of the hileia bahiana; in Eastern Brazil it occupies less rainy stretches of the coast. For instance, rainfall of less than 1,000 mm and as low as 650 mm occurs on the Lower Rio Doce and around Saquarema Lagoon. Not far from the sea, on the shores of the coastal lagoons and behind the protection of lines of sand dunes that support only shrubs and bushes, there was before a continuous strip of variable width of mata de restinga or mata de dunas. This kind of forest was rather open, with trees up to 10-15 m tall. Treetops are often flat and irregular and despite the heavy rainfall--1,000 mm to

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2,000 mm--the lush undergrowth characteristic of the tropical forest of the coastal escarpments is lacking. These forests have been almost completely destroyed, unleashing the sand dunes. The former existence of forest, however, is indicated by remaining portions of hardened lateritic soils (B horizon), which could not have developed without forest cover (Hueck 1972a). Morevoer, this is often indicated by remains of tree roots and trunks covered and uncovered by the sands. Because there was no commercially valuable timber in the restinga forest, even less is known about it than about the subtropical forest. The mata de restinga is said to have also covered the lower elevations of the coastal escarpments; therefore the boundary between it and the mata atlântica is not clear.

The mata de restinga and the lower levels of the mata atlântica and hileia bahiana were the ecological niches prefered by the coastal Tupinambá.

The climate is quite different in the southern section of Eastern South America, which includes Southern Brazil, Uruguay, Southern Paraguay, and Northeastern Argentine.

Summer mean maximum temperatures range from 20 to 30 degrees. Winter mean minimum temperatures range from less than 10 to more than 19 degrees. The isothermal lines follow a pattern of roughly concentric rings around the southern section of the uplands where the lower temperatures are found; therefore the lowlands are warmer and the uplands cooler. Variations in the mean temperature range annually from 5 to 14 degrees, increasing from north to south. Frost occurs every year in almost the entire area, the duration and intensity being greater

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as one moves southward. The mean annual frequency of frosts ranges from only one day, near the Tietê, to more than ten days on the highest elevations of the southerns section of the uplands. The warmest month is January or February, and the coolest July. Rainfall is more or less evenly distributed throughout the year. The month when the least rain falls varies in different regions from November to August, and 60-80% of rain is concentrated in the summer season. The humidity of the air varies from an average of 70% to 80%.

About 80% of the area has a humid, subtropical climate (Cfa following Koppen's classification). In the transition between Cfa and Aw climates, there is the Cwa climate, with a short winter dry season and hot summers (more than 22 degrees), which is called a subtropical upland climate. Only the highest areas of the uplands have a Cfb climate, humid and subtropical, without a dry season, but with cool summers and relatively cold winters.

If we follow, instead, Gaussen's bioclimatic classification, almost all the area has a climate described as axeric, because temperatures are always positive and there is no dry season. Because there are no biologically dry days throughout the year, the xerothermal index is set at 0. Mesaxeric climates (7) predominate, the most widespread being the eumesaxeric (7a--hot or subtropical) in which the mean temperature of the coolest month ranges between 10 and 15 degress and there are chances of frost every year. The 7a bioclimate in Gaussen's classification roughly corresponds to the Cfa climate in Koppen's classification. The hypotermaxeric climate (6b--sub-equatorial or peritropical), in which the mean temperature of the coldest month is higher (ranging between 15

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and 20 degrees) is found on the Upper Paraná valley and along the northern section of the coast. This kind of climate is described as an attenuated modality of the equatorial climate without the dry season (6a) prevalent in western Amazonia. However, if it resembles this kind of climate in relation to the absence of a dry season, it has a different origin; therefore its thermal regime is very attenuated, with relatively lower temperatures that account for the occurrence of frost.

The hipomesaxeric climate (7b--subtropical attenuated), in which the mean temperature of the coldest month ranges between 0 and 10 degrees, and there is a chance of light snowfall, is found in only a rather small patch at the highest elevations of the southern section of the uplands on the headwaters of the Uruguay.

A xeroquimenic climate (4) extends along the boundary between the southern and eastern sections of Eastern South America. This subthermaxeric climate (4dTh') is tropical, warm and subhumid, with 1 or 2 biologically dry months. Because the mean temperature of the coldest month is higher than in the southern section (from 15 to 19 degrees), this climatic subregion is actually in the transition between the hot tropical climates and the cool subtropical climates.

The area is covered by seven major types of vegetation. Around 30% of the area is covered by the subtropical subdeciduous forest found south of the Tropic of Capricorn, here including the gallery forests found along the major rivers all the way southward to the Lower Paraná. These forests cover the areas of the interior not reached either by the mixed broadleaf-coniferous forest characterized by Araucaria angustifolia O. Ktze. or by the oceanic breezes. Climate,

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elevation, and soil variations determine different facies for these forest but, despite local varaitions, the subtropical forest forms a unique phytogeographic entity that differs greatly from the coastal tropical rainforests. The subtropical forest streches from the crests of the coastal mountains (Serra do Mar)--actually the elevated rim of the uplands--all the way to the lowlands of the Paraná Valley. North of the Tropic of Capricorn only the gallery forests of the western bank of the Paraná stretch farther to the interior, but south of the Tropic of Capricorn this forest, mixed with other kinds of vegetation such as the thorny tree parkland savannas, stretch westward almost to the Paraguay River. West of the Paraná-Paraguay line the thorny tree savannas of the Chaco reach to the Andean foothills.

The subtropical forests stretch from the Tropic of Capricorn to the Jacuí-Vacacaí valley, nearly 30 degrees south. North of the Tropic of Capricorn the forest becomes progressively more mesophylous, until north of the Rio Grande Valley, about 20 degrees South, it gradually merges with the tree savanna (cerrado) of Eastern and West-Central Brazil. South of the Jacuí-Vacai Valley open grasslands extend to the Pampas. Only small forest patches are found on the Lower Camaquand on the nearby escarpments of the granite shield facing east, but gallery forests stretch much further southward along the Lower Paraguay, Middle Paraná, and Middle and Lower Uruguay, as well as the lower courses of their major tributaries, reaching all the way to the Paraná Delta.

One of the general characteristics of the subtropical forest is that there are perenefolious and deciduous trees mixed, which is why it is called semideciduous. This forest was very rich in species, with trees

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up to 30 m tall (predominating those bearing medium or small leaves of a grayish-green color) and a dense undergrowth of vines, epyphites and, in some areas, tree ferns. One of the loftiest trees is the cedro (Cedrela sp.). Palm trees were sparsely distributed. In poor soils--generally on the transition from the heavy porous soils resulting from decomposition of volcanic rocks, to the sandy ones, resulting from the erosion of sandstones--there is a drastic reduction in tree size, the tallest being only 15 m high. The floristic composition, however, is almost the same, except for small islands of dry forest where even cacti grow.

In the alluvial varzea soils, often inundated, along the major rivers there develops a different facies of this forest, containing dense bamboo stands (Chusquea sp.).

The geomorphology of the Paraná and some of its tributaries, repeat, on a much smaller scale, that found along the Amazon. Upon the levees there are gallery forests; between the levees and the valley bluffs there is a strip up to 5 km wide of inundated grasslands and abandoned meanders with stillwaters or swamps, forming horseshoe lakes and lagoons. The predominant vegetation of the Lower Paraguay, Lower Paraná, and Delta, is the tree parkland savanna (parque mesopotamico). Because the area constitutes a labyrinth of lowlying islands and mud banks between the multiple arms and channels of the river, much of it is swampy or flooded part of the year. Winter temperatures may fall to as low as -4 degrees and frost occurs every year between May and Setember. Climax subtropical forest occurs almost only in galleries upon the levees around the islands. The width of these gallery forests is

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variable. Being an impoverished extension of the subtropical forest, only a few tree species reach all the way to the Delta and the Uruguayan coast, and often tree species from the semidry Chaco forests are mixed in. Trees are from 8 m to 20 m tall, and there is a lush undergrowth of vines and epyphites. Palm trees are scattered among them.

Along the Delta only a few species predominate, constituting what are called seibales, sauzales, alisales, and espinillares. A narrow belt of low trees, among them predominating the tala, previously extended to the Río de La Plata estuary and the Atlantic coast.

The highest elevations of the uplands (from 500 m and upward in the south, and from from 700 m and upward in the north, are covered by an evergreen, mixed broadleaf-coniferous forest with A. angustifolia (Paraná pine). Humidity is very high, with from no less than 1,400 mm of rainfall to as much as 2,400 mm. This forest has three strata; a high stratum of Araucaria trees 20 m to 25 m high, sometimes mixed with cedro (Cedrela sp.) and other tall trees, dominates a lower heterogenous stratum of other coniferous such as pinheirinho (Podocarpus sp.). Palmito (Euterpe edulis) and mate (Ilex paraguarariensis) also occur in this second stratum. The Araucaria forest covers about 15% of the total area. As will be detailed later, Araucaria forest is a major determinant of the human occupation of Southern Brazil, because the pine nut was a dominant resource for preagricultural and early agricultural peoples. As a natural resource, the Brazilian pine nut is far more comparable in its reliability and bounty to the acorn, which supported the sedentary populations of Central California (Kroeben 1925), than to the totally unpredictable piñon, which formed the base of the highly

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precarious economy of the Great Basin Numic groups (Steward 1938; Thomas 1979:123-126).

The nearby mountainous area called Serra do Mar, actually the coastal escarpments of the uplands, receives even heavier rainfall (up to 4,500 mm) and is covered by a tropical evergreen rainforest (mata atlântica) which, at lower elevations, also covers parts of the coastal lowlands, particularly on the river mouths. This forest is characterized by tall trees (30 m to 35 m high) and a lush undergrowth of vines, epyphites, tree ferns, and palm trees. The mata atlântica covers about 5% of the area.

Open grasslands (campo) cover about 25% of the total area. Grasslands extend without interruption from south of the Vacacaí-Jacuí Valley to the Río de La Plata estuary; circumscribed patches appear on the top of the uplands amidst the Araucaria forest.

Tree parkland savannas (parque mesopotamico) cover about 10% of the area. They represent an eastern extension of the thorny parkland savanna of the Chaco and are found along the Lower Paraguay and between the Lower Paraná and the Middle Urguay.

The phytogeographical boundaries of Eastern South America are not easy to draw. To the northwest the boundary between the Amazonian rain forest and the cerrado is clear and sharp, but complicated, whereas to the west the cerrados merge imperceptibly with the Chaco. To the south the open grassland that covers the low but rolling relief of Rio Grande do Sul extends into the completely flat Pampa area and at least part of it must be included, because I found it necessary to discuss ceramic traditions centered on the Lower Paraná and the Río de La Plata estuary.

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From an archaeological/cultural area point of view, we should apply Willey's (1971:fig. 7-1) term `Eastern Brazil' only to the area north of the southern escarpments of the Brazilian Uplands where the ceramics of the Pedra do Caboclo and of the Palo Blanco Traditions met around A.D. 400. South of that boundary those parts of Willey's Chacoan and Pampean archaeological/cultural areas that include the lower reaches of the Paraguay, Paraná, and Uruguay Rivers down to the Río de La Plata, ought to be included, at least from the point of view of the ceramic cultures, in a new archaeological/cultural area that I suggest should be called La Platan.

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CHAPTER 3

ROOTS OF THE PROBLEM: CLEANING THE AUGEAN STABLES

3.1 Languages of the Tupí-Stock: Classification and Areas Where Spoken

The ideas about the existence of a very close relationship between Guarani and Tupinambá, which Rodrigues (1964) claims are only dialects within the same language--Tupí-Guarani--have long been totally accepted. Ideas about the southern origin of Guarani, placed in the Paraná-Paraguay watershed, or the alternative model that places the origin of Tupí-Guarani in the Brazilian Uplands between the headwaters of the Guaporé and Tocantins, have been repeated so often that any deviation from these ideas is startling to the collective consciousness (or better said the collective unconsciousness) of the archaeological community. Over the years the few investigators who have questioned these models--W. Schmidt and O. Menghin--have remained in poor repute, perhaps for other reasons, but possibly also because they dared to question what was not questioned before.

These ideas have been so deeply imbedded in the thinking of most South Americanists that they have assumed the status of paradigms in the sense in which Kuhn (1962) has popularized the term. Therefore, before it is possible for me to consider an ecologically and demographically rational model of the prehistory of Eastern South America, these deeply held ideas must be exorcized. Precisely because they are so deeply imbedded, the exorcism is so difficult and painful.

The problem is complex and intertwined but will be treated in three segments, because its solution is made possible by:

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1. Our better understanding of relationships between the languages in the Tupí stock, as progressively more sophisticated techniques are brought to bear on the problem;
2. The interpretation of models of Tupian migration, as our ability to understand and interpret the ethnohistoric records improves;
3. Our increased ability to discriminate between ceramic complexes, as more heuristic procedures are substituted for the pseudo-scientific procedures enforced by the PRONAPA.

In all modesty I must note that this prologue to the solution of my thesis has assumed Herculean proportions and therefore the metaphor, cleaning the Augean stables, is peculiarly precise.

When the Europeans first arrived on the Atlantic coast of South America they were astonished to find that mutually intelligible languages were spoken along the coastal strip from the mouth of the Rio Pará on the Amazon drainage, to the Río de La Plata, a distance of more than six thousand kilometers (Figures 1 and 2). This peculiarity became very important for the Europeans because they could use the same interpreters all over this enormous area. They soon learned a jargon of these languages. The length and intensity of Pre-Columbian trade networks in Amazonia (Lathrap 1973), make it plausible that this jargon--the Lingoa Geral--was also Pre-Columbian in origin.

When the Europeans began to explore and occupy the Amazon and the Paraná-Paraguay drainages, they soon discovered that other closely related languages were also spoken along these rivers. These languages were spoken for long stretches along the Amazon, interrupted by other

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stretches occupied by speakers of languages related to Arawakan, Cariban, and other linguistic stocks. The Tupian speech communities reached from the mouth of the Amazon Marañón, on the Lower Huallaga, Middle Ucayalli, and Upper Napo, covering an east-west distance of almost 3,500 km in a direct line.

South of the Amazon, Tupian languages are still spoken along the courses of the Tocantins, Xingu, Tapajós, and Madeira, all the way to their headwaters. North of the mouth of the Amazon there were also Tupians in Amapá, extending to the ocean in French Guiana.

The differences between the languages spoken on the coastal strip and in the Paraná-Paraguay basin appear to be slight, but a major division could be made between the languages spoken by the coastal Tupí or Tupinambá (Abaneenga) and the Guarani (Abaneem).

The coastal Tupí or Tupinambá language was spoken along most of the coast of Eastern and Northeastern Brazil, from Cananeia on the southern coast of São Paulo, to the mouth of the Rio Pará and the Lower Tocantins at the mouth of the Amazon. The Tupinambá also had some small holdings in the interior, on sections of the Upper and Middle São Francisco, as well as on the Upper Tietê (Figures 1 and 2, redrawn from maps in Métraux [1928a:map 4], Loukotka [1939; 1945; 1969], Nimuendajú [Lowie 1946], Steward and Mason [1948], Steward and Faron [1959:23], Greenberg [1960] and Rowe [1973]).

Guarani or Abaneem was spoken only along a relatively small portion of the coast, from Cananeia south, in Southern Brazil and Uruguay, as well as around the Río de La Plata estuary. In the interior, the Guarani speakers occupied a larger area in the drainage of the Paraná,

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Paraguay, and Uruguay. They inhabited the valleys of the major rivers between the Paranapanema to the north, the Jacuí to the south, the Lower Paraguay and the Upper Paraná to the west, and the Lower Paraná and Uruguay to the east. Some smaller groups were also found on the Upper Paraná to the north of the Paranapanema, and between the Piratinim and Negro Rivers, south of the Jacuí.

Northwestward of the Guarani, the Chiriguano and related groups still occupy a large area between the Upper Pilcomayo and the Upper Guaporé. With the other Tupians of the Madeira, the Middle and Lower Amazon, the coastal Tupinambá, and the Guarani, they form a circuit around the Brazilian Uplands inhabited by Ancient East Brazilians and Macro-Gê.

Tupian speech communities once covered a north-south distance of almost 4,500 km in a direct line between French Guiana and the Río de La Plata estuary (Figures 1 and 2).

At the time when the Europeans arrived the differences between the Tupian languages spoken along the Amazon and many of its tributaries appear to have been slightly more pronounced. However, many of the groups speaking those languages have completely disappeared, and there are no documents left either to classify or corroborate claims that they, too, spoke the Lingoa Geral.

Many classifications have been proposed for the Tupian languages, but only the most important will be discussed here. Those classifications drawn by Rivet (1924), W. Schmidt (1926), Loukotka (1935, 1950), and Mason (1950) are basically geographical, grouping the languages--or what they supposed were languages--into subdivisions under

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a geographic terminology. Up to that time no documented study of these divisions on a linguistic basis had been attempted. In all the above classifications the basic division is between Guarani and Tupinambá, each further subdivided geographically.

Mason's (1950) classification is typical:

I. Guarani

- A. Paraná
- B. Bolivia
- C. Araguaia

II. Tupí

- A. Coastal
- B. Guiana
- C. Southern Amazon
- D. Upper Amazon

Some of these subdivisions include only extinct groups: II.A. Coastal Tupí. Others include extinct and surviving groups: II.A. Paraná Guaranian; II.D. Upper Araguaia Tupians. All the other subdivisions include only modern groups. I am refering to them as groups, instead of languages, because most of the names listed, especially the ancient ones, are only "tribal" names; that is how they referred to themselves or how other peoples referred to them. In most cases there is no information as to whether the differences, if any, also included linguistic differences. Some of these names are also synonymous, that is, they represent Spanish and Portuguese versions of the same names.

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Mason (1950) also diffidently proposed a Macro-Tupí-Guaranian phylum, including Miranya (Bora), Witoto, Zaparo, and a number of less important languages that are generally placed in one or another of these linguistic "families". The existence of this phylum, also included in Greenberg's (1960) classification, has not been corroborated by other researchers.

In 1935, Loukotka reintroduced the lexico-comparative method first devised by Brinton (Loukotka 1968). He divided what was called, for the first time, the Tupí stock into nineteen different groups of languages, sometimes further subdivided in dialects. The criteria by which languages are listed in one group rather than in another are lexical comparisons between standard vocabularies, that is, a selected list of 45 words, many of which Rodrigues (1964) claims are "cultural". Moreover, lacking a statistical method, there was no way of more accurately rendering the degrees of linguistic relationship; therefore the linguistic families are poorly delimited. Family delimitation here concerns how different two languages could be and still be classified in the same family.

Before the final and more refined version of his classification based on the lexico-comparative method was published in 1968, Loukotka had proposed another classification (1950) in which the basic division into nine groups of languages was again mostly geographic. But upon this geographic scheme is superimposed another that tries to explain the spatial distribution of these groups by means of hypothetical migrations, some prehistoric and others supposedly historic. This migration model will be discussed in the next section.

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The last group of languages proposed by Loukotka (1950, 1968), included all those that he believed showed mixing of foreign radicals and were therefore described as lexically "impure".

In 1955, Rodrigues (1955, 1958, 1964) applied to the Tupian languages, for the first time, the lexicostatistical glottochronological method devised by Swadesh in 1949 (1971:971) in order to measure degrees of divergence and establish chains of relationships, as well as to more accurately render the chronological indices obtained. Rodrigues compared 100 to 200 cognates, drawn from Swadesh's diagnostic list of "non-cultural" words, which, itself, was drawn from a large group of languages about which there were doubts as to their degree of relatedness. Based on the assumtion of a reletively constant rate of substitution in a basic vocabulary, indices of retention of cognates were calculated, permitting the establishment of the order of relationships between these languages, and the representation of the degree of affinity in two-dimensional diagrams.

In Rodrigues' (1964) classification the Tupí stock is divided into seven linguistic families that are further subdivided into subfamilies, languages, and, in some cases, dialects. The Tupí-Guarani family (A) is divided into six subfamilies. The first subfamily (a) includes the Tupí-Guarani language (1) with twelve other languages: (2) Tenetehara, (3) Oyampi, (4) Kawaib, (5) Apiaka, (6) Kamayura, (7) Aweto, (8) Tapirape, (9) Xeta, (10) Pauserna, (11) Kayabi, (12) Canoeiro, and (13) Takunape. Tupinambá and Guarani are described as two dialects of the same Tupí-Guarani language (1) with five others: Kaiwa, Txiriguano, Tapiete, Izozo, and Guarayu. Other languages have been classified in

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different subfamilies such as (b): Cocama and Omagua, (c) Guayaki, (d) Maue, (e) Munduruku and Kuruaya, and (f) Siriono.

It is important to remember that all the languages listed above are still part of the same Tupí-Guarani family (A).

The other six linguistic families established by Rodrigues are: B - Yuruna, C - Arikem, D - Tupari, E - Rama-rama, F - Mondé, and G - Puruborá.

Only Yuruna (B) is further divided into subfamilies, but some of the constituent languages of the other families are subdivided in dialects. Summarizing, Rodrigues came up with two linguistic strata:

1. Languages he thought were closely related and therefore have been classified in one or more subfamilies of the same family;
2. Languages that are distantly related and have been classified in different linguistic families but in the same stock, and therefore must have separated at an earlier time level than the former.

After this major breakthrough it is worthwhile to map the geographic distribution of these more distantly related languages, that is, those that must have split first from the original core. Lathrap (pers. com. 1983) points out that all the groups speaking these languages live along tributaries of the upper courses of the Xingu, Tapajós, and Madeira, mainly between the Madeira-Guaporé and the Jiparana, far from the main course of the Amazon (Figure 2). Most of these families are clustered around the northwestern section of the Chapada dos Parecis, along the divide between the rivers flowing on the one side to the Madeira and on

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the other to the Guaporé (Iténez). In any case they all are in the same ecological situation, that is next to the northern edge of the Brazilian shield--still in a riverine environment but as far as they could move upstream, short of climbing to the uplands and entering the cerrado area. Because all these rivers are southern tributaries of the Central Amazon or of the Madeira, the only rational explanation is that they have radiated from Central Amazonia up these rivers, which further suggests that we should look to this area as the center of origin of the Tupí stock.

The contrary idea--which holds that the center of origin was on the headwaters of the above-mentioned rivers (Rodrigues 1964)--is based on Sapir's (1951:455) suggestion, badly stated and looking more like an afterthought, in his otherwise brilliant and lucid paper. He suggested that the originating center of a linguistic stock should be where their most divergent languages are today found in close geographical proximity. The same has been repeated by Swadesh (1971:277), and accepted by Rodrigues (1964:103) and others.

The more sensible explanation proposed by Lathrap (pers. com. 1983) is based on Steward, who explains the linguistic heterogeneity of the Montaña populations on the assumption that they had migrated upstream along the western tributaries of the Amazon until they encountered a different environment that they could not penetrate:

> Culturally the Chuncho belong with the Tropical Forest peoples. They appear to represent a series of migratory waves that had spent their force against the barrier of the Andes, where representatives of many widely distributed linguistic families . . . subsided into comparative isolation. No other area

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> of South America has greater linguistic diversity. (Steward 1963:507)

The idea that Tupinambá, Guarani, and some other related languages are dialects of the same language is no longer tenable. Because we know that they have followed a two-pronged spread around the Brazilian Uplands, these two languages were separated for at least two thousand years.

Greenberg's (1960) classification seems, at best, capricious.

Improved and more refined work in historical linguistics have further clarified the situation. Lembe (1971) was the first to apply to the Tupian languages the method of studying soundshifts (i.e., phonetic and phonological changes) in order to measure the degree of relatedness between them and be able to place the nodes of their successive separations. The approach is different from that used in lexicostatistical glottochronology in which, when calculating percentages of cognates, neither phonological changes nor modifications in the use of affixes are considered; that is, phonologically changed words are treated as identical, following the law of phonological regularity.

The differences between Guarani and Tupinambá as distinct languages were not discriminated by the lexicostatistic method used by Rodrigues (1958, 1964). The systematic use of soundshifts on a small group of Tupí-Guarani languages shows otherwise: As can be seen in the phylogenetic tree (Figure 3, drawn from Lembe [1971]) the ten languages that have been studied are divided into four groups:

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1. Tupinambá and Cocama.
2. Guarani, Guarayo, and Siriono.
3. Parintintin, Kamayura, and Urubu.
4. Assurini and Guajajara.

Even though this will be discussed at length in Chapters 11 and 12, it seems fit to bring up the point here that the fact that Tupinambá is in one group and Guarani in another is crucial for my thesis. This means that the speech communities we shall call, respectively, Proto-Tupinambá and Proto-Guarani had split long ago. This allows for the time I hypothesize Tupinambá and Guarani had been geographically separated, following totally different histories for over one thousand years, before they again collided on the Brazilian coast near the Tropic line.

The fact that Tupinambá and Cocama-Omagua share some features that differentiate them from Guarani and other languages, such as Siriono, is also important. Put differently, the whole far-flung bundle of languages--Tupinambá, Cocama-Omagua and, no doubt, Kokamilla and Yurimagua that extend over most of the Brazilian coast and along most of the length of the Amazon into the Peruvian and Ecuadorian Montaña--is more closely related than the adjacent Tupinambá and Guarani languages on the south coast of Brazil are to each other (Figures 1 and 2).

The demonstration that Siriono is a divergent branch of Guarani is also important. Siriono-speaking populations still occupy sections of the Upper Mamoré and Upper Guaporé, which fact makes more plausible a point to which I will return later--the Guarani passed through the Upper Guaporé on their way to the Paraguay.

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Those classifications that are based on, or gave rise to, hypothetical reconstructions of the spread of the languages being classified (e.g., Loukotka 1950; Rodrigues 1945, 1955, 1958, 1964) will be discussed in detail in the next section.

3.2 Contradictory Reconstructions of the Origin and Spread of Tupian Languages and the Material Culture of the Guarani and Tupinambá

3.2.1 Reconstructions Based Primarily on Ethonhistoric Data

The first European chroniclers reported the migratory movements of the Tupinambá and Guarani in the sixteenth and seventeenth centuries. The Tupina (Tupinambá) were moving to the coast from the area beyond the São Francisco River, while the Amoipira were migrating from near the coast to the interior, and other Tupinambá groups were moving up and down the coast starting from the area of Bahia (Soares de Souza [1587] 1938; Cardim 1925:197; Métraux 1927:2-6).

At about the same time the Chiriguano and Guarayo were reported to be moving northwestward from the Paraguay River, crossing the Chaco in raids to the headwaters of the Madeira and the foothills of the Andes (Diaz de Guzman [1612] 1914; Nordenskiöld 1917; Métraux 1927:18).

All these mass movements suggested to many that the Tupians had originally migrated from some heartland, and scholars soon began to look both for a likely source area and for the routes of their dispersal. Alternative reconstructions of the prehistoric routes of dispersion that brought the Guarani and the Tupinambá to the areas where they were found by the Europeans are now mainly only of historical interest, but should be reviewed briefly as a background and to show how they formed a block to our present level of understanding.

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The earlier researchers were looking for a point of origin for the speakers of the languages that were classified at the time in a "Tupí-Guarani" group. This corresponded closely to what is now described as the Tupí-stock in Rodrigues' (1964) classification. Following the usage of the time, these "Tupí-Guarani" were frequently described as a "race" (e.g., Métraux [1927]), but it is clear that a racial classification was not intended. However, only the relatedness of their languages was used as a basis for amalgamating these groups, while great differences in material culture were ignored. These groups, which shared only a few traits of material culture, were nevertheless lumped together simply because their languages were related as, for example, in Klimeck's and Milke's (1935) statistical analysis of Métraux's tabulations (1928a).

These early hypotheses were based exclusively on distributional studies; that is, their intent was to explain the pattern of the historic ethnic (linguistic) distributions, with little or no archaeological data known or used. Their conclusions fall into two basic patterns:

1. Those that placed the center of origin in the Paraná-Paraguay watershed.
2. Those that placed it on the drainage of the southern tributaries of the Middle Amazon.

From the time of the earliest scientific speculations about the indigenous inhabitants of South America (beginning in the second half of

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the nineteenth century) certain investigators, such as von Martius (1867:I,177-179), placed the center of dispersion of the "Tupí-Guarani" somewhere between the courses of the Upper Paraná and the Paraguay. This hypothesis rests basically on one known fact--namely, the existence in historic times of a massive, apparently stable, occupation of the area by the Guarani--with one supposition: that of the very late, almost protohistoric settlement of the coast by the Tupinambá. The Tupinambá arrived on the coast moving from southwest to northeast, that is, from the hypothesized originating center at a time estimated to have been between 100 - 200 years before the arrival of the Europeans (e.g., Métraux 1927:2).

Ehrenreich (1891:44,46-49; 1892) placed the originating center in the same area and hypothesized that from there two branches, possibly already modified by influences from other cultures, had moved north--the first down the Tapajós, and the second, later, down the Xingu--to settle on the Middle Amazon. A third branch, that of the Tupinambá, was thought to have begun moving eastward only in very late times and, after arriving on the coast, to have followed it to Northeastern Brazil. Ehrenreich describes the expansion of the "Tupí-Guarani" as following the major rivers and as being accomplished at the expense of the earlier Gê populations.

The foregoing reconstruction was accepted by such Brazilian ethnologists as R. Garcia (1922:I,339), Lima (1949:105), Costa (1939; 1959:200, map B), and Cesar (1966:53). It was also accepted by Lothrop (1932:94), and applied by Rivet (1924:687) and Mason (1950:208,226,236) to their respective linguistic distributional studies.

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Alternative and contemporary hypothesis placed the dispersion center of "Tupí-Guarani" on the headwaters of the Xingu. Von den Steinen (1886:308-324) apparently based this hypothesis on the geographical distribution of traits of the material culture of the groups concerned.

Likewise Métraux (1928a:310-312), following Nordenskiöld's method, but not his level of insight, presented a detailed distribution study of traits of the material culture in historic times. Ceramic, ethnographic, and archaelogical data, however, were still scanty. Because those traits Métraux deemed most important were found together consistently only in the watershed of the Tapajós and Xingu, he hypothesized that this was where the center of origin of the "Tupí-Guarani" material culture should lie. From there they were thought to have migrated in three successive waves. The first moved down the Tapajós and Xingu to the Middle Amazon. The second moved up the Amazon to the Napo. The third, being the largest numerically, moved first up the Tapajós and down the Paraguay to the Paraná, afterwards spilling out along that line into Eastern South America until they had arrived at the coast. Subsequently some groups moved northeastward up the coast from near the Tropic line, while others moved from the mouth of the Amazon down the coast and around Northeastern Brazil. However, these two branches were believed never to have met on the coast of Rio de Janeiro, which remained occupied by such earlier settlers as the Goitacá. Some other "Tupí-Guarani" groups also were believed to have moved down the Tocantins and the Araguaia to the Lower Amazon.

All these movements climaxed in early historic times. Late historic migrations included those of the Guarani southward to the Río de La

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Plata, the Chiriguano westward to the Chaco and other groups northward to the Guianas and westward to the Marañón.

Loukotka (1935:397 map), using linguistic criteria rather than the material culture, placed the center of dispersion of the languages of the Tupí-Guarani family on the Upper Tapajós, between the Juruena and Arinos Rivers. In a later article, Loukotka (1950) hypothesized a series of migrations, some of them prehistoric and others supposedly historic, to account for the geographic distribution of these languages. He apparently held that all these migrations started from the same originating center indicated above. The first prehistoric migration went eastward, resulting in the settlement of the Kamaiura and Aueto on the Upper Xingu. The next two prehistoric migrations were southward. The first resulted in the occupation of part of the Paraguay watershed by the ancient Guarani and later on in the "Guaranization" of alien peoples, such as the Guayaki. The second southward migration was that of the ancient Tupí (Tupinambá) who, after reaching the coast, moved northward to the mouth of the Amazon. This migration resulted not only in the settlement of the coast by the historic Tupinambá but in the occupation of Maranhão, the Lower Tocantins, and Lower Xingu by the contemporary Tupian groups.

The first historic migration went northeastward and took the Tapirape and Ampanea to the Middle Araguaia. Another historic migration was held to have resulted in the Tupian settlement of the Guianas. The third, moving up the the Amazon, resulted in the Tupian settlements on the Marañón. Another migration moved northward down the Tapajos. The last one went westward to the Andes, resulting in the Chiriguano

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occupation and in the "guaranization" of alien peoples on the Paraguayan Chaco and the Bolivian Llanos.

Rodrigues (1945:333), partially following Métraux (1928a) and Loukotka (1935:397, map; 1950), hypothesized that the center of origin of the Tupí linguistic stock was situated somewhere to the east of the Madeira, between the headwaters of the Xingu and the Upper Araguaia. From there Rodrigues proposed that the Proto-Tupians migrated northeastward, the Guarani southeastward, and the Tupí eastward, occupying the coast only shortly before the arrival of the Europeans.

In a later version Rodrigues (1958:231-234; 1964:103-104), using the lexicostastistical glotochronological method proposed by Swadesh in 1949 Swadesh 1971), tentatively calculated that the differentiation of the Tupí stock predated 3000 B.C. The separation of the Tupí-Guarani linguistic family from the Tupí stock is estimated to have begun ca. 500 B.C.

In the preceding section I have discussed why Rodrigues suggested that the center of differentiation of Proto-Tupí could be placed in the Upper Madeira, between the Guaporé and the Jiparana. He also pointed out that, because the differentiation of the Tupí-stock probably began in preagricultural times when the Tupians supposedly did not have any pottery, the identification of the heartland of the Tupians could not be arrived at through archaeological means.

The placement of the originating center of the Tupí stock on the Upper Madeira, as well as Rodrigues' glotochronological calculations, have been followed by Evans (1964:445), Beltrao and Kneip (1969:111), and Riester (1972:56). However, Schwerin (1970:17) places the

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"Tupí-Guarani" homeland between the Madeira and the Xingu, at the same time suggesting that the coast was not reached by moving down the Amazon, but rather by movements overland from the Lower Amazon to the São Francisco watershed and thence to the coast.

Only a few scholars diverged from what we might describe as the Paraná-Paraguayan, and the Southern Amazonian heartland hypotheses. W. Schmidt (1942:214-215) pointed to the Upper Amazon instead of its southern tributaries as the hearth of the "Tupí-Guarani". He believed that from that area--where they supposedly had had close contacts with the Andean cultures--they spread to the south, southeast, and perhaps also directly to the east before the Arawak invasions isolated the Tupians on the Upper Amazon from the other Tupians down river. The southeastern branch, upon reaching the coast, moved northeastward along it, thence around the shoulder of Brazil and thence northwestward, beyond the mouth of the Amazon.

Sampaio (1914:590) placed the originating center of the "Tupí-Guarani" further northward on the Panama Istmus, from where they supposedly migrated first to the mouth of the Orinoco and the Essequibo. A second migration took them southward, down the northern tributaries and up the southern tributaries of the Middle Amazon, and thence eastward to the coast. Freitas (1914:108-112) saw the originating center in the highlands around Lake Titicaca, from where they supposedly spread eastward to the Upper Madeira, the Upper Beni, and all the way to the Araguaia. He considered that after the Quichua conquest of the highlands, the "Tupí-Guarani" had to migrate south and eastward. Some groups moved out of the mouth of the Amazon and southward down the

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coast, first among them being the Tamoyo, who met the Guarani coming from the interior on the Tropic of Cancer.

Although using some archaeological data, Susnik (1975:13-36), like others before her, relied mainly on ethnohistoric information to propose the most detailed reconstruction ever attempted, excepting that by Brochado (1973a, 1973b). Susnik (1975:57) stresses the mechanisms of colonization, for which I am deeply indebted to her. Her ideas must be understood in the light of an integrated cultural history of the whole of South America, such as that proposed by Menghin (1955-1956, 1957a, 1957b, 1960, 1961, 1962a, 1962b, 1967, and 1971; Menghin and Wachnitz 1958). Successive waves of peoples exhibiting progressively more complex technical and integrational levels or stages are held to have spread in many directions from the northern part of the continent. The first to arrive were preceramic cultures of hunters-planters that apparently moved along the interfluvial areas, spreading from the interior to the Atlantic coast. Second were proto-neolithic or Paleo-Amazonian cultures with simple, small pottery vessels, relying more on planting tuberous roots than on manioc or maize. These groups supposedly entered the Llanos of Colombia and Venezuela simultaneously from the northwest and the northeast, spreading up the northern tributaries to the mainstream of the Amazon. While some moved down river from the central Amazon to its mouth and thence southeastward to Northeastern Brazil, others spread up the southern tributaries, crossing to the Paraguay River, and thence moved down that river and the Paraná to the southern coast, as well as eastward, into Southwestern Brazil. All these peoples spread in more limited migratory waves than those that followed and therefore could not be ethnically identified.

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The third to arrive were recent neolithic cultures that later on could be identified with the Arawak, Carib, and Tupí-Guarani, as well as with other minor ethnic groups. These groups entered the Llanos of Colombia and Venezuela from the same directions as the others, around 2000 - 2500 B.C., crossing to the Amazon drainage, from where they spread in every direction. Their ethnic individualization, however, was achieved only somewhat later and derives from contacts with other peoples, extensive acculturative proccesses, and ecological adaptations. In the case of the "Tupí-Guarani" the place of the original integration of their languages is hypothesized as lying west of the Upper Madeira, from where they spread first southeastward to the area between the headwaters of the Xingu, the Araguaia, and the Paraguay. From the latter area they subsequently spread yet farther afield in two successive and culturally differentiated waves.

From ca. A.D. 500 onwards the Paleo-Tupí-Guarani or, as Susnik calls them, the proto-ava-amazónico, began to spread into Eastern south America, already linguistically separated into two main branches: the proto-Tupina and the proto-Mbyá. Both were archaeologically identified by a plain and corrugated pottery, without any polychrome painting or large vessels that could be used as burial urns. The proto-Mbyá spread from the headwaters of the Paraguay southward, between this river and the Paraná--only occasionally crossing the latter--but never reaching the coast. The proto-Tupina spread first southeastward from the Upper Paraná up the Rio Grande, thence northeastward down the São Francisco, afterwards crossing to the upper reaches of the coastal rivers of

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Northeastern Brazil, and circling northwestward to the Lower Tocantins. Throughout this long inland circuit they reached the coast only at two places, occupying two short stretches at Río de Janeiro and at Bahia, while the rest of the coast was occupied solely by the earlier preceramic and proto-neolithic inhabitants. Later movements of the same wave were those of the proto-Kawhayba northwestward down the Tapajós, and of the proto-Amanayé, and perhaps also the Tapirape, northeastward down the Araguaia.

The second major migration wave comprised the proto-Tupinambá and proto-Cário, warlike riverine boatmen, identified by their polychrome painted pottery, which included large vessels occasionally used as burial urns. These large, well-integrated groups gave more impetus to the southward migrations. The proto-Tupinambá, like the proto-Tupina before them, moved around the interior circuitous route, but branched more frequently to the coast and, upon reaching it, spread up and down some stretches of it. Because they are supposed not to have spread farther than the Jaguaribe River in Northeastern Brazil, the occupation of all the rest of the coast to Maranhão and Pará is assumed to have been only in historic times. As for the proto-Cário, most of them moved south down the Paraguay, the Paraná, and the Uruguay to the Río de La Plata, but one branch separated on the Upper Uruguay, reaching the coast and moving northward until they met the southeastward moving Tupinaqui (Tupinambá).

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3.2.2 Reconstructions Based Primarily on Archaeological Data

3.2.2.1 Rise of Interest in Brazilian Archaeology, 1866-1965

The pottery made by the coastal Tupí (Tupinambá, Tupinikin, and Tamoyo) and the use to which their vessels were put were described in detail during the second half of the sixteenth and the beginning of the seventeenth centuries, when the Tupinambá culture was still, if not exactly pristine, at least not much altered (Correia [1551] in Liete 1956:223; Staden [1957] 1963; Thevet [1557] 1558; [1575] 1944, 1953; Lery [1578] 1963; Gandavo [ca. 1570] 1964; Anchieta [1584] 1964; Soares de Souza [1587] 1938; D'Abbeville [1614] 1963; and D'Evreux [1615] 1864). In contrast, next to nothing was written at that time about the pottery made by the Guarani.

The polychrome painted pottery found along the main course of the Amazon and some of its upper tributaries also struck the fancy of the Europeans and were frequently commentated upon (Carvajal 1894:43-44; Medina 1934:442-443; Oviedo [1543-1575] 1945:152; Ortiguera 1909:376; Chantre y Herrera [1637-1767] 1901:68,331). Among these pottery complexes, those found upstream on the Napo, Aguarico, and Tiputini were later demonstrated to be related to the Omagua (Métraux 1928a:242-246; Lathrap 1962; 1970a). The pottery said to have been found in the maze of islands near the mouth of the Amazon (Oviedo [1543-1575] 1945:152; Medina 1934:442) was possibly related to the Marajoara culture or even trade materials from Marajó (Brochado and Lathrap 1980).

In the post-contact period, the Tupinambá and the Guarani gradually vanished from Eastern South America or were acculturated and--the fact

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that the pottery they left must have been found in huge quantities during the clearing of land for planting that followed the onset of European colonization notwithstanding--there is practically no mention of it until archaeological research was begun.

Although the archaeology of Brazil had a bright start at the beginning of the nineteenth century with the investigations undertaken by P. W. Lund (1839-1845, in Hurt 1980) it never attracted as much attention as that of Amazonia, and was often presented as merely an appendix to that area (Netto 1885). Until 1965 most of the research was centered on the preceramic cultures of the Lagoa Santa caves and rockshelters, on the petroglyphs found inland, and on the coastal shellmiddens or sambaquís. The Guarani and Tupinambá ceramics attracted much less attention and the simpler ceramics of what I shall call the Pedra do Caboclo Tradition is scarcely mentioned at all. It is possible to subdivide this first period of archaeological research in Eastern Brazil into two parts.

The first part runs from 1866 to 1913 and the list of articles then published, here including only those dealing with ceramic cultures, comprises: Mabilde ([1866] 1897, 1899), Nehring (1879), Netto (1885), Ehrenreich (1886), Meyer (1896), Bischoff (1887, 1928), Ihering (1890, 1895, 1904, 1906, 1907a, 1907b, 1912), Schupp (1892, 1903-1905), Paldaoff (1900), Teschauer (1901), Barbedo ([1903] 1951), Ullrich (1906), Calizto (1906), Roquette-Pinto (1906, 1962), Krone (1914), and Luedecker (1913).

Research, stopped by World War I, started again only in 1927, and the list of researchers (for those still active later, indicating only

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articles published through 1965) includes the following: Teschauer (1914, 1927, 1929), Abreu (1928), Métraux (1928a, 1928b, 1946a, 1946b, 1946c, 1948a, 1948b), Simoens da Silva (1934), Tibirica (1935a, 1935b, 1935c), Klimek and Milke (1935), Serrano (1936, 1937), Costa (1939, 1959), Dreyfuss (1939), Mattos (1938, 1940), Caldas (1942), Naves (1943), Godoi (1946a, 1946b, 1952), Watson (1947), Tiburtius, Bigarella and Bigarella (1950-1951), Drumond (1950), Baldus (1951-1952), Santos Silva (1953), Bigarella, Tiburtius and Sobanski (1954), Altenfelder Silva and Blasi (1955a, 1955b), Fernandes and Blasi (1956), Schmitz (1957, 1958, 1959), Menghin (1955-1956, 1957a, 1957b, 1960, 1961, 1962a, 1962b, 1967, 1971), Pereira Junior (1957, 1964a, 1964b, 1965, 1967), Walter (1958), Altenfelder Silva (1958, 1961-1962, 1963), Ott (1944, 1945,1958), Neves da Silva (1959, 1960), Laming and Emperaire (1959), Laming-Emperaire (1962), Rohor (1959), Bryan (1961, 1977), Blasi (1961, 1963, 1965, 1966, 1967), Blasi and Chmyz (1963), Chmyz (1963a, 1963b, 1964, 1965), Dias (1963, 1964), Piazza (1965) and Simons (1966).

The situation was quite different in Uruguay and Argentina where a long-standing interest has focused on the simple pottery of what I shall call the Palo Blanco Tradition and, into a lesser degree, on the Guarani pottery. Beginning with the very first archaeological excavation in Argentina, that by Zeballos and Pico (1878), we will have to list a large number of researchers, including chiefly but not only: Burmeister (1872), Lista (1878), Ameghino (1880-1881, 1918), Ambrosetti (1893, 1894, 1895a, 1895b), Cezar (1895), Torres (1903, 1907, 1911, 1919), Outes (1904, 1916, 1917, 1918), Serrano (1921, 1930a, 1930b, 1930c, 1931, 1932, 1933a, 1933b, 1933c, 1934, 1936, 1937, 1946, 1947, 1950,

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1954, 1955, 1958, 1961, 1972), Aparicio (1922, 1923, 1925, 1928, 1928-29, 1931, 1934, 1936, 1940, 1948), Frenguelli and Aparicio (1923), Devicenzi (1927), Vignati (1931, 1936, 1941, 1942), Greslebin (1931), Lothrop (1932), Freitas (1953), and Figueira (1957).

The Argentinian and Uruguayan bibliography after 1932 can be found in the sections dealing with the Palo Blanco Tradition and the Guarani Subtradition.

In Paraguay the interest arose much later and I can list only a few investigators: Boggiani (1900), Bertoni (1914, 1922, 1932), Mayntzhusen (1912, 1930, 1941, 1944), Fiebrig (1923), Vera (1930, 1940), Schmidt (1932, 1934, 1940), Vellard (1934), Benitez (1942), Menghin (1962) and Susnik (1959, 1974, 1975). The interest, except for Pride (1926), Petrullo (1932), and Fock (1961, 1962) has been mainly focused on the Guarani pottery.

In all the attempts made at constructing a chronology before 1969, the general frame of reference was governed by the common knowledge that the Tupinambá and the Guarani were the last to arrive in Eastern South America. This was coupled with the generally held belief that their occupation was a short one, particularly over the coastal zones. Automatically, all other occupations, especially preceramic ones, were relegated to earlier times. The ceramics of the Pedra do Caboclo Tradition were consistently overlooked in these very simplistic chronological frameworks. Furthermore, it was generally believed that the Gê had adopted pottery only recently and then only because of Tupinambá or Guarani influences. On the other hand, on the Lower Paraná and Río de La Plata areas the simpler ceramics were always viewed as, at

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least at their beginnings, preceding the Guarani occupation (Lothrop 1932; Howard 1947; Howard and Willey 1948; Palavecino 1948a; Willey 1946; Serrano 1950, 1955, 1972).

From the end of the nineteenth century onwards, when antiquary and archaeological interest began to grow, all findings of polychrome pottery on the coastal strip were consistently attributed to the coastal Tupí because vessel shapes, sizes, and decorative techniques coincided with those described by the first European chroniclers as being used by the Tupí, Tupinambá, and Tamoyo of Cabo Frio in the sixteenth and seventeenth centuries (Netto 1885; Ihering 1904; Ott 1944; 1958; Pereira Junior 1965; Simons 1966). On the other hand, the polychrome or corrugated vessels found in the drainages of the Paraná-Paraguay and Uruguay, as well as on the coast of Southern Brazil, were attributed to the Guarani, even in the absence of direct information about the kind of pottery produced by the Guarani who inhabited that area in the sixteenth and seventeenth centuries. This attribution, made on the grounds that the pottery bore some similarities to that attributed to the coastal Tupí (e.g., Métraux 1928a:233,236), eventually led to the entirely mistakenly conception that the Guarani and the Tupinambá pottery were the same or very similar.

The list of archaeologists dealing with the Guarani pottery is very long, starting with Nehring (1879) in Brazil, and with Ameghino ([1880-1881] 1918) in Argentina. The entire list is too long to be quoted here, but that has been detailed exhaustively by Brochado (1973a:11-14,25, 1973b) and by Susnik (1975).

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Some Guarani-related groups of Southeastern Bolivia--such as those speaking Chiriguano--were a language closely related to Guarani--were still making pottery decorated with corrugation as late as the beginning of the twentieth century (Outes 1909; Nordenskiöld 1920, 1924; Métraux 1930; 1948c:469,475; Paulotti 1942). Despite the fact that all and any finds of corrugated and/or polychrome pottery in former Guarani territories are, to this day, automatically attributed to them, there is almost no information in the early chronicles about Guarani ceramic vessels.

Obviously, this must not lead us to believe that the ancient Guarani did not have pottery; nevertheless it hinders any attempt at reconstructing the uses to which the pottery was put. That the ancient Guarani did have pottery, however, may be substantiated by other means. The historic sites of the late sixteenth and early seventeenth centuries known to have been occupied by the Guarani produced a great deal of the same pottery that I describe here as being of the Guarani Subtradition. This includes almost all the characteristic vessel shapes, as well as decorative or pseudo-decorative techniques--including polychrome painting--that are found in the earlier prehistoric sites and are also present in historic sites, thus making this attribution secure. The complete list of these historic sites, including the Spanish towns of the Guaira and the Jesuit Reducciones or Missions of the Guaira and Tape, is provided by Brochado (1974).

Concern about the place of origin of Guarani pottery arose later than concern about the place of origin of the Tupí-Guarani languages. Métraux's (1928a) archaeological data was too scanty, but even if

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pottery did not figure prominently in his list of material cultural elements, it still was used to support some important conclusions. For instance, Métraux (1928a:246-247) claims that the only characteristics of the material culture common to all the "Tupí-Guarani--by this meaning all those speaking the related languages now classified in the Tupí stock (cf. Rodrigues 1945; 1964)--were the painting and the varnish applied to their pottery. The use of varnish he attributed to Amazonian influences, postfire coating with vegetable resin being common in many contemporary Amazonian ceramics (cf., Linne 1925). Moreover, Métraux believed that the only innovation in pottery-making introduced by the "Tupí-Guarani" was the systematic use of corrugations as decorative motifs. He suggested that corrugations had been invented somewhere in the southern confines of the range occupied by the Guarani, and from thence diffused among them and, perhaps, the Tupinambá. He placed great emphasis on the archaeological distribution of the technique of corrugation in his reconstruction of the origin and migrations of the "Tupí-Guarani".

Next to ponder the origin of the Guarani pottery were Lothrop (1932) and M. Schmidt (1932). Lothrop accepted the Paraná-Paraguayan center of origin, but according to M. Schmidt, the distinct traits of the "Tupí-Guarani" material culture--especially those related to the decoration of pottery, such as corrugations, polychrome painting, etc.--could have originated in different places, subsequently arrived at different times, and were integrated into m/e "Tupí-Guarani" tradition in the Paranaian area.

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The same criteria were at least partially accepted by Canals Frau (1953:350-351), who attached little importance to the dispersion center on the grounds that he did not believe in the ethnic unity of the migrants. Rather, he held that their historic cultural characteristics were formed afterwards by means of borrowings from other cultures. Laming and Emperaire (1959:70-78) also upheld this model.

Serrano initially followed the practice, long widespread in Argentina, of attributing all archaeological complexes to the historic indigenous groups known to have occupied the area, in the belief that they were relatively recent. An attempt at time perspective in the archaeology of what is known as the Litoral, although repeatedly suggested by (Serrano 1933a, 1946:5-30, 1954) and utilized by Palavecino (1948a), was first published in fuller form only in 1972 (Serrano 1972).

Serrano assigned complexes such as Palo Blanco (Básica del litoral) Naré, and Eldoradense to an Early Ceramic Period tentatively dated A.D. 1 - 1000, although he believed that the latter date might be earlier. He placed what he called cultura Entrerríana or Básica del Litoral persistente towards the end of this period. To a Late Ceramic Period (A.D. 1200 - 1500), he assigned first what he called the Iguazu pottery or Arroyo Malo Style (i.e., Guarani pottery), and second, the pottery of what he calls the Ribereños plásticos. He also places what he describes as a lithic culture derived from Patagonia and attributed to the historic Charrua, in this same time range. More information about Serrano's attempt at chronology can be found in Chapter 7.

By the time Serrano finally published his chronology of the Litoral, Menghin had already sketched a longer chronological framework for

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Southern Brazil, Northeastern Argentina, and Uruguay, using more sophisticated levels of cultural and economic interpretation (Menghin 1955-1956, 1957a, 1957b, 1960, 1961, 1962a, 1962b, 1967, 1971). In his reconstruction, around 9000 - 8000 B.C. Proto-Gê populations of Lagid race invaded the Brazilian Uplands and crossed them to reach the the coast. These proto-Gê are classified as epiprotolithic hunters-gatherers with a lithic industry based on pebble and core tools. Around 8000 - 7000 B.C., they developed locally to epimiolithic hunters-planters with hand-axes of the Altoparanaense industry. By 6000 B.C. the influence of these epimiolithic populations upon the epiprotolithic groups of the Fuegid race established along the coast stimulated what is generally called the sambaquí culture, with its characteristic large shellmiddens. By 2000 B.C. neolithic elements from Amazonia, which he called Paleo-Amazónicos, trickled down to the Proto-Gê hunters-planters, first bringing large pecked stone axes and maize and later a simple incised pottery like that described as Eldoradense. Sometime before A.D. 1, a second neolithic wave arriving from Amazonia brought groups of tropical root planters with a more complex pottery than that of the Riberefios plásticos. A full neolithic was introduced by the Guarani only in the thirteenth or fourteenth centuries. This framework is clearly closer to my interpretation than any other earlier attempts.

Altenfelder Silva and Meggers (1963:125), using the first C^{14} determinations for Eastern South America, estimated that, after the preceramic horizons represented respectively by the older levels of the Lagoa Santa caves, some inland sites, and the coastal shellmiddens, the

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ceramic horizon represented by the "Tupí-guarani" pottery of Southern Brazil could be as old as ca. A.D. 750 for sites in Paraná State, ca. A.D. 950 for the occupation of the upper levels of some coastal sambaquís, and ca. A.D. 1150 for sites in São Paulo State.

Altenfelder Silva (1967a; 1970:14) later developed this scheme, attempting to adapt Willey's and Phillips' (1958) framework of cultural stages to Brazilian reality and proposed that after an Early and Advanced Lithic Stage there was an Archaic Stage, estimated as ranging from ca. 2000 to 500 B.C., to which he assigns, among other traits, the aceramic pit-houses of Southern Brazil. To the next, or Formative Stage, estimated to span ca. 500 B.C. to A.D. 500, he attributes such diverse pottery complexes as those found:

1. In the upper levels of some sambaquís e.g., Taquara, Itararé and Guarani;
2. In the upper levels of Jose Vieira site, e.g., Casa de Pedra;
3. In most of the "Tupí-guarani" sites of Southern Brazil, e.g., Estirao Comprido, also including those such as Casa de Pedra and Itararé;
4. In the Pedra Oca shellmiden, later called the Periperi pottery.

A Recent Stage, lasting from A.D. 500 to historic times, includes the "Tupí-Guarani" sites of São Paulo State. Actually, what have been called the Tupí-Guarani sites of Southern Brazil--corresponding to the States of Paraná, Santa Catarina and Rio Grande do Sul--contain Guarani pottery, whereas those farther to the north, in São Paulo State, have Tupinambá pottery.

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Lathrap's ideas (1962, 1970, 1972), which are closely followed in this dissertation, will be discussed at length later. Suffice it to say here that, according to him, most of the languages of the Tupí-stock, such as Guarani, Tupinambá, Cocama and Omagua, were consistently associated with different styles or subtraditions of the Amazonian Polychrome Tradition as these spread outward from Central Amazonia.

3.2.2.2 The Programa Nacional de Pesquisas Arqueologicas (PRONAPA) in Brazil, 1965-1970

In 1965 the Programa Nacional de Pesquisas Arqueologicas (PRONAPA) headed by C. Evans and B. J. Meggers of the Smithsonian Institution began to fund twelve Brazilian investigators: F. Altenfelder Silva, J. Proenza Brochado, V. Calderon, I. Chmyz, O. Ferreira Dias, S. Maranca, E. Th. Miller, N. A. Souza Nasser, C. Perota, W. F. Piazza, J. W. Rauth and M. F. Simões, as well as one Argentinian archaeologist, V. A. Nunez Regueiro.

A strip along the coast measuring more than 4,000 km in length, stretching all the way from Northeastern Brazil to the Río de La Plata, was investigated with PROPANA support. Investigations continued later with other sources of support. Despite the fact that the width of this strip varies from 500 to 1000 km it has been called the coastal strip, as opposed to the larger areas inland, which are generally still not well researched (Brochado, et al. 1969:1-5; PRONAPA 1970:1-3).

Many other investigators worked outside of the PRONAPA but in the same general area: M. Albuquerque, A. F. G. Laroche, A. Soares e Silva, A. L. Bryan, R. Gruhn, M. C. Beltrao, E. G. de Faria, L. M. Kneip, L. Pallestrini, N. Guidon, E. Carvalho, L. Cheuiche, O. Blasi, A. Beck,

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A. A. Schmitt, P. I. Schmitz, I. I. Basile Becker, D. Lazzarotto, E. Fensterseifer, F. La Salvia, G. Naue, J. Pivetta, P. A. Mentz Ribeiro, I. Wust, G. Baumhardt, L. Heuser, H. E. Martin, R. Steinhaus, A. S. Barbosa, A. F. Miranda, and S. Mochlecke in Brazil. R. Bernal, R. Boretto, J. Baeza, A. Bosch, J. Femenias, M. Fornaro, A. Dias, and A. Rodrigues were working in Uruguay; E. M. Cigliano, M. A. Caggiano, C. N. Ceruti, and A. Rizzo, in Argentina. This list includes only those researching the pottery traditions discussed here.

The combined efforts of these reasearchers increased the number of archaeological sites yielding either Guarani or Tupinambá pottery from perhaps less than a few score to more than one thousand, and produced a large number of articles, forming a bibliographical list too long to be quoted here, but summarized by Brochado (1973a; 1973b).

Even if we have objections to the basic tenets, methods, and techniques of the PRONAPA, we have to acknowledge its singular importance as a catalyst in the resumption of research in Eastern South America. Through it, Brazil's potential for archaeological research was discovered once again and money from government institutions became available. The few researchers who survived against all the odds during the previous period of low funding were reanimated. Other people joined the effort, even though remaining outside the PRONAPA, and research projects multiplied and publications began pouring out.

At this point it is necessary to give some information about the basic tenets, methods and techniques employed by the PRONAPA investigators (see also Brochado and Lathrap 1980). I wish to show here how the inherent epistemological weaknesses have warped past

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interpretations and, because PRONAPA furnished about ninety percent of the samples at my disposal, still limit this presentation.

During fieldwork what is called a standard test-pit or corte padrão, measuring 2 m x 2 m, is usually excavated in every site. However, in open sites cultural deposits more than 35 cm deep are rare, and besides, most of these sites are located in soils much disturbed by cultivation, in some cases for many centuries. Consequently, most of the open sites are neither deep enough nor sufficiently well preserved to permit more than surface collections. Only a few have had their surfaces scraped or have been thoroughly excavated. Exceptions to the rule are the occupied rockshelters and caves, pit-houses, mounds, and the upper levels of some shellmiddens, whether sambaquís or not, which sometimes provide deep midden accumulations from which important stratigraphic information has been secured.

In open sites the surface distribution of sherds is usually taken as indicating the actual extent of the site. Areas of denser concentrations are assumed to be the places formerly occupied by houses. In the few published cases where the surface of whole sites has been scraped off, this assumption generally proved to be true; the habitation floors correspond closely to the areas of higher density (e.g., Pallestrini 1968-69, 1969, 1972-73, 1974, 1975, 1976, 1977, 1978; Beltrás 1978; Beltrás and Kneip 1967, 1969a, 1969b; Beltrás and Faria 1970-1971).

The size of these presumed houses and the distances between them have been measured. Distances to topographic or geographic features--for instance, to the nearest water supply--have also been

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recorded. However, usually only the maximum and minimum of any measurements for a number of sites believed to be somewhat related are actually published.

In order to establish "phases", a sample of sherds is collected from each site or part thereof, more often than not only from the densest concentrations. The size of the sample varies, following the investigator's preferred criteria, from as low as one hundred sherds, to the complete collection of every sherd in view, amounting sometimes to totals in the thousands.

These sherds are then classified in exclusive binomial categories of type-varieties, usually based on the range of techniques found on the exterior surface finish. When more than one kind of finish occurs in the same or opposite surfaces of the same sherd, it is classified accordingly to only one of these, following rules that have never been made explicit nor agreed on by all investigators. For instance, painting is generally held to be more important than any plastic decoration or pseudo-decoration, and rarer techniques to be more important than more common ones. All the sherds whose exterior surfaces are plain are also subdivided according to the diverse kinds of seemingly extraneous materials found in the paste, together with the sizes of these inclusions and their relative proportions. Some sherds that show external or internal decoration or pseudo-decoration are also subdivided following the same criteria, but there is little consistency in the way that this is done.

By these means, a number of types and varieties are created: usually two or three plain ones and, in the case of the Guarani pottery, twenty

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or more decorated type-varieties. Lists of these type-varieties can be found in such PRONAPA publications as those here described as Terminologia I (1966), Terminologia II (1969) and Terminologia III (1977).

Percentages of these type-varieties are calculated and seriated, employing as a guideline the percentage differences shown by the two most important plain types between the lower and upper levels of the excavated test-pits. Even in cases where there are many more decorated sherds than plain sherds or sherds showing some kind of pseudo-decoration, such as corrugation--as frequently happens in the Guarani pottery--seriations are based on the sole criteria of the differences in percentage shown by what is perceived as temper in the plain types. Involved is the supposition that, at least within limited areas, all the levels or sites that show the same frequences should be generally contemporaneous.

These seriations are regarded as representing chronological sequences of sites occupied at different times, and each seriation is called a "phase". When the percentages of type-varieties at a given site do not fit in one given seriation, the site is seriated in a different sequence, which is considered to represent a different "phase".

Most of the so-called phases appear to represent, more than anything else, the differences between classificatory criteria formed from one year of fieldwork to the next. Some others appear to reflect geographical differences between related groups of potters. Also, a time variable implied by the term "phase" is probably always present,

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but is difficult to separate from the other factors. Therefore, these "phases" may represent materials narrowly localized in time, as well as materials representing many centuries or more than one millenium in certain cases.

When describing the ceramic and lithic materials with all other measurable attributes of the sites in the same seriated sequence, only extremes of variation in the general direction shown by what is described as the "tendencies" of the percentages of the type-varieties are usually published. Whenever information on the popularity of vessel shapes or shape sets is published, trends are obscured because the order of the data array is always in terms of plain types.

Certain Brazilian investigators, most of them working outside the PRONAPA, changed or improved some of these analytical techniques but with a few exceptions, the basic tenets have been maintained.

In most articles, no seriations are actually illustrated; only some very general comparative remarks about the direction shown by the "tendencies" of the percentages of the type-varieties are given. Only in a very few cases is site-by-site data published.

Using these methods a large number of "phases" have been proposed and, in most cases, succintly described. There are now around 150 these "phases"; about 70 were counted in 1973 for the Guarani and Tupinambá pottery alone (Brochado 1973a; 1973b) and their number is still growing. A list of all "phases" established by PRONAPA investigators and some others can be found in Simões (1972).

PRONAPA "phases" were described as archaeological communities identified by means of a seriated sequence. This simply means that each

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"phase" will comprise all the sites having pottery samples that fit into the same seriation.

The more than seventy "phases" proposed for the "Tupiguarani" ceramics comprise more than 900 sites, but around 160 other sites, surveyed by investigators not in the PRONAPA nor following its lead, were ommitted.

The PRONAPA "phases" are rarely described as succeeding each other and forming regional sequences, as phases should. Most of them are excessively long, some spanning almost the duration of the Guarani or the Tupinambá occupation of Eastern South America. Because they are generally synchronous with other "phases" of neighboring areas, in most cases these "phases" have no chronological value. As they stand, they represent regional or local cultural differences rather than the passing of time.

In the report on the results of the PRONAPA up to 1968 (Brochado et al. 1969; PRONAPA 1970) the beginning of pottery-making in the coastal strip (Eastern Brazil) was related to the Periperi Tradition, ca. 1000 B.C. Moreover it was argued that, as in the case of Ananatuba in Amazonia, these earlier ceramics did not have any influence beyond the immediate area. In the light of the available C^{14} dates, it was stated that following the Periperi Tradition there was a hiatus of ca. 500 years. Pottery reappeared again only from ca. A.D. 500 onwards, assuming two different forms:

1. The pottery of the so called Regional Traditions, including Vieira, Taquara, Casa de Pedra, Itararé, Una, and Aratú;

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2. The pottery of the "Tupiguarani" Tradition.

Both the Regional Traditions and the "Tupiguarani" Tradition were believed to have been at least partly contemporaneous, lasting to historic times. Nevertheless, it was suggested that Taquara could have influenced the "Tupiguarani" Tradition.

The effort at constructing a chronology was at that time mainly focused on the "Tupiguarani" Tradition, which was subdivided into three subtraditions--Painted, Corrugated, and Brushed--that were believed to have succeeded one another.

From the beginning of the PRONAPA in Brazil it became clear that finds of polychrome and/or corrugated pottery actually mapped onto the area that the ethnographic data indicates was occupied in historic times by either Tupinambá or Guarani-speakers (compare Figures 1 and 2 to Figure 22). Moreover, no other indigenous group was known to have been producing polychrome pottery in Eastern South America in historic times. The ceramics being made by those groups that occupied parts of that area with the Tupinambá and the Guarani and who spoke languages related to Ancient East Brazilian, Macro-Gê, and Charruan are known to have been either plain or to show only very simple techniques of surface finishing, such as non-obliterated coils, punctations, nail incisions, simple line incisions, basket or net impressions, or red slip. Corrugations, which are rare, are thought to represent later influences from the Tupinambá or the Guarani.

Finally, polychrome and corrugated pottery have been found in sites historically related to the Tupinambá or the Guarani, such as the

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earliest European forts, towns, and missions. Some other sites, even if not obviously related to these early historic European settlements, produced C^{14} dates that placed them in the historic time range of the Tupinambá or Guarani occupations of their respective territories; these also have polychrome and corrugated pottery. An outline of all these findings has been published by Brochado (1974).

The first radiometric determinations for the ceramics attributed to the Guarani were obtained in the Paraná watershed on the Ivaí River, at the José Vieira site, some time before by Laming-Emperaire (1962), but the advent of the PRONAPA in Brazil produced a steady flow of C^{14} dates that now totals about seventy in Brazil. Only one has so far been obtained in Argentina (Cigliano 1968).

From the very beginning, the C^{14} determinations indicated that the pottery attributed to the "Tupiguarani" had more temporal depth than was formerly believed possible. Now, as we have seen, there was, and still is, a widespread belief that the "Tupí-Guarani" invasions of Eastern South America could not have happened long ago, that they had been accelerated by the onset of European colonization, and indeed received much of their impetus from it (e.g., Métraux 1928a:237, 1928b). But because there are now about 70 radiometric determinations ranging from between ca. A.D. 100 to 1850 and even after (Figures 15 and 17), the beginning of the occupation of Eastern Brazil by the Guarani and the Tupinambá must have occurred at least 1500 years before the arrival of the Europeans. Among at least some Guarani groups, pottery production lasted for at least 1800 years until the beginning of the twentieth century. Not only do some small groups still speaking Guarani inhabit

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parts of their formerly vast range, but Guarani has become one of the two official languages of Paraguay.

Such a long temporal development fully justifies calling this a ceramic tradition instead of an almost protohistoric ceramic horizon, as formerly believed.

The ethnic identity of the craftsmen who made this pottery was so well substantiated that the Brazilian archaeologists sponsored by the PRONAPA began, from the time of PRONAPA on, to classify all these ceramics in what they called the Tupiguarani Tradition, whereas they had refused to name any other archaeological complex by a term that could have any ethnographic connotation (Meggers 1967; Meggers and Evans 1973:54). Even so, when referring to that ceramic tradition they used to spell the name as if it was not hyphenated--Tupiguarani, and not Tupí-Guarani--in order not to be confused with the ethnographic Tupí or Guarani, or with the speakers of the Tupí-Guarani languages in Rodrigues' (1964) classification, a practice that actually represents a contradiction in terms. If the use of the hyphen was deluding, the running together of the two terms proved to be a terminological blunder of the highest order.

The so-called Tupiguarani Tradition established by the PRONAPA investigators, even if it was alluded to or implied many times (e.g., Brochado et al. 1969:12-16; Terminologia II 1969:8; PRONAPA 1970:12-15; Willey 1971:449-451; Terminologia III 1977:15; Brochado 1973a:7-10), was never clearly defined; that is, its exact characteristics have never been specified. The faulty description of this pottery simply perpetuated the mistaken notion introduced by Métraux (1928a:233,236)

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that this pottery was pratically the same throughout Brazil, Uruguay, Paraguay, and Northeastern Argentina. Therefore, while some archaeologists simply do not acept the "Tupiguarani" ceramic tradition, others attribute to it archaeological manifestations that have formally distinct components, for example, such complexes as Itacaiunas (Figueiredo 1965), Río Fresco and Carapana (Simões et al. 1973), Curaça (Calderon 1966:110) and Cabrobó (Calderon 1967:110, 1969:167).

This failure of precise thinking also resulted in such abortive exercises as the comparison of some Tupinakin (Tupinambá) to vessels depicted by Staden ([1557] 1963) to the characteristic vessel shapes shown by Guarani jars (Drumond 1950), as well as the seriation, in the same quantitative Fordian sequences, of materials from the Tupinambá and the Guarani Subtraditions.

3.2.2.3 The Following Years, 1971 to the Present

When the first Europeans arrived on the coast the Tupinambá expansion was found to be still in full swing and this immediately gave rise to the widespread assumption that wherever pottery similar to that known to have been produced by them in historic times was found archaeologically, it had been spread by their outward expansion. The only obstacle to the reverse application of such reasoning, that is, using dated finds of the Tupinambá or the Guarani pottery to plot the areas of their respective prehistoric expansions, was that some of the C^{14} dates seemed to be too early. Investigators such as Chiara (1978) and Pallestrini (1972-73) suggested that the early C^{14} dates were not compatible with the notion of a late "Tupí-Guarani" expansion.

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On the other hand, other investigators assumed that this kind of relationship can be established between linguistic families and ceramic traditions, even in times far removed from the ethnographic present (Lathrap 1962; Brochado, et al. 1969; PRONAPA 1970; Lathrap 1970a; Altenfelder Silva 1970:13; Meggers 1972:129; Susnik 1975).

Three important data sets from the last twenty years of work, when combined, remove all obstacles to a complete re-examination of the relationship between the expansion of the Guarani and Tupinambá and the spread of the polychrome and corrugated pottery into Eastern South America: (1) The close spatial correlation between the archaeological distribution of pottery attributed respectively to the Guarani or the Tupinambá, and the territories effectively occupied by one or the other in historic times; (2) the non-existence of attributes characteristic of these subtraditions in the pottery produced by the non-Tupí-speaking groups that shared parts of the same general area; (3) the presence of pottery attributed to the Tupinambá or the Guarani in sites historically related to one or the other.

As we have seen, the general idea of a migration of the "Tupí-Guarani" along the Atlantic coast from southwest to northeast is very old, going back to the time before the existence of radiometric determinations. With the first C^{14} dates for ceramic complexes having corrugated and polychrome painted pottery this reconstruction was revived (Meggers 1972:129, 1979:256-258, fig. 4; Meggers and Evans 1977:11-69, 1978a:543-591, 1978b:1-40). I have published a reconstruction of how the "Tupiguarani" could have spread from a secondary center in Southern Brazil all the way to Northeastern Brazil

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and thence northwestward at least to Maranhão, which now must be regarded as thoroughly misguided (Brochado 1973a, 1973b). This reconstruction, however, was adopted as standard by PRONAPA investigators and some others, and thereafter used as a model into which to force all new evidence (e.g., Meggers 1979:256-258, fig. 4). Therefore, it is worth emphasizing that, in that paper, I made a major contribution to the mess I now lament and attempt to clean up.

In 1973, restudying the published data (Brochado 1973b), I suggested that differences in the spatial distribution of attributes--such as vessel shapes, the relative proportions of vessel surfaces that were decorated or left plain, as well as the relative popularity of the decorative techniques employed--indicated that the pottery previously classified in the "Tupiguarani Tradition" actually shows at least two totally different aspects, which I then called facies. The pottery of one of these facies is found in the coastal strip only to the north of a line following approximately the course of the Tietê River, and from there stretches to the coast of Maranhão. The pottery of the other facies is found only to the south of the same line and from there stretches to the Río de La Plata (Figures 1, 2, 13, 15, and 17). I suggested also that these two facies actually represent the pottery made respectively by the Tupinambá and the Guarani (Brochado 1973b:16-20). The existence of two different ceramic subtraditions changes completely the way the C^{14} dates must be used.

Because my original model showed the spread of pottery from south to north along the coastal strip, I then expressed my perplexity about the following problem: If the pottery of the Southern or Guarani facies had

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actually passed from the Upper Paranapanema to the Guanabara Bay area, crossing the coastal mountain ranges, or if it had passed to the area north of the Tietê River, how and why it was so thoroughly transformed as to make it necessary to describe it henceforth as a different facies, even if both facies could still be viewed as part of the same tradition (Brochado 1973b:6)? In this dissertation, I present proofs that no such transformation actually took place, and that it was not the same pottery that spread all the way from the Río de La Plata to the mouth of the Amazon, or vice-versa.

Another explanation must then be found. If these two ceramic traditions had instead diverged from a common center in the area between the Upper Paranapanema and the Tietê, a ceramic complex showing characteristics of both should be found there, not two subtraditions separated by a sharp boundary. Because this was not the case either, and a clear boundary has been found, the only answer is that the pottery of two different subtraditions, already well differentiated elsewhere, and arriving from opposite directions, came together at that boundary around A.D. 1000 (Figures 21 and 22).

Another suggestion that I made in the 1973 paper was that the division into two facies should replace the former division of the "Tupiguarani" Tradition by the PRONAPA investigators into three subtraditions: Painted, Corrugated, and Brushed (Meggers 1967; Brochado, et al. 1969:12-16; Terminologia II 1969:8; PRONAPA 1970:12-15; Terminologia III 1977:15).

The three subtraditions created during the PRONAPA were based on the knowledge that in some sites there are more sherds showing some kind of

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painting--be it bichrome or polychrome painting, red or white slip, or any combinations thereof--than there are sherds showing other kinds of decoration or surface finish, excepting plain ones. That is, after subtracting all plain sherds, there are more painted ones among the rest. All these sites were then assigned to a Painted Subtradition.

When, by the same token, more sherds bearing some kind of plastic decoration or pseudo-decoration than painted sherds were found, the sites were assigned to a Corrugated Subtradition. This criterion was applied even where, as is often the case in Eastern and Northeastern Brazil, there were more sherds bearing other kinds of plastic decoration, such as rim-nicking or nail incisions, than actual corrugation. The Brushed Subtradition was composed of all those sites where brushed sherds represented around 20% or more of the total.

Such division into subtraditions is fatuous because it disregards, among other things, the fact that in some sites most of the sherds are actually plain. This circumstance, as we shall see, indicates that most of the outer and inner surfaces of the vessels were left undecorated. In other sites, the reverse is true; most of the sherds bear some kind of decoration or pseudo-decoration, that is, some surface finish other than plain smoothing of the outer and/or inner surfaces.

The Painted, Corrugated, and Brushed "Subtraditions" were likewise believed to represent a developmental sequence arranged in that same order, the popularity of painting decreasing at the same time as the popularity of corrugations increased, both being ultimately replaced by brushing in most regional sequences.

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This assumption appeared at the time to be warranted by C^{14} determinations that placed the earliest site attributed to the Painted Subtradition ca. A.D. 420 - 720 (Figure 15:13), and the earliest of the Corrugated Subtradition ca. A.D. 770 - 990 (Figure 15:4). Nevertheless, given the total range covered by these determinations, these two sites might just as well be contemporaneous.

Radiocarbon determinations obtained after 1973 by Brochado and Schmitz on the Middle Jacuí (Schmitz 1979, 1982f) for sites where there are many more corrugated than painted sherds (Figure 15:1) indicate that the sites originally grouped in either the Painted or the Corrugated Subtraditions" have an almost identical distribution in time. Actually at least a few of the sites formerly allocated to the Corrugated Subtradition are positively earlier than the earliest ones allocated to the Painted. Radiocarbon determinations numbered 2, 12, 13 and 16 in the chronological chart (Figure 15) are from sites formerly classified in the Painted Subtradition, while all the other determinations are from sites classified in the Corrugated or Brushed Subtraditions. Nevertheless, against all the evidence, some investigators still hold fast to the chronological value of the Painted and Corrugated Subtraditions (Meggers and Evans 1977, 1978a, 1978b:24; Meggers 1979).

The so-called Brushed Subtradition constitutes something quite different. It is possible that brushing as a means of scraping the lower part of some vessels could have been an old technique, but everything indicates that the enhanced popularity of brushing as a technique of surface finish was brought about by missionization. Brushing is common only in sites where contacts have occurred and

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afterwards is found in the pottery of the missionized Guarani. As such, brushing more closely resembles an horizon than a tradition or subtradition, and therefore constitutes a good time marker for the beginning of processes of missionization in Southern Brazil (Brochado 1974).

In the most recent chronological reviews published by Meggers and Evans (1977:11-69, 1978a:543-591, 1978b:1-40; see also Meggers 1979) the sections dealing with Brazil are based on the evidence published by the PRONAPA investigators. They began by discarding all the C^{14} dates for ceramic complexes earlier than ca. A.D. 100, and believed culture development to have been completely different and almost independent in the four subregions into which the South American lowlands are divided: Amazonia, Venezuela and the Antilles, the Coastal Strip (Eastern Brazil), and the Southern Lowlands. Contacts between these areas were assumed to have been minimal.

In the Meggers-Evans scheme, the earliest dated pottery of the Amazonian coastal shellmiddens (Mina) is believed to have lasted only for a few centuries beginning ca. 3000 B.C. and to have subsequently disappeared without having exerted any influence (see Figure 6, C^{14} dates for Mina pottery almost to historical times). The next ceramic complexes of Brazil--Vieiria, Taquara, Itararé, Una, Aratú, Papeba and Periperi--are judged as being completely different from each other and, therefore, treated as distinct regional traditions. There is no explanation of this "budding" of ceramic complexes, between A.D. 1-1000 in widely separared regions apparently without any obvious antecedents. All speculation about their origin is shunned as premature and the only

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opinion advanced is that they do not represent independent pottery inventions. The beginnings of Una, Papeba, and Taquara are set between A.D. 1 - 500, and those of Vieira, Itararé and Aratú between A.D. 500-1000.

The "Tupí-Guarani" Tradition is viewed as also appearing suddenly and already fully developed on the Upper Paraná by A.D. 500. Even acknowledging that it has all the diagnostic characteristics of the tropical forest cultures, there is no mention of its obvious relation to the Amazonian Polychrome Tradition. The temporal reality of these three subtraditions is still maintained in the face of all evidence to the contrary. The pottery of the Bahia shellmiddens (Periperi) as well as that of the Ribereños plásticos of the Lower Paraná are called "floating" complexes because they could not be related to anything else.

Using my published data (Brochado 1973a, fig. 3), but not deigning to quote the source, Meggers (1979:256-28, fig. 4) repeats in a recent article my earlier interpretation of the spread of the "Tupiguarani" pottery from south to north, to indicate the existence of a point of view in conflict with Lathrap's reconstruction of the dispersal of the Tupí-Guarani languages (Lathrap 1970a:78-79, map 5). However, after comparing the two supposedly conflicting reconstructions, we will find that in Megger's attempt there is no indication about how, that is, by what routes, the Tupí-Guarani came to southeastern Brazil after their postulated differentiation in the Amazonian refugia.

This kind of reconstruction of the spread of the Guarani and Tupinambá could be maintained by some only because:

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1. The pottery of the so-called Tupiguarani Tradition has been regarded as being homogeneous in its characteristics, overlooking the existence of two subtraditions: the Guarani in Southern Brazil, Paraguay, Uruguay, and Argentina; the Tupinambá in Eastern and Northeastern Brazil.
2. The earliest C^{14} dates for sites in Southern Brazil have been presented, while the earliest ones for sites in Northeastern Brazil have been ommitted.

The earliest C^{14} dates on the coast of Northeastern Brazil are now known to have been earlier than those in Eastern Brazil (Figure 17: 21, 22, and 23). However, this could not by itself invalidate completely the reconstruction of the spread from south to north, even if the "Tupí-Guarani" were therefore allowed only 200 years or less to move all the way fron one point to the other through the intervening 4000 km. On the other hand, the existence of two different ceramic subtraditions completely changes the way the C^{14} dates must be used (compare Figures 15 and 17).

All the faulty reconstructions of the origin and spread of the Tupian languages and/or of the material culture, not only of the Guarani and Tupinambá, but of several other Tupians as well, can be attributed to a few misconceptions.

1. Chronological inferences as to movements of populations can be obtained from the study of linguistic differentiation--that is, the comparison of distinct languages and linguistic stocks--relating them to the periods of time assumed for the development of these differentiations.

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The languages of the Tupí stock were found to be spread over an immense area, and since Sapir (1951:452-458) it has been postulated that the greater the geographical extent covered by a linguistic stock, the greater is the period of time that must be allowed for the movements of the people speaking its languages. However, differences between some of the languages of the Tupí stock found very far apart were thought not to be great. For instance, ancient Guarani and Tupinambá, along with modern Kaiwa, Chiriguano, Tapiete, Izozo, and Guarayo, were described as being only dialects of the one and the same language, although Cocama and Omagua were classified as other, closely related, languages in different subfamilies of the same family (Rodrigues 1958, 1964).

Given that the above mentioned criterion of relative age holds good only insofar as geographical extent is proportionate to the degree of language differentiation, the spread of these languages was erroneously believed to have taken place not long before the Conquest, and therefore ought to have been very rapid, taking into account that groups of people could overrun a large territory more rapidly than their language could split into different languages.

Lemle's (1971) pioneering application of the method of soundshifts to the Tupian languages in order to measure the degree of relatedness between them indicates that differences between languages that were formerly believed to be closely related were much greater. Therefore, the geographical extent of the spread of these languages is proportionate to the degree of their differentiation, and a longer time perspective must be accepted.

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2. Tupinambá cultural data has been applied to the Guarani. Because documentary evidence about the Tupinambá was more complete and easier to find than that about the ancient Guarani, it became a common procedure to use the former data set to fill the assumed deficiencies in the latter. This ongoing practice stems at least from Lozano ([ca. 1750] 1873) and I will cite here only a few examples. Torres (1911) and Serrano (1936, 1947) used Tupinambá data extensively to corroborate or explain ethnohistoric as well as archaeological data about the ancient Guarani inhabitants of Argentina, Uruguay, and Southern Brazil. This is particularly visible in Métraux (1928a, 1928b) where the material culture and religion of both the Guarani and the Tupinambá were described with those of several other Tupians in widely separated areas. One piece of information about one ethnic group was extended or corroborated by others from another group, without any attempt to delimit the material culture or the religion of any one of them. For example few, and apparently contradictory, accounts of Guarani anthropophagic rituals exist, therefore, these accounts have been expanded by using the much richer documentation, including illustrations pertaining to the Tupinambá rituals that actually apply to only a few Guarani instances.

In latter monographs, Métraux (e.g., 1948a, 1948b, 1948c), following the plan of Steward's Handbook of South American Indians, which is mainly geographical, described the cultures of different Tupian groups. But by that time the error had been already accepted.

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The contrary practice--that is, the carry-over to the Tupinambá of data pertaining to the Guarani--is not so common and this is not easy to explain, because the Tupinambá disappeared very early, but several Guarani groups still survive.

3. Because archaeological research was so slow to develop in Eastern South America, for a long time there was little data about the Guarani and the Tupinambá ceramics. From this stemmed the mistaken notion, introduced or maybe just continued by Métraux (1928a:233-236), that they were pratically the same. Even in recent years pottery descriptions are so faulty that the confusion still persists. Because what is apparently the same pottery was found along most of the coast of Eastern South America, as well as in most of the watershed of the Paraguay-Paraná and Uruguay (therefore stretching all the way from the Río de La Plata to Maranhão) and because the first radiocarbon determinations obtained were earlier in Southern than in Northeastern Brazil, a model of south-to-north spread was likely to be built.

A recent report (Schmitz 1981) lists 139 researchers in Brazil, centered in 21 institutions, generally Government-sponsered Universities or Museums. Working alone or in teams, they continue to work, covering progressively wider areas and refining our knowledge of South American prehistory. Nevertheless, research is still concentrated in South and Eastern Brazil while other areas, relative to their size, are understaffed.

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The complete list of researchers and the more recent bibliography can be found in the sections dealing with the different ceramic traditions, as well as in Brochado and Lathrap (1980) and in Hurt (1980).

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CHAPTER 4

CONSTRUCTING AND ALIGNING CHRONOLOGIES

I concur with Meggers and Evans (1977:12, 1978a:544, 1978b:2) when they say that we are still attempting to build the space-time framework in which to fit the chronology of Eastern South America. The precise geographical distribution of all the lithic and ceramic phases, styles, traditions, etc., are still unknown and, even if we have a moderately extensive set of radiometric determinations for ceramic complexes, no phase or tradition has its beginning--or many times even its end--clearly defined in time. This chapter will note briefly some of the epistemological issues about which I differ with PRONAPA in our attempt to eliminate these gaps. Other difficulties are less theoretical than due to the nature and preservation of East Brazilian sites.

Open sites in Eastern South America are usually very shallow and many have only a surface scattering of sherds. Those sites I have tested myself should, from my understanding, represent only one component because there are not enough sherds at sufficient depth to suggest that they were occuppied for more than a couple of years. These sites are not large, either; therefore they cannot be interpreted as resulting from villages moving from one place to another in the same area. Nevertheless, some internal rearrangement of houses can be demonstrated for a few of them.

The fact that most of the sites have been occupied only once and not for a long time facilitates the interpretation of the C^{14} determinations

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obtained from them. Usually there is only one C^{14} date per site, but in a few cases there are more. In the case of Guarani or Tupinambá sites, when there is more than one date, these usually fall in the same time range. Therefore, even if most of the Guarani and Tupinambá sites have not been stratigraphically excavated or the stratigraphic evidence has not been published yet, there is no problem as to which of two or more complexes represented in the site the C^{14} date should be attributed; there is only one complex and only one relatively short occupation.

I will assume that, given some conditions, the distribution of C^{14} dates through time and space indicates the displacement of human groups. If I have two small, adjacent areas, such as A and B, and the earliest C^{14} date for B is found to be later than the earliest date for A, I will assume that area B was occupied later than area A and, therefore, that the vanguard of the movement of successive occupations of these sites proceeded from A to B.

Vessel shapes will be given more importance in ceramic comparisons than, for instance, what is perceived as decoration or temper. Because vessel shapes are more closely connected to food preparation, ritual distribution, and consumption, they would not change as easily as, for instance, decoration. I can affirm without fear of contradiction that there is always a functional relationship between the set of vessel shapes of a determined culture and the kind of foods they prepare and serve in them.

I am aware that vessels having quite different forms could have been used for the same culinary ends, and that, conversely, vessels having the same or comparable shapes could have had different uses, but I will

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argue that, once established, the uses to which vessels assigned to a given set of vessel forms were put would not change unless there is some change in the food rituals and etiquettes themselves. For instance, Western and Chinese sets of vessel forms have not changed much during the approximately 400 years they have been exposed to mutual influences because they reflect basically different food rituals.

I will stress not only the functional role of vessel shapes, but their structural role as well; ethnicity could have partially affected diet--as we know for most ethnic groups it does--and hence a particular set of vessel forms (e.g., DeBoer and Lathrap 1979).

Temper, or what has been perceived as such, will not be given so much importance as a time-marker because it reflects more the availability of tempering materials, and sometimes the different ways vessels are used. In the first case the availability of tempering materials might have differed geographically. For instance, cauixi has a much more restricted geographic distribution than say, caraipé. Sand is widely distributed and sherds, due to recycling, are always at hand everywhere.

In the second case, vessels used over fires may have different tempering materials than do those that are not. For instance, caraipé will give both lightness and poorosity; cauixi will give more tensile strength, and sand or crushed sherds will improve the expansibility. Therefore, if different expectations are made for different parts of one vessel, these segments may receive different tempering materials.

No explanation has been yet given at to why tempers change through time. Many explanations involve only time. Displacements can take the

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potter from an area where one kind of temper is available to another area where it is not. Sometimes, new vessel forms have been adopted together with the temper used in them. In the headwaters of the Araguaia, in Central Brazil, all the local groups who adopted beiju-platters from the Caraja tempered them with caraipé, even if they used sand or crushed sherds for tempering in other kinds of vessels.

I will have to disregard the seriated sequences constructed by the PRONAPA investigators because, as I have explained before, they are based in the percentage changes of some characteristics of what has been perceived as temper, and changes in temper may reflect not only time--if they reflect time at all--but other variables.

Lathrap (1964, 1966, and 1967) severely criticizes Evans and Meggers use of seriations that are actually space-time vectors; the widespread use of this kind of seriation has ever since, biased archaeological research in Brazil. Nevertheless, this will not represent a big problem for me because the main purpose of this dissertation is to reconstruct space-time vectors, and this approach offers the only means by which to reconstruct paleodemography on a geographical scale broad enough to be meaningful.

On the other hand, I will use all the C^{14} dates available, not only mine but all those published. The method of chronology by continuous features (as discussed by Rowe 1959) cannot be used because it is applicable only to materials coming from discrete units of sites, that is, limited in space and time. Discrete units of primary association are not indicated in most of the published materials. Only materials that came from sites I surveyed or excavated myself can be treated as

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discrete units. In the published research, with only a few exceptions, all the materials from a number of sites are described together as part of the same "phase", and with so little provenience data that reorganization into smaller, more useful units is impossible.

Most of the C^{14} dates mentioned in the text are from the articles quoted, others from Simoes (1972) or the Smithsonian Institution list of C^{14} dates (n.d.). Libby's half-life of 5568 years has been used. All the radiometric determinations have been reunited in five charts (Figures 6, 9, 12, 15, and 17), in which the bars indicate the total span between the extremes of their 1-sigma range of statistical error. Throughout the text, for easy presentation, these extremes have been rounded to the nearest fifty year interval (e.g., A.D. 880 $\pm$ 100 is given as A.D. 800-1000 and A.D. 1275 $\pm$ 40 as A.D. 1250-1300).

However, all the pottery of Northeastern, Eastern, and Southern Brazil--excepting those of the Guarani and Tupinambá, which are clearly part of the Amazonian Polychrome Tradition--appear to have something in common. Therefore, I have attempted to find how the specific vessel shapes are distributed throughout the many "phases" and "traditions" described by Brazilian archaeologists. I have tried also to find how these forms were distributed through space and, if possible, time.

I will have to acknowledge that because of the Fordian seriation techniques used by my colleagues, coupled with the definition of phase accepted (Terminologia I, 1966, II, 1969), it is frequently impossible to know which forms were used at what times. Therefore, in this attempt at comparison I am not seriating the forms of each "phase" separately, but rather grouping together under the same heading all the shapes

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common to all or most of the "phases" of each "tradition", excepting only those "phases" that show excessive deviations from the others ascribed to the same "tradition". The simplicity of the pottery of the pre-polychrome traditions, Pedra do Caboclo and Palo Blanco, has put constraints on the analysis. Decoration techniques have been less important in drawing these comparisons because, except for some red slipping and incised decoration, most of the ceramics are characteristically plain. Painting is characteristically absent and the few painted sherds seem to be intrusions or borrowings from the Guarani or the Tupinambá ceramics. In the incised decoration the same few and very simple techniques are used repeatedly and always very parsimoniously. Cases of the increase of these decorative techniques have been tentatively interpreted as a) borrowings from the Palo Blanco pottery of Southern Brazil (e.g., Taquara and Taquaruçu Styles), or b) late imitations of the Guarani or Tupinambá emphasis on decoration or pseudo-decoration.

Because of all these problems, only tentative results were expected from the distributional comparison of sets of vessel forms, but the results (Figures 5 and 8) are tremendously rewarding. In Figure 5, the ceramic traditions and subtraditions that I believe should be united in Pedro do Caboclo Tradition have been ordered from the right to left, following the order they occupy in space from north to south through Northeastern, Eastern, and Southern Brazil and, in each area, from those with the earliest beginning dates to those with the latest. As a result, a development in time and space from a single common ancestor seems evident through visual inspection and an understanding of how ceramic traditions function (Haury et al. 1956).

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Beginning from one small set of vessel shapes in the Pedra do Caboclo Style, we see new forms being successively invented or adopted, and old ones being lost so that, at the end, the sets are almost completely different from those at the beginning. It is abundantly clear, however, that they are historically related and result from a process of evolution through time and space. Therefore, I am emphasizing in this chapter the idea of tradition to denote the evolutionary relatedness of most of the simple ceramic complexes of Eastern South America, with the clear intent that, insofar as it is possible, the taxonomic units for ceramic complexes should approach real ethnic units and boundaries. That argument has already been developed in Brochado and Lathrap (1982).

There are only a few instances of stratigraphic continuities from preceramic to ceramic times, but these exceptions are of greatest interest and significance. The strongest cases for cultural continuity across the aceramic-ceramic boundary can be seen in what I will call the Pedra do Caboclo ceramic tradition and in the Vieira Subtradition of what I will call the Palo Blanco ceramic Tradition. The lithic materials are very similar, both in the earlier preceramic sites and in the later dated ceramic sites of the same general area, suggesting that pottery was generally adopted by preceramic groups as trait-unit intrusions (Lathrap et al. 1956), and that the lithic industries were carried from one stage to the next by an ongoing cultural tradition.

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On the other hand, both the Aratú Subtradition and the Guarani and Tupinambá Subtraditions of the Amazonian Polychrome Tradition are clearly site unit intrusions. This fact is indicated by the homogeneity of this pottery over large areas and the absence of obvious connections between the meager lithic materials of the later cultures and the lithics of any previous preceramic cultures of the area. This clearly indicates that the spread was by means of population movements rather than by adoption by preceramic groups, that is to say, as site-unit intrusions.

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CHAPTER 5

THE PEDRA DO CABOCLO CERAMIC TRADITION

5.1 The Mina Ceramic Tradition

The earliest C^{14} dates we have for pottery in Amazonia come from the mouth of the Rio Pará, southeast of the mouth of the Amazon. There, what is called the Mina Tradition pottery, comprising the phases Mina, Urua, Tucumã, and Areão--the first two found in shell middens, and the last two in open sites--shows a continuity from at least 3500-3700 to 1400 B.C. Their antiquity is attested by more than two dozen radiocarbon determinations (Simões 1971; Correa and Simões 1971; Simões 1972, 1978, pers. com. n.d.) of which only the 14 already published are in the chart (Figure 6:1-14).

Mina, then, constitutes the earliest dated human occupation of Amazonia and the oldest pottery of Brazil, ranging in age with the oldest pottery anywhere in South America, such as the Valdivia Complex of coastal Ecuador dated from 3300 to 2500 B.C. (Meggers, Evans, and Estrada 1965), Puerto Hormiga dated from about the same time (Evans and Meggers 1968:89) and Palo Blanco on the Río de La Plata estuary in Argentina, dated from 3000 to 1000 B.C. (Cigliano et al. 1971) (Figure 12:1-3).

Mina pottery is tempered with crushed shell and sand. Vessels are small, showing simple, rounded forms with direct, inslopping, outslopping, or everted rims (Figure 5:1, 6, and 7). In the Mina Phase, the only decorative or pseudo-decorative techniques are red slip, brushing, scrapping, non-obliterated coils, and very simple incised

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patterns. The pottery of the Uruá Phase has been described in almost the same terms, only it is said to have a better surface finish, and sometimes flat bases. Red slipping, brushing, scrapping and, more rarely, incising and polishing are the only techniques of surface finish. It has been suggested that the Mina Tradition ceramics gave rise to a ceramic tradition found down the coast in the shell middens of Maranhão (Maiobinha) and Bahia (Pedra Oca, etc.), (Simões 1971, n.d.). From the inspection of illustrations in Correia and Simões (1971) it appears that Mina vessels are quite small, being no larger than 20 cm in width and/or height.

5.2 The Periperi Pottery

What is described as the Periperi ceramic tradition, found in five shell middens on the coast of Bahia, has been subdivided into two phases: Periperi (Pedra Oca, etc.) and Cajaiba. The Periperi shellmiddens are composed of Ostrea sp., Anomalocardia brasiliana Gml., ash, and sand. At all levels there are sherds of simple, sand tempered pottery that is completely plain except for one sherd that shows unobliterated coils. The only vessel forms so far reconstructed are medium sized, rounded bowls (Figure 5:6). Pebbles have been used as hammerstones, grinders, pounders, and palm-nut breakers with shallow pecked depressions. There are also bone points, and bone and shell beads and pendants.

Three C^{14} dates place the Periperi Phase between ca. 750-1000 and 100-350 B.C. (Calderon 1964, 1969b:162-3, 166-7; Brochado, et al. 1969:16-8; PRONAPA 1970; Simões 1972; Calderon 1974:145) (Figure 6:41-43).

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The Cajaiba Phase, found in only one site, is thought to be in the same time range, or possibly later. There are only a few sherds, probably from the same vessel, but the site has been ascribed to a different phase because of two small, polished stone celts different from those common on the coast, some palm-nut breakers with polished depressions, and a shell spoon, the like of which is not found in the Periperi Phase sites (Simões 1972; Calderon 1974:145).

Everything seems to indicate that the Periperi ceramics are in the same Mina Tradition, being a continuation of the latter, which apparently was moving down the coast around the shoulder of Northeastern Brazil. However, even if there are still shellmiddens farther south (e.g., on the coast of Espírito Santo [Perota 1974], and Rio de Janeiro, where the preceramic Macaé Phase [Dias 1969b:146-7] has been placed by two C^{14} dates between 1700-2000 B.C. [Simões 1972]), the Mina Tradition pottery did not expand beyond southern Bahia (Figures 4 and 6).

5.3 The Ananatuba Pottery

I am arguing that Mina is the source of the Pedra do Caboclo tradition, but in the the last phase of the Mina Tradition, in strict sense, near the mouth of the Rio Pará--the Areão Phase--estimated at around 1400 B.C., we have the end of that tradition. In addition to the simpler vessel shapes typical of the earlier phases (Figures 4:1, 6, and 7), wide bowls with exteriorly thickened rims (13), and globular pots with a constricted mouth and strongly everted rims (7), as well as griddles or platters (8) have been recovered. As a rule, all vessels have flat bases. Decorative or pseudo-decorative techniques are red

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slip, nicking of the rim or body, incisions and punctations, as well as brushing (Correia and Simões 1971).

Forms like those described above should represent a second level of complexity in the shape sets characteristic of Central Amazonia that developed there at an earlier time, because by ca. 1200 B.C. most of these were already in the Pocó Phase (Brochado and Lathrap 1980).

Form 7 described above represents a connection between the Mina Tradition and what has been described as the Ananatuba, Mangueiras, and Formiga Phases of Marajó Island (Meggers and Evans 1957:174-242). The beginnings of what I will call here simply Ananatuba have been estimated ca. 2000 B.C. (Oliver and McEwan 1980). Its later part has a C^{14} date of ca. 800-1200 B.C. (Simões 1967b) (Figure 6). Ananatuba has some clearly Central Amazonian vessel forms, such as the one described above (7), plus open carinated bowls (18), open, rounded bowls with thickened rims (11B), small rounded dishes with thickened rims (13), as well as spherical, strongly restricted pots with short collars (17). These are found with some other forms, for example, globular pots or jars with short vertical or insloping necks (3) that are certainly not Amazonian (Figure 5). Five or six of these forms are also characteristic of the Marajoara Style: forms 11 and 18 are common for bowls, forms 7 and 17 for pots, and form 13 for dishes. Form 10, which in Ananatuba appears only in what is described as the Formiga Phase, is a smaller version of the Marajoara tall, truncated-conical cups. However, in Ananatuba, the typical Amazonian decoration by broad and/or fine-line incisions is not restricted to the Amazonian vessel forms. Most vessels, even if they are only medium sized, are larger than those in the Mina pottery. They

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usually measure from 20 cm to 40 cm in rim diameter, and from 5 cm to 40 cm in height (Meggers and Evans 1957:174-242, figs. 52-84).

5.4 The Pedra do Caboclo Style

Ananatuba is not the direct ancestor of Gê ceramics. In the same time range as Ananatuba, or even before, we find the same set of simple plain vessel shapes, including the very characteristic form 3 (Figure 5), far to the southeast near the coast of Northeastern Brazil, at the beginning of what I shall call the Pedra do Caboclo Tradition. This pottery, comprising the phases Pedra do Caboclo (ex-Brocoto) and Angico (Figure 4:PC) has been described from six sites; four rockshelters or burial caves and two open sites. Twenty C^{14} dates extend from ca. 700-1000 B.C. to late historic times (Figure 6:17-36). Given the very compressed stratigraphy of one of the sites, the earliest date for the pottery could extend back to ca. 2800 B.C., although at that level the sherds may be intrusive.

In the Angico Phase, temper is either coarse or fine sand with quartz and feldspar granules, sometimes mixed with charcoal and hematite. The pottery is almost all plain, and only a few sherds show body-nicking, wavy red lines painted on the natural surface, or resist painting. The first two kinds of decoration most likely represent later influences, or even intrusions, from the Tupinambá Subtradition, from possibly A.D. 800 onwards. The set of vessel shapes is quite simple, including mainly small or medium sized rounded bowls and pots that are open or slightly constricted, most of them having lobed rims or spouts (Figure 5: 1, 4, and 6). Small, vertically or horizontally perforated

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buttons or adornos are common, as are holes through the wall near the rim, probably for attachment of suspension cords. Some of these vessels are bag-like or boat-shaped, and have oval, rather than circular, mouth openings (Figure 5:15).

Most vessels are medium sized, measuring no more than 35 cm in diameter and/or height. But there are also some large oval pots or jars, 40-50 cm tall, with constricted mouths and direct rims (Figure 5:2), or short, vertical, or in-sloping necks (3), identical to those typical of Ananatuba. In the caves of the Angico sites some of the above forms of pots or bowls had been used consistently, at least from A.D. 350-500 onwards, as secondary burial urns that were not buried in the ground but left on the surface.

Tupinambá influences or actual Tupinambá sherds appear from A.D. 350-500 or 650-900 onwards and can be attributed to trait intrusions from nearby Tupinambá sites (Cacimba). Therefore it is possible that the urn burials also represent Tupinambá influence. Pottery appears to have entered a period of technical decline after ca. A.D. 1150 (Laroche 1970, 1973, 1975:20, 1977:56; Laroche and Laroche 1980).

The Pedra do Caboclo pottery was probably adopted by preceramic groups with lithic material of the Itaparica Tradition. This industry, in the Bom Jardim Subtradition, was developing in Northeastern Brazil from ca. 9000 B.C. onwards. In its final part--described as the Paquevira Phase, the beginnings of which have been C^{14} dated ca. 2700 B.C--the Bom Jardim Subtradition shows a rapid decline and is characterized by the appearance of pecked stone artifacts made from coarse rocks like granite and gneiss, some of them very large. These

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are elongated and pointed, and have been described as wedges, cleavers, axes, pounders, and cudgels. There are also net-sinkers, palm-nut breakers with depressions, grinders, and thick flakes and polyhedral blocks or cores. The triangular, barbed, and stemmed points are rare, however; instead many "microlithic" points could have been used to form composite projectile points. Most of the artifacts appear to have been used to work wood (see also Hurt 1980). With the ceramics are also found pecked and ground, round or oval hammerstones, small polished celts, polished stone points, and beads of stone, shell, bone, and teeth. Fragments of wooden artifacts appear in the upper levels (Laroche 1970, 1973, 1975:20).

The pottery described as the Papeba Phase (Figure 4:PB) found more to the north, in one site near the coast, is clearly in the same Pedra do Caboclo Tradition (Laroche 1975:23). Temper is sand with quartz and feldspar granules. The set of vessel forms appears to include cognates of most or all of the shapes in that tradition (Figure 5:1-4). Even the lobed rims or spouts, the small perforated buttons, and the holes near the rim are present. But the vessels are never as large as some in the Angico Phase of the Pedra do Caboclo Tradition and from 20% to 30% of the sherds are red-slipped. Stone artifacts are limited to flake scrapers, small points or perforators, small polished celts, pebble hammerstones, and grinders. Abundant shells of Strombus goliath indicate a coastal orientation, and many shell fragments were used as scrapers and borers (Nasser 1974:158).

The Papeba pottery has been C^{14} dated between A.D. 250-350 (Smithsonian Institution List of C^{14} Dates n.d.) (Figure 6:37). Sherds

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of Papeba pottery have also been found in some Tupinambá sites of the area (Curimataú) (Nasser 1971:183, 1974:162). The same or related pottery has been found somewhat farther south, on the coast of Paraiba and of Alagoas (Nasser 1974:161, Note 1; Laroche 1975:23) (Figure 3).

Both the Pedra do Caboclo and Papeba sites are on the tops of low hills, right at the transition between the thorny scrub forest of the uplands (caatinga) and the rain forest of the coast (mata atlântica); those of the Pedra do Caboclo, however, are found towards the interior, in what is called the agreste (dry forest), whereas the one published site of the Papeba Phase is near some coastal lagoons.

In the nearby interior to the southwest, north of the Lower São Francisco River, some other sites have also produced simple pottery like these. In the Gruta do Padre, a few plain sherds have been found in a level of ashes and burned human bones, the residue of burned burials that represent the last occupation of the cave and have been described as the Pajeú Phase (Figure 4: PJ), which is dated by two C^{14} measurements as extending from 150 to 900 B.C. (Simões 1972; Smithsonian Institution List of C^{14} Dates, n.d.; Figure 6:39-40). The bodies had been decked with beads and pendants made from shells and human teeth and wrapped with crude textiles. A few polished stone artifacts accompanied them (Calderon 1969a:135).

The same kind of burned burials accompanied by stone and bone beads and a few flaked and pecked stone artifacts like those of the Paquevira Phase, found in two sites (Pedra do Caboclo and Orobo) (Figure 4:PC) of the Pedra do Caboclo Tradition where they likewise represent the last occupation, have been described as the Machados Phase. Although no

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pottery was found in the Machados Phase levels, it has been tentatively dated ca. 150 B.C. by comparison to the Pajeú Phase (Laroche 1975:28,39). Three partially burned burials, wrapped in coarse textiles probably made from caroa fibers (Neoglazovia variegata) (Maranca 1976a:166) were found in a burial cave, the Toca do Gongo, farther north of the Lower São Francisco (Figure 4:GG). These could be related to the Pajeú and Machados Phases, even though they were not accompanied by pottery. A fourth burial, in a squatting position with the head covered by a globular, slightly constricted pot C^{14} dated ca. 30-250 B.C. (Maranca 1976a) (Figure 6:38), could be related to the Pedra do Caboclo pottery. A fifth burial, possibly primary, in a plain globular pot covered by another smaller one, and a sixth burial, probably secondary, in a corrugated urn, can be related to the Cabrobó pottery (Calderon 1967:110), which will be discussed later.

A rockshelter far to the west, on the Balsas River, a tributary of the Middle Tocantins (Figure 4:PN), also produced simple pottery, tempered with the same type of sand but also containing graphite granules. That pottery is plain, except for some red-slipping, and the set of vessel forms includes only small, rounded, open bowls and slightly constricted pots. From the description, it appears to be similar to the Pedra do Caboclo pottery, even if it has been assigned to the Aratú Tradition, as the Pindorama Phase (Schmitz, Barbosa, Wust, and Moehlecke 1982:95). At least part of the pottery of three nearby open sites has been included in the same phase. The lithic industry is composed of large pebbles, sometimes only broken, but some also crudely flaked, that had been made into grinders, pounders, hammerstones, and palm-nut breakers with pitted depressions.

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The rockshelter, which contained midden deposition more than one meter deep, was used primarily for burials. Some burials are primary, interred in extended or partially flexed positions, and some are secondary bundles of bones, in many cases surrounded and covered by stones. Fresh-water shells, small animal bones, and seeds--especially palm-nuts--also occur. On the walls there are small, shallow, very simple engraved petroglyphs, sometimes encrusted with red or lead-colored painting. These have been described in almost the same terms as those found on the southern escarpments of the Brazilian uplands, far to the south, at the other end of the enormous area throughout which is found ceramics of the Pedra do Caboclo Tradition (Brochado and Schmitz 1972/3, 1976; Ribeiro et al. 1973).

Another kind of pottery, tempered with siliceous bark ashes (caraipé) has some of the characteristic vessel forms of the Urú Tradition. As I will show, Urú maps precisely onto the expansion of the Carajá. Probably, the same process of "carajaization", which I shall discuss in the next section, was also at work here.

The sites are in the dry forest (cerradão) on the transition between the tree savanna (cerrado) and the gallery forests of the Tocantins. The beginning of the occupation of the rockshelter was estimated ca. 1900 B.C., probably by comparison to the materials of the Pedra do Caboclo Phase and since has been apparently C^{14} dated ca. 1850 B.C. (Figure 6:16).

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5.5 The Una Style

After the ceramic styles represented by the Pajeú pottery, the Gongo burials 1-4, and by the Papeba pottery--all constituents of the Pedra do Caboclo Tradition, and all found in Northeastern Brazil--the next style that can be assigned to Pedra do Caboclo is that described as Una. These ceramics are found farther to the southwest, in the southern section of the Brazilian Uplands (Planalto Oriental). This area comprises the headwaters of the Paraná (Mogi-Guaçu and Paranaiba Rivers), the São Francisco, and the Araguaia Rivers, which flow in divergent directions. The Una pottery has also been found in the Paraiba river valley and on the nearby coast. This pottery has been described under many different names.

Lapa Vermelha IV. (Figure 4:LV), dated from 100 B.C. to A.D. 1630 (Prous 1978:70) (Figure 6:44).

Piumhi. (P) Seven sites, dated A.D. 1-200 (Dias 1974:109, 1976/7) (Figure 6:45).

Mucuri. (MC) Five sites, dated from A.D. 450-600 to historic times (Dias 1964, 1969a:124, 1969b:151, 1969c:113-119, 1976/7, 1979:18) (Figure 6:46).

Tangui. (TN) Six sites, dated A.D. 700-900 (Perota 1969, 1974:134) (Figure 6:47).

Una. (UN) Three sites, dated from A.D. 800-900 to historic times (Dias 1969b:146, 1975:3, 1976/7:117, 1979:18, n.d.a; Beltrao and Kneip 1969a:97 (Figure 6:48).

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Unaí. (UI) Dated A.D. 1050-1250, found in the upper levels of the Gentio Cave (Dias 1976/7:121-122 (Figure 6:49,50).

Jabaquara. (JB) Around thirteen sites (Souza 1971:47).

Lapa Pequena. (LP) dated A.D. 1300-1500 (Bryan and Gruhn 1978).

Around seventeen sites from the Lagoa Santa area (Figure 4:LS) (Junqueira and Matta 1978:117) and several from the Upper Paraiba valley (UN) (Maranca 1969:135-136) have been described.

Information is sparse, but similar pottery has been found in more than 60 sites, about half of which are small caves or rockshelters (Piumhi, Mucuri, Jabaquara, Tangui, Lapa Vermelha, Lapa Pequena, and Unaí). Most of the open sites in the northeastern section of the uplands are medium sized (Piumhi), but those on the coast (Mucuri, Tangui, Una, and Jabaquara)--with a few exceptions (Mucuri and Una)--are small, with few sherds. Most of the sites in the uplands are in the cerrado (Piumhi on the São Francisco and Unaí). Some, on the headwaters of the Mogi-Guacçu, are in the tropical forest, which at that elevation (700 m) is composed of mixed broadleaf-coniferous trees with A angustifolia. The climate is of type Cwb (Koppen) or 4c (Gaussen), that is, mesothermal with cool summers and winter rains. There are four or five dry months and from 800 mm of rain, on the headwaters of the São Francisco, to 1,500 mm on the Upper Mogi-Guaçu.

Most of the coastal sites (Mucuri, Tangui, and Jabaquara) are on hillsides, up to 700 m in elevation, whereas those on the Upper Paraiba Valley are at middle elevations (500 m), but all are concentrated in the rain forest (mata atlântica). A few sites are on the coastal lowlands,

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on beaches (Una and Jabaquara), or near mangrove swamps, rivers, or lagoons (Una and Tangui); these are in the restinga vegetation.

The climate on the coast is of type Aw (Koppen), corresponding to the bioclimates 4d and 6b (Gaussen). It is still hot and humid, but with less rainfall, varying around 1,000 m annually, while on the lower zone of the escarpments of the coastal range (Serra do Mar) the climate is of type Aw or Am, with more rain; in both cases there is only a short dry season.

The pottery found in all these sites is tempered either with fine or coarse sand. The sand, in varying quantities, comprises only quartz and/or feldspar granules, sometimes mixed with hematite granules and/or mica speckles. It is thin-walled and completely plain, with dark surface color. In the earlier times, in the uplands, most of this pottery seems to have been well-smoothed, but later, on the coast, it became coarser, with the exterior surfaces usually scraped or brushed. Red slipping is also common (Piumhi, Una, and Tangui).

Shapes 1 to 4 (Figure 5), characteristic of the Pedra do Caboclo Tradition were retained and four or five new forms were added: open bowls some rather shallow with a direct rim (6A); conical and sometimes deep bowls with an everted rim (11 and 13); constricted globular pots with everted rims and incurved walls (7); tall conical beakers or cups with a direct or slightly flaring rim (10A and 10B); and, possibly, shallow truncated-conical bowls with a flat base (16). Flat griddles (8) are found only on the coast (Tangui). All the vessels are small or medium sized, usually measuring no more than 20 cm to 35 cm at their maximum diameter and 10 cm to 30 cm in height. Globular or oval jars

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with a narrow, straight, or flaring neck (9) are unlike any other East Brazilian archaeological pottery, except that same form appears, as we shall see, in the Aratú Subtradition.

Incised lines, rim nicking, punctations, nail incising, corrugation, and white slip usually appear only in some carinated bowls with cambered rims that are characteristic of the Tupinambá Subtradition (Piumhi, Mucuri, and Una). However, it is not known if this represents some sort of borrowing by trade or copy--suggesting some sort of contact--or later reoccupation of these sites, most of which are caves that could have been used for burials for a long periods of time. Ceramic spindle whorls appear only in the uplands (Piumhi). Straight tubular ceramic pipes are rare (Lapa Vermelha IV).

Lithic artifacts are common only in the earliest times on the uplands, where there are well-retouched, chipped knives and scrapers, cores and flakes, as well as pecked or polished celts, pestles, polishing stones, hammerstones, possible bolas stones, and large pounders (Piumhi). Later on, on the coast, there are only a few celts (Tangui), pestles (Una), nut-breakers with pitted depressions, pounders and large flakes, and even these sometimes disappear altogether (Una). On the uplands, the highly polished crescent-shaped axes could also be attributed to these groups. Crescent-shaped axes had been depicted on wall paintings in caves of the Lagoa Santa area (Caetano and Cerca Grande). Prous (1978:70) attributes the relatively late naturalistic representations of animals in some of these wall paintings to the ethnic groups to which the pottery of the Una Style is attributed. Bone projectile points or awls (Piumhi and Una), shell, bone, or biconical

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clay beads are common, and textiles are sometimes used to wrap the burial bundles (Mucuri).

The earliest burials on the coast appear to have been secondary ones, interred near the villages directly in the ground or in urns (Mucuri and Una). Slightly later are primary burials, interred near the villages or deposited in caves and accompanied only by urucu (Bixa sp.). The last burials, probably in historic times, are secondary burials in urns with offerings, deposited in caves (Mucuri, Piumhi, and Tangui). Grave offerings include beads from seeds, bone, or teeth, textiles and smaller vessels.

Some of the coastal sites situated on beaches are middens with shell and fish bone (Una and Jabaquara). Sometimes ceramics are found capping earlier middens of the preceramic Itaipú (Dias 1975:3, 1976/7, n.d.a) or Pequere III phases (Souza 1977:47), possibly indicating the acquisition of pottery by preceramic groups that, in later stages of their development, probably had some kind of agriculture, as suggested by the many stone mortars and pestles of the Pequere III phase.

It is clear that this pottery persisted until late historic times. Alvim and Dias (1972/3) and Dias (1976/7, 1979:18) attribute it to the Goitacá, who inhabited the northern section of the coast in Rio de Janeiro and in neighboring Espírito Santo until the beginning of the seventeenth century, and who afterwards were known by the names Purí, Coroado, and Coropó (Eschwege 1818:76, 91, 104, 125, 242; Wied-Neuwied [1821] 1940:38; Saint Hilaire 1830:1-125; Vasconcellos [1663] 1865:142; Ehrenreich 1886; Métraux 1929, 1946b). All these groups have been placed in the Purí linguistic family by Loukotka (1968). Nevertheless,

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Souza (1977:47) attributes the same pottery, found in the southern section of the coast of Rio de Janeiro, to the Goianá or Guiana (Guayaná), classified in the Caingang linguistic family by Loukotka.

The first group of languages is part of the Ancient East Brazilian, and the second is Macro-Gê. Contacts between these groups and the Tupinambá seem to have been fairly frequent in later times, resulting in visible acculturation affecting the pottery of both groups (Dias 1975:3). The Tupinambá influences in Piumhi have been traced to the Tupinambá sites found farther up the Sapucaí River (Belvedere). The same influences in the Mucuri and Una pottery have been attributed to the presence of rather late Tupinambá sites in the areas occupied by the groups making the earlier styles (Sernambitiba and Ipuca) (Dias 1969b:149-151, 1972:79-80, 1975:9-10).

Many of these vessel shapes and other ceramic characteristics have been carried on to the present time in the Neobrazilian (caboclo) ceramic tradition of the coastal area, described as the phases Calundu (Dias 1967:96-98) and Parati (Dias 1969b:153-155, 1971b; Souza 1977:47). These phases have vessel shapes reminiscent both of the Una and Tupinambá pottery. Accordingly, the Jabaquara pottery is found at the base of the historic and modern shellmiddens where the Parati pottery is found.

There are many lithic sites on the Upper São Francisco, but because they are not found in the same area as the earliest ceramic sites (Dias 1976/7), and because their materials have not yet been described, it is difficult to determine which preceramic groups had adopted the Piumhi pottery. However, I will assume that the ancestors of the Purí-speaking

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groups also occupied, at that time, all the area where this pottery is found. Moreover, the way that the lithic materials found in the Piumhi sites have been described makes them appear very similar to the lithics of the preceramic Paranaiba Phase of the Itaparica Tradition, found on the Upper Paranaiba (Barbosa 1976b; Barbosa, Schmitz, and Miranda 1976/7; Simonsen 1975). As we have seen, preceramic groups with lithic materials of the Bom Jardim Subtradition of the Itaparica Tradition were in all likelihood the ones who had adopted earlier the Pedra do Caboclo pottery in Northeastern Brazil.

The preceramic levels of the Gentio Cave, on the Paracatu River, a tributary of the Upper São Francisco, have been dated between 6650 and 5300 B.C. These produced lithic materials described as very similar to those of what is called the Serranopolis Phase, which shall be mentioned again in the next section. Maize has been dated there ca. 3000 B.C. (Dias 1976/7, pers. com., in Schmitz, 1982g:218). The pottery (Unaí) is tempered with coarse or fine sand and has been placed by one C^{14} measurement between A.D. 1050 and 1250 (Figure 6:50). The burials, possibly primary ones, are accompanied by lithic artifacts, bone points, textiles, strings and baskets, calabashes, feathers, and seed beads. Interesting enough, the preceramic inhabitants had agriculture for at least 4000 years before they had pottery.

In Lapa Pequena rockshelter sherds described as being similar to those of the Gentio Cave have been C^{14} dated A.D. 1300-1500 (Bryan and Gruhn 1978).

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5.6 The Jataí Style

Another different, although related, pottery is found in eight or more rockshelters on the Paranaiba River (Figure 4:JT) (Wust and Schmitz 1975; Moehlecke 1976b; Schorr 1976; Wust 1976c; Schmitz, Barbosa, and Wust 1976; Schmitz, Barbosa, and Ribeiro 1981b; Schmitz 1982b:41-84; Schmitz, Barbosa, Wust, and Moehlecke 1982:85-106).

The climate there is of type Aw (Koppen) or 4c (Gaussen), tropical, with hot summers and winter rains (1,500-2,000 mm annually) and a short dry season of three to four months. Most of the sites lie on the transition between the tropical forest and the dry forest (cerradão).

The pottery is tempered with coarse or fine sand, to which, in later times, siliceous bark ash (caraipé) had been added. Most of the pottery is plain, except for red slipping and some incisions and punctations similar to those in the Taquara and Taquaruçu pottery farther south. The Jataí pottery lacks some of the characteristic Pedra do Caboclo and Una vessel shapes (Figure 5: 2, 3, and 4) but has such other characteristic Una forms as 7, 10, and 11; however, its bowl forms are deeper (6B). To these two new forms have been added: tall pots or jars (12) and shallow bowls or dishes with inflected walls and everted rims (13). Vessels are very small--smaller than in the previous Ananatuba, Pedra do Caboclo, and Una pottery--being no larger than 15 cm to 20 cm in width and 5 cm to 15 cm in height.

The Jataí pottery is found in the upper levels of the rockshelters. The lithic materials found in the lower levels have been ascribed to the Serranopolis Phase, which has been dated by a number of C^{14} measurements from 7000 B.C. to A.D. 900-1100, when the Jataí pottery appears

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(Figure 6:49-50). The large implements obtained from large and thick flakes found in the pottery levels were possibly used for wood-working or planting, and are said to be completely different from the denticulates, scrapers, and borers that characterize the previous Serranopolis industry. Pitted palm-nut breakers also occur. Burials are in flexed position with seed beads, as elsewhere in the cemeteries of that tradition, and lumps of iron oxides. Shellfish are common from the preceramic levels upwards. Near or on the surface of the deposits, wooden and bone points, baskets, strings, and mats are still preserved, as well as maize and peanut kernels, squash and fruit seeds, cotton, animal bone (including fishbone), and eggshells. It is believed that the Jataí pottery lasted until relatively late historic times (ca. A.D. 1750). Tupinambá sherds (Ipora) have been found in the upper levels of the rockshelters (Wust and Schmitz 1975; Schmitz 1976/7:6).

The lithic materials that accompany the Jataí pottery apparently do not represent a development from the previous Serranopolis tools. Moreover, Serranopolis is not definitely part of the Itaparica Tradition (Schmitz et al. 1977; Schmitz 1976/7, 1980). Therefore, the Jataí pottery probably was not adopted by the preceramic inhabitants, but rather brought into the area by late invasions of Macro-Gê speakers from the southeast. This is more likely because the Jataí is so late in relation to the other Pedra do Caboclo Tradition pottery. The earlier inhabitants to the east had had pottery for at least 2000 years, in the Pedra do Caboclo subtradition of its own tradition; the Una Tradition, with a time depth of more than 1000 years, is another possible antecedent.

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5.7 The Itararé Style

The next group of ceramics that can be assigned to the Pedra do Caboclo Tradition are those assigned by I. Chmyz to the Itararé and Casa de Pedra Traditions (Brochado et al. 1969; PRONAPA 1970). They are found in the uplands between the Paranapanema and the Iguaçu, as well as on the adjacent stretch of coast and have been described under many different phase names. To anticipate my conclusions, it is well to note here that the Itararé Style, along with the Taquara and Taquaruçu Styles, to be discussed below, can be attributed with considerable confidence to the groups known collectively as Caingang. Here, I am using the term `Caingang' in the comprehensive linguistic sense as it was used by Métraux (1946:449) and Schaden (1963:77), therefore including such tribal groups or subdivisions as: Caingang (Kaingán, Coroado), Xokleng (Xocrén, Botocudo), Guayaná, Goianá, Goianaz, Guanhanã), Aweikama (Coroado), etc.

Casa de Pedra. (Figure 4:CP) Three sites, one a rockshelter, two on the Middle Iguaçu, A.D. 1100-1200 (Chmyz 1967:1-14, 1968:121, 1968:37, 1969:115, 1971, 1974:fig. 7) (Figure 6:55). One, the Wobeto rockshelter (W) on the middle Ivaí (Laming-Emperaire 1962; Andreatta 1968:69; Chmyz 1971, 1976:38, 1977:200). Some sherds have also been found in five Guarani sites, three of the Umuarama Phase, including Jose Vieira (JV), A.D. 400-700 (Laming-Emperaire 1959, 1962; Chmyz 1968:176, 1969:99, 1971, 1976) (Figure 6:54), as well as at Estirão Comprido (Condor Phase) (Silva e Blasi 1955; Silva 1959; Chmyz 1971, 1976), and at Barracao (B) (Variety B pottery) (Blasi 1965:22; Chmyz 1971, 1976).

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Candoí. (CD) Four sites (one a rockshelter) along the Middle Iguaçu, A.D. 400-550 (Chmyz 1969:123, 1971:96, 1971:11) (Figure 6:64). A few sherds, possibly related, have been found in burial mounds (Chmyz 1968:48, 1969:125, 1971:101).

Itararé. (IT) Nine sites, seven along the Upper Paranapanema and Itararé (Chmyz 1967:67, 1968:115, 1969:120, 1969:97, 1969:21, 1977:52-72, 200-204; Chmyz et al. 1968:16) and two outside the Wobeto rockshelter (W) on the Middle Ivaí, mixed with Casa de Pedra sherds (Andreatta 1968:69; Chmyz 1976:38, 1977:200). Itararé sherds are frequently found intruding into levels of Guarani sites dating from A.D. 650-950 to 1100-1300 (Cambara) (Figure 6:57), and 1250-1450 (Condor). They also occur in historic sites of the nineteenth century (Tamboara, Calore, and Tibagi) (Chmyz 1971, 1977:202); the last two site are related to a modern Guarani migration (Métraux 1927; Nimuendajú 1954). Itararé sherds are also mixed with Casa de Pedra sherds in other sites such as Barracao (B) variety A pottery (Blasi 1965:20; Chmyz 1976:38, 1977:200) Estirão Comprido (Silva and Blasi 1955; Silva 1959; Chmyz 1971, 1976) and Dionisio Cerqueira (DC) (Blasi 1965:20; Chmyz 1976).

Cantu. (CT) Six sites, some of them pit-houses, on the Middle Piquiri, dated by three C^{14} measurements to A.D. 1000-1600 (Chmyz 1977:200; Chmyz and Sauer, in press) (Figure 6:65-67).

Açungui. (AC) Nine sites on the Upper Iguaçu, as well as some sherds in Guarani sites (Guajuvira and Imbituva) of the seventeenth and eighteenth centuries (Chmyz 1968:36, 1968:115, 1969:117, 1977:200). In some of these later sites there are also some sherds showing the

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decorative techniques of nail incisions and net and textile impressions which are charactertistic of other pottery such as Cantu and Candoí (Chmyz 1971:101).

Ibirama. (IB) Two sites on the headwaters of the Itajaí and of the Uruguay (Piazza and Eble 1968; Piazza 1969:65; Chmyz 1971). The same pottery, or something transitional between what have been described as Una and Itararé, has been found in some of the eight pit-houses located on the Itararé and Verde Valleys (RV) (Prous 1979). On the coast the same Itararé ceramics have been found from Guaratuba Bay to Santa Catarina Island (E, RL). Northward there is a large gap where, because of the dearth of information, it is still difficult to establish the boundaries between the manifestations of the Itararé and Una ceramics.

Itararé. (IT) has been found in five shellmounds: Ilha das Pedras (Chmyz 1967:23, 1976), Guaratuba and Ilha das Cobras (Rauth 1963:2; Chmyz 1976), Rio Pinheiros 8 (Tiburtius et al. 1954:180) and Forte Marechal Luz, A.D. 950-1150 to 1200-1450 (Bryan 1961:149, 1965:189, 1977; Chmyz 1976) (Figure 6:60).

Araquari. (A) has been described from four shellmounds, including the same Forte Marechal Luz (Piazza 1974:57; Chmyz 1976).

Piraí. (PI) from two shellmounds, including Itacoara (Piazza 1974:58). Related ceramics have been found in other shellmounds such as Enseada (E), dated A.D. 1000-1200 because of relations with that of Forte Marechal Luz (Beck 1968:90, 1970; Beck et al. 1970:26) and Rio Lessa (RL) (Beck et al. 1969; Beck 1970:64, 1971; Chmyz 1976: fig. 1); as well as in other sites containing shells and fish bone

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but not shellmounds, such as Base Aérea (BA) (Rohr 1959:206; Schmitz 1959:298; Chmyz 1976:38) and Tapera (TA), dated by three C^{14} measurements to A.D. 650-1200. Guarani sherds have been found in the upper levels dated A.D. 1300-1500 (Rohr 1966, 1969; Chmyz 1969:126) (Figure 6:61-63).

The Itararé pottery have been found in more than 50 sites. Two of them, on the uplands, are rockshelters (Candoí and Caso de Pedra) and a few more are pit-houses (Cantu and Rio Verde). On the coast this pottery appears in the upper levels of thirteen preceramic shellmounds (sambaquís) (Araquari, Enseada, Rio Lessa and Piraí), as well as in two open sites comprising lenses of shells and fish bones that are not actually shellmounds (Tapera and Base Aérea). Most of the sites are rather small and shallow, with only a few sherds, but there are exceptions (Cantu). In the interior some of the sites are near the major rivers in the tropical rain forest (Itararé and Cantu), at elevations below 400 m (Itararé, Candoí, and Cantu), and some are found at elevations of 800 m or more (Rio Verde) on hillsides far from the major rivers (Açungui, Casa de Pedra, and Rio Verde) in the tropical forest mixed with pines (Araucaria sp.) (Açungui, Candoí, Casa de Pedra, Wobeto, and Rio Verde).

The climates on the lower elevations on the periphery of the uplands and on the coast are of type Cwa or Cfa (Koppen) with a very short or no dry season, corresponding in general to Gaussen's 6b bioclimate. They are peritropical, with the mean temperature of the coldest month between 15-20 degrees Celsius (Itararé, Casa de Pedra, Cantu, Wobeto). On the highest points of the uplands the climate is of type Cfb (Koppen) or 7a

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(Gaussen), that is, subtropical, rainy, temperate, with the mean temperature of the coldest month between 10-15 degrees Celsius (Açungui, Casa de Pedra, Catanduva, Candoí, Barracao).

On the coast the shellmounds are near the shore in the beach vegetation; several of the other sites (e.g., Araquari) are in the coastal rain forest (mata atlântica).

The pottery is tempered with much sand containing quartz granules and, more rarely, hematite granules (Itararé and Açungui) or crushed sherds and quartz (Casa de Pedra), and sometimes calcite granules (Piraí). In most cases both fine and coarse sands were used, but in Casa de Pedra only fine was used. Most of the pottery is coiled (Itararé, Açungui, and Casa de Pedra), rarely modeled (Açungui and Casa de Pedra); thin-walled, well-smoothed (Araquari, and Piraí) or almost polished (Casa de Pedra). The surface color generally ranges from black to light brown or brick-red (Itararé, Açungui, Araquari and Piraí), or to dark gray (Casa de Pedra); sometimes the darker colors predominate (Itararé) and, in other cases the lighter colors such as red or gray (Açungui). The set of vessel forms includes only two of the Pedra do Caboclo pottery forms (Figure 5:1 and 2), only five of the Una vessel forms (1, 2, 6A, 7, and 10B), and five of the Jataí forms (1, 7, and 10, including the new ones, 12 and 13). Forms 2, 7, and 10 are apparently rather rare. Some globular constricted pots with a cambered rim or short collar (5) probably represent a borrowing from the Guarani pottery.

Most of the vessels have distinctive rim profiles, exteriorly thickened and beveled on the lip. Bases are slightly rounded,

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flattened, or slightly concave. On the other hand, there are two or three new forms; tall pots or jars (12) and shallow bowls with inflexed walls and everted rims (13) are the most important. Vessels are rather small, most of them measuring between 12 cm and 20 cm in diameter. Only a few of them are up to 40 cm in height.

Some of the pottery is completely plain (Casa de Pedra, Enseada, Rio Lessa), but in some 10% or less of the sherds a red slip occurs (Itararé, Açungui, Araquari, and Piraí) and this apparently increases through time. In some other sites more to the west, instead of red slip, 10% of the sherds show punctations (Cantu and Candoí), nail incisions, and other surface modifications such as pinching, brushing, and net or basketry impressions (Candoí). The same range of decoration occurs on the coast (Tapera).

In some other cases, only one or two sherds show punctations (José Vieira, Forte Marechal Luz, and Base Aérea). Even rarer are simple incised motifs (Casa de Pedra). White slip is reported only on the coast (Araquari). Cases of more frequent nail incisions or punctations, as well as corrugations and white-on-red painting surely represent the intrusion of Guarani ceramics into the lower levels, especially in some coastal sites (Piraí).

In most sites there is actually more lithic material than potsherds, but only a few shaped tools are elaborated from cores, most of them being elongated or circular plano-convex scrapers. Characteristically, most of the lithic materials are only flakes and cores with evidence of use, and in some sites only these are found (Açungui and Casa de Pedra). Bone projectile points also appear (Jose Vieira, Wobeto and Casa de

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Pedra). Polished stone artifacts such as celts and pounders (Araquari and Piraí), as well as pitted anvil-stones (quebra-coquinhos) are apparently found only on the coast (Araquari), except for some celts, pestles and possible blunt arrow points (virotes), which have been found in some of the pit-houses (Rio Verde). In the rockshelters (Casa de Pedra) there are stone hearths containing burnt pinhão shells of A angustifolia sp. and nuts of the geriva palm (Arecastrum sp.). Very simple engraved motifs appear on the rock shelter walls (Candoí and Casa de Pedra) (Chmyz 1971:101).

In the Catanduva pit-houses the most characteristic implements are circular plano-convex scrapers; chipped axes, denticulates, knives, grinding stones, flat and grooved polishers, large polished cylindrical pestles, and pitted anvil-stones also occur. There is no pottery, but otherwise the lithic material itself is similar to that characteristic of the aceramic and ceramic sites of the uplands. Chmyz (1974) believes that the Catanduva pit-houses represent the preceramic inhabitants who later on adopted the Candoí pottery, but the C^{14} dates, ranging from A.D. 1050-1250 to 1600-1800, appear to be too late to warrant that belief. Nevertheless, there appears to be nothing against the assumption that the appearance of pit-houses is considerably earlier than the acquisition of pottery. Indeed, the spread of pit-houses might map onto the expansion of the Caingang.

All the lithic materials associated with the Itararé pottery, as well as those found in the Catanduva pit-houses, are clearly related to those of the Andirá, the final late preceramic phase of the Humaitá lithic tradition of the uplands (Chmyz 1967a:63, 1969:21, 1977:38-51).

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The beginning of that tradition has been dated ca. 4700 B.C. in the area (Ivaí Phase) (Chmyz 1967, 1969:74). There is also the possibility that the few Andirá sites (4) were actually left by the same Itararé peoples occupying specialized, short term, seasonal sites in which the utilization of pottery was not indicated.

The continuity of the lithic materials from preceramic to ceramic levels in some shellmounds (Forte Marechal Luz) clearly indicates that the pottery there was adopted by the preceramic inhabitants and did not result from any reoccupation of the sites by new groups (Bryan 1977:12). In the interior the continuity of the lithic materials of the Humaitá Tradition in the Itararé sites also suggests that pottery was adopted by preceramic groups. These groups sometimes occupied pit-houses (Catanduva) or rockshelters but, apparently, most of the time lived in open sites.

It is clear that the Itararé pottery persisted until late historic times; consequently they generally have been compared to the modern Caingang pottery (Manizer 1930; Borba 1908; Fernandes 1941; Métraux 1946:459, fig. 58:e,f; Chmyz 1967:19). Starting from the fact that the generic name "Caingang" was introduced only in 1882 by T. Borba (Métraux 1946) and notwithstanding that there is still much confusion about the use of "tribal" names, if we look to ethnic maps such as those by Nimuendajú (Lowie 1946: map 7), Mason (1948), Loukotka (1969) or Rowe (1973), the area occupied by the Caingang-speaking Guayana (Goaianaz, Goianá, or Guanana) in the first half of the eighteenth century (Nimuendajú 1954) coincides in general with the area of dispersion of the Itararé pottery and the Catanduva pit-houses. The contacts between

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the Guayana and the Guarani were not peaceful (Montoya [1630] in Cortesão, 1951:346) although they easily accepted Guarani influence, some even adopting the Guarani language (Métraux 1946; Baldus 1957; Hicks 1966). This easily accounts for the many instances of acculturation shown by their pottery, and explains why Itararé pottery is found so often and is so persistent in Guarani sites (A.D. 650-950 to the nineteenth century) (Chmyz 1969:120)

In a recent study T. O. Miller (1978) compares pottery made by the last Caingang potters still living in two reservations of São Paulo, to potsherds found lying at places known to have been occupied by the Caingang two or three generations ago, and to archaeological pothserds attributed to the Itararé and Casa de Pedra "Traditions" found in contexts about which there is no historical information. He was able to demonstrate continuity; all three groups of ceramics belong to the same tradition. Differences reflect the degeneration of techniques and borrowings from the surrounding Brazilian society.

5.8 The Taquara and Taquaruçu Styles

Other ceramics, closely related to Itararé and Casa de Pedra that also can be assigned to the Pedra do Caboclo Tradition are those described by E. Miller as the Taquara Tradition (Brochado et al. 1969; PRONAPA 1970) and the Taquaruçu Tradition (Miller, pers. com.). These ceramics are found in the southernmost section of the uplands, south of the Iguaçu, on the adjacent stretch of coast, and on the lowlands at the foot of the escarpments. They have been referred to first by Bischoff (1887:193, 1928), briefly mentioned by Roquette-Pinto (1906), and later

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described by Menghin (1957), Schmitz (1958, 1966), Miller (1967) and Rizzo (1968a, 1968b). This pottery has been described under many different phase names, most of they clearly alluding to the same ceramic manifestations.

Taquara. (Figure 4:T) More than ten sites (three rockshelters), most on the headwaters of the Taquari, Caí, and Sinos Rivers, on the adjacent coast, and a few on the Upper Uruguay; dated by seven C^{14} measurements from A.D. 350-550 to 1200-1400 (Miller 1967:19, 1969:37, fig. 4, 1974:19) (Figure 6:84-89).

Caxias. (CX) 41 pit-houses on the headwaters of the Taquari and Caí, dated by seven C^{14} measurements from A.D. 350-500 to 1200-1400 (Schmitz et al. 1967:2-14, 1968:167; Schmitz 1969; La Salvia and Schmitz 1973; La Salvia 1968a, 1968b) (Figure 6:78-83).

Osório. (O) More than 20 sites on the coast (Bischoff 1887:193, 1928; Roquette-Pinto 1906, 1962; Schmitz 1958, 1959, 1966; Tiburtius et al. 1951).

Erveiras. (ER) 30 sites (two pit-houses) on the Pardo and Taquari, one dated A.D. 900-1200 (Ribeiro 1975, 1980. Ribeiro and Silveira 1979) (Figure 6:91).

Taquaruçu. (TC) More than four sites on the Upper Uruguay, dated from A.D. 1050-1200 to 1700-1850 (Miller 1969:37, fig. 4) (Figure 6:75-76).

Xaxim. (X) Sixteen sites on the headwaters and on the Upper Uruguay, dated A.D. 900-1100 and 1550-1700 (Piazza 1969:60, 1969:65, 1971:74; Miller 1971:49) (Figure 6:73-74). Two more sites (one pit-house)

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have been described by Lazzarotto et al. (1971:84), who ascribed them to the Itapiranga Phase.

Guatambu. (G) 48 sites (two rockshelters and five pit-houses) on the headwaters of the Uruguay and Taquari, dated by three C^{14} measurements from A.D. 50-200 to 1200-1300 (Miller 1971:44) (Figure 6:69-72). One of the rockshelters (Matematico Cave) has been partially published by Lazzarotto et al. (1971).

Vacaria. (VC) A site on the headwaters of the Uruguay (La Salvia et al. 1968:108, 1970:493); another, on the headwaters of the Taquari (Matematico Cave) has also been included in the Guatambu Phase.

Urubici. (UR) Eleven pit-houses on the headwaters of the Uruguay (Rohr 1971:14; Chmyz 1976:39).

Eldoradense. (EL) Six sites near the Upper Paraná (Menghin 1957, 1960, 1967; Rizzo 1968c, 1969).

Itapiranga. (IP) Some sites on the Upper Uruguay (Becker and Schmitz 1968:458, 1970:499; Lazzarotto et al. 1971:84).

Girúa. (GR) Some sites on the Upper Uruguay, dated A.D. 1450-1650 (Miller 1971) Figure 6:77).

Jaguaruna. (JG) Two pit-houses and two shellmounds on the coast (Rohr 1969:5).

Caí. (C) A rockshelter on the Caí River, dated A.D. 1100-1500 (Ribeiro 1972) (Figure 6:92).

Tres de Mayo. (3M) A rockshelter on the Upper Paraná (Rizzo 1968a, 1968b).

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The ceramics listed above have been found in more than 170 sites, of which ten or more on the uplands are caves or rockshelters and around 60 are pit-houses. On the coast they appear in the upper levels of many preceramic shellmounds (sambaquís), as well as in sites with layers of shells but in which shells are not the major component of the agregation of the midden (Osório or Taquara). Most of the sites are small (approx. 20 m in diameter) and shallow, and sherds are very sparse; only a few sites can be described as large (Taquara, Taquaruçu, and Guatambu).

In the interior the sites are concentrated on the highest part of the uplands, near the coast. Some are found far from the rivers; the pit-houses are on hilltops and the open sites are on the tops or sides of low hills or spurs near small streams, at elevations between 400 m and 800 m (Taquara, Caxias, Erveiras, Taquaruçu, and Xaxim) or up to 1000 m (Ibirama, Guatambu, Vacaria, and Xaxim). Some are found in the floodplains (várzeas) of the major rivers (Pelotas, Antas) at lower elevations (Guatambu). On the highest elevations the sites are found near or in the interior of clumps of pines (Araucaria sp.) scattered on grasslands, and lower down in the subtropical mixed forest with pines. The climate there, at more than 600 m elevation, is of type Cfb (Koppen), temperate, rainy (1750-2000 mm annually) the mean annual temperature 15.9 degrees Celsius, the temperature of the warmest month below 22 degrees and cool winters (8-12 degrees Celsius) with frequent frosts and occasional snowfalls.

Only a few sites, farther to the west near the Upper Uruguay or its tributaries, are at elevations of less than 600 m, in the tropical forest (Taquaruçu, Itapiranga, Taquara, and Girúa), or on the boundary

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with the open grasslands (campo). The climate there is of type Cfa (Koppen), humid (1500-1750 mm of rain), transition to subtropical, and without a dry season. The mean temperature of the warmest month is above 22 degrees and the annual mean temperature is 17.3 degrees. However, in the entire area, on the higher as well as on the lower elevations, the mean temperature of the coldest month can be as low as -3 degrees Celsius. The coastal sites, shellmounds or not, are found near the shore in the beach vegetation (Osório or Taquara).

Pottery is tempered with very fine sand consisting of quartz and hematite granules; coarse sand is used occasionally but only farther to the west (Taquaruçu). Surface color varies from a light red to a medium or dark brown or gray; the darker colors, including black, predominate. Pottery is well-smoothed, sometimes even polished (Taquaruçu and Guatambu), and thin-walled. The darker colors have been obtained by deliberate smudging (Guatambu and Vacaria). Vessels were manufactured both by coiling and by modeling, in some cases by hand, in others perhaps inside small baskets (Taquara, Caxias, Osório, and Erveiras).

Most vessels are only slightly larger than their cognates in the Jataí pottery, and about the same size as those in the Itararé pottery. Usually rim diameters are under 22 cm, and depths under 30 cm. In only a few of the assemblages do the largest vessels attain diameters or depths of up to 40 cm (Urubici, Taquaruçu, Vacaria, and Girúa).

The set of vessel forms include only two of the Pedra do Caboclo forms (Figure 5:1 and 3), four of the Una forms (1, 6A, 7, 10A, and 10B,), four of the Itararé forms (1, 7A, 10B, and 12), and five of the Jataí forms (1, 6B,, 7A, 10B, and 12). There is a new form (14) that is

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a deep cylindrical straight-walled jar or beaker with a rounded or slightly flattened base. The deep pots (12) are often double inflexed. Forms 7 and 14 sometimes have an exteriorly thickened rim with a beveled lip, like those in Itararé. Form 5 was probably borrowed from the Guarani.

Plastic decoratation is the norm. The techniques include punctations, ranging into drag-and-jab or stippled punctation, and fingernail markings in a variety of combinations. So-called pinching and dentate stamping, are actually the result of the vessels being built inside coiled baskets or covered with impressions of pieces of basketry, mats, textiles, nets, cords or strings. There are also combed incisions and applique nubbins. Incised parallel lines or chevrons, rocker stamping, dentate stamping, and red slip (Guatambu) as well as small modelled adornos (Taquaruçu) occur only in some of the sites.

At this point it is worthwhile to distinguish between three groups of sites.

1. Those where 80% or more of the sherds are decorated and the decoration covers almost all the external surface of most vessels. Most of the rims are typically exteriorly thickened with a beveled lip, many times underlined by a row of pinching (Taquara, Caxias, Osório, and Erveiras).
2. Those where the pottery is predominately plain but up to 30% of the sherds show punctations, fingernail markings, pinchings, or incised lines that occur in zones or bands near the rim or the bottom. In such cases most of the rims are direct or slightly everted, and the

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lips are rounded or flattened (Guatambu, 25%-40%; Itapiranga, 33%; Jaguaruna, 17%; Xaxim, Taquaruçu, Vacaria, Eldoradense, 10%; and Urubici, 4%). Suspension holes also occur (Guatambu and Vacaria).

3. A few sites where the pottery is actually plain and only a few nail-incised sherds occur (Tres de Mayo, Caí, and Urubici).

The 35 known C^{14} dates indicate that these quantitative and qualitative variations in the amount of decoration represent a change through time. The more decorated pottery--which also has more varied decorative techniques--as well as those molded into baskets are older (A.D. 350-550 to 1200-1400: Taquara, Caxias, and Erveiras) than the less decorated ones (A.D. 900-1000 to modern times: Taquaruçu, Guatambu, Xaxim, and other still undated pottery).

Stone tools include chipped unifacial and bifacial axes and chopping tools with point and edge opposed, stemmed and unstemmed scrapers, core and flake scrapers, punchers, flakes exhibiting traces of use, and hammerstones. There are also polished or semi-polished axes, cylindrical or square pestles up to 80 cm long, stone pendants, pounders, anvil-stones, grinders, and sandstone polishers. Some polished stone zoomorphic representations with ventral depressions (zoolitos), generally of birds, have also been found with Taquara Style pottery (Serrano 1958:161; Tiburtius 1960:22; Miller 1971:54; Ribeiro et al. 1977). These are more characteristic of the coastal percermic sites. The presence of stone bolas, projectile points, and small bifacial knives (Erveiras) in some of these sites has been thought to represent some sort of intrusion from the Rio Pardinho lithic phase of the Umbú Tradition found in the same area (Hurt 1980).

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The lithic materials found with such Taquara pottery as Taquara, Guatambu, and Caxias are similar to those found in aceramic sites of the same area and described as the Camboata lithic phase (Miller 1967:19, 1974:18) and Cara (Guatambu) (Miller 1971:42-3). By the same token, those lithic materials related to the Erveiras pottery have been compared to those found in other sites without pottery and described as the Pinhal lithic phase (Ribeiro 1979:45). Often even the polished artifacts appear in the aceramic sites. All the above lithic phases are viewed as the final development of the Antas Subtradition of the Humaitá Tradition. Farther west, near the Upper Uruguay, the lithic materials found with the pottery (Taquara, Taquaruçu, and Eldoradense) are similar to those described as the Caaguacu Phase of the Tamanduá Subtradition of the Humaitá lithic tradition. The Altoparanaense industry (Menghin 1955-56, 1957) found in that area described by Hurt (1980) is cognate.

The continuity of a single lithic industry from preceramic to ceramic times is therefore suggested (Menghin 1957; Miller 1967:19, 1971:44; Ribeiro 1979:45, 1980:4) and that suggestion is seemingly warranted by the C^{14} dates of some of the aceramic sites, placing them, in relation to the ceramic sites, as late preceramic (Cara: A.D. 1-100; Camboata: A.D. 250-350) (Smithsonian Institution, List of C^{14} dates, n.d.). Therefore, here again pottery was adopted by the same preceramic groups that occupied the area for a long time before; that is from 4000 B.C. in the case of the Antas Subtradition, and from 4700 B.C. in the case of the Altoparanaense (Tamanduá Subtradition) of the same Humaitá Tradition (Hurt 1980). However, there is also the possibility that some of these lithic sites, which have relatively late C^{14} dates (Caaguacu:

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A.D. 1200-1300) were actually left by the Taquara potters and, due to specialized or seasonals occupation of particular sites, pottery was not present.

Occasionally, a few sherds of the Taquara pottery have been found in the levels or on the surface collections of some Guarani sites on the periphery of the uplands and of the coast--Xaxim in Mondaí sites, Taquara in Induá sites (Brochado 1969:41-43)--as well as in Toropi sites, Erveiras in Botucaraí sites (Ribeiro et al. 1976), and Taquara and Osório in Maquiné sites.

On the coast, small Taquara Osório sites are frequently found near Guarani sites. Taquara ceramics apparently are not found in Guarani sites as often as the Itararé pottery; in every case, it appears that, as opposed to the Itararé and Casa de Pedra pottery, the contacts were maintained with the Guarani only in late, almost historical times, because all the above Guarani "phases" persist into the seventeenth century.

The existence of pit-houses was first alluded to by Soares de Souza ([1587] 1938) who, referring to the Goaianaz (Guayana) of the São Paulo uplands, says: " . . . they lived in holes underground . . . " (. . . viviam em covas debaixo do chao . . .). Later, Borba (1908:126) referred to some depressions in the ground south of the Paranapanema (Tibagi) and interpreted them as pit-houses (moradias de bugres) or storage pits for pinhão nuts. Bryan (pers. com.) mentioned pit houses area on the headwaters of the Uruguay. Chmyz (1965:44) excavated the first pit-house (buraco de bugre), which was on the Antas River on the headwaters of the Taquari.

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Pit-houses are characteristically found on the higher elevations (above 500 m) of the southern section of the uplands. The northernmost examples known have been found at on the headwaters of the Rio Grande, part of the Paraná drainage, at about 700 m. The climate there is of type Cwb (Koppen) or 4dMes (Gaussen), mesothermal with cool summers and winter rains. The mean temperature of the coldest month is below 15 degrees Celsius. The site is on the transition from the open grasslands (campo) to the tropical broadleaf forests mixed with some Araucaria that characterize the vegetation from there to the south. Pottery of the Aratú Subtradition (Jaraguá), of the Pedra do Caboclo Tradition, was found inside the house (Dias and Carvalho 1978:239). More pit-houses have been identified on the Itararé and Verde valleys (Rio Verde) and contain Itararé pottery or something transitional between Una and Itararé (Prous 1979). Apparently, the density of the pit-houses increases to the south. However, only a few, the Middle Iguaçu (Catanduva) (Chmyz 1968:48, 1969:109), and on the confluence Iguaçu-Paraná (Cantu) (Chmyz 1977:200) have been investigated. Pit-houses have been identified by the thousands on the headwaters of the Uruguay and the Taquari through the use of aerial photographs (Miller pers. com. 1968). However, only around a hundred pit-houses have been actually surveyed on the ground and even fewer have been excavated. The surveyed pit-houses include 3 in Cotia (Figure 4:CO) (Piazza 1969:65), 11 at Urubici (UR) 5 in Guatambu (G), 31 at Bom Jesus (BJ) (Lazzarotto et al. 1971:80), and 10 in Xaxim (X) (Lazzarotto et al. 1971:84) all of the above on the headwaters of the Uruguay. Several at Criuva (CR) (Chmyz 1965:35), 41 in Caxias (CX), and 2 in Erveiras (ER) are on the headwaters of the Taquari.

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The southern pit-houses are on hilltops and in pine clusters scattered in the grasslands above 500 m and up to 1000 m in elevation. They occur singly and dispersed, or in clusters of 8 (Taquara), 10 (Criuva, Cotia and Urubici), or 20 or more (Guatambu), of different sizes, frequently arranged in concentric circles around the largest one. This kind of settlement clearly indicates a Gê type social order expectable in this branch of Gê.

The houses dug through clay or relatively soft basalt rock measure from 2-12 m in diameter, and from 0.4-5 m in depth. Some consider as subterranean only those houses 2 m or more deep with straight vertical walls, and classify as semi-subterranean those less than 2 m deep, in which the walls form a concave depression with the floor (Schmitz and La Salvia 1973:183); others challenge such a division (Ribeiro 1980).

Arrangements of stones on the floor and around the periphery appear to have supported posts for the roofs, which have been reconstructed as being conical with an inclination of only about 10 degrees. The roofs were held up by posts, the central one sometimes triple, and up to 10 posts placed around the outer margin, where an earth wall up to 0.6 m high often elevated the rim or corrected any unevenness of the ground on the steeper hillsides. In the deeper houses, a bench of pounded clay up to 1 m high surrounds the sides and a clay ramp with flat stone steps was built into the wall, providing access (La Salvia 1983).

In most of the excavated pit-houses there is only one thin layer of occupation, but in some cases up to four layered floors indicate successive occupations of the same house stretching, with some

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interruptions, for hundreds of years. Successive C^{14} dates for the same house, separated by episodes of abandonment (e.g., Caxias A.D. 350-500, 500-700, and 1050-1150) are clear proof of this pattern of repeated renovation. The occupation levels contain ash, charcoal layers, and stone hearths. The hearths are arranged on the floor or on top of the clay bench, and contain burnt shells of A angustifolia nuts (pinhão), seeds, and occasionally bones. Pottery is found frequently, but not always; in most cases there are only a few sherds. The only exception to this (Urubici) produced more than 2000 sherds. Few chipped and polished stone artifacts occur. In some cases there are only lithic materials (Catanduva, Criuva, and Cotia), but in many other cases it is not known if there is pottery (e.g., Bom Jesus).

The pit-houses are usually associated with earth mounds (Cantu and Caxias). Some are oblong, measuring 1 m wide, 3-5 m long, and 0.4-1 m high; Others are round, measuring from 3-5 m in diameter. These mounds may be composed only of earth, with evidences of cremated burials (Cantu), or honeycombed with clay divisions (Caxias). Others, contain large stones, sometimes forming cists underneath, but without any clear indication of burials (Caxias). They were probably reused through time, as indicated by C^{14} dates such as A.D. 750-850 and 1250-1400 for one mound (Caxias).

Other groups of pit-houses are surrounded by long parallel earthwalls, 1.5 m wide, 0.5 m high, built 30 m apart (Bom Jesus). A similar earthwall 170-180 m in diameter encircling a mound 20 m in diameter and 3 m high, containing Eldoradense pottery was described by Menghin (1957). Another ring earthwall measures 35 m to 45 m in

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diameter. Two nearly parallel earthwalls 400 m long are associated with some pit-houses nearby.

In other places the pit-houses are related to annular depressions in the ground (dancador de indio) (Taquara and Guatambu). Near other pit-houses (Urubici) there are flat round areas on hilltops, measuring from 15-70 m in diameter, surrounded by earthwalls 1 m wide and 0.3 m high. The center is often marked by a small, low mound. Excavations in the compacted soil in the interior of the earthwalls revealed refuse up to 0.4 m deep containing pottery and lithic materials. Rohr (1971:18) interprets them as round villages surrounded by palisades.

Subterranean galleries were first described by Drenkpol (1933) who did not believe they were dug by Indians. Rohr (1971:15) found sherds and lithics inside some of them, establishing that they were indigenous constructions and had probably been used for refuge. The cylindrical galleries have been dug into hillsides through soft sandy clay and are always situated near pit-houses. They measure 1.5-2 m in diameter and up to 40 m in length, frequently branch, and usually have some air holes plus more than one entrance, all small and often closed with earth and stones. Petroglyphs were sometimes engraved on their walls. The pottery and the lithic material found in the galleries are the same as those found in the pit-houses nearby (Urubici).

The known C^{14} dates suggest that the pit-houses were occupied from at least A.D. 350-500, or even before, until A.D. 1250-1400. The largest and deepest houses were apparently the first to be dug, while the shallower ones were dug later, sometimes through the earth embankment around the openings of the larger ones (Schmitz 1969). After

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the last dates those pit-houses that contained pottery were apparently abandoned; afterwards, the same pottery only appears in open sites. However, the dated aceramic pit-houses found farther north were in use from A.D. 1050-1250 until historic times (Catanduva and Cantu).

If we look to a map of the spatial distribution of the pithouses and of the minimum winter temperatures on the uplands, it becomes clear that they represent an adapatation to the cold winters, which had minimum temperatures of -3 degrees Celsius, frequent frosts, and occasional snowfalls. Notwithstanding, a few pit-houses (two at Jaguaruna and three on Santa Catarina Island) have been found on the coast, where low temperatures do not occur (Rohr 1971:15). It is not known why, after A.D. 1250-1400, the use of pit-houses was discontinued and the historical Caingang were found living in thatched lean-tos or huts (Métraux 1946:453; Becker 1976).

On the Middle Iguaçu, as well as on the Upper Uruguay (Ijuí) there are large clusters of small, low, earth mounds not obviously related to any pit-houses. They are oblong or rounded, averaging from 1.7-4 m long, by 0.6-1 m wide, and 0.4 -0.8 m high and were probably burial sites (Chmyz 1968:48, 1969:125, 1971:191; Brochado 1969:48). One group is surrounded by a low earthwall, and a few Candoí-like sherds have been found in one of the mounds (Chmyz 1971:191). Similar mounds have been found on the Upper Paranapanema, related to the Andirá lithic phase (Chmyz 1967:63). These clusters of mounds resemble the cemeteries of the historic Guayana (Montoya [1628] in Contesao 1951; Lozano [ca. 1750] 1873(1):423; Teschauer 1929:341-344; Serrano 1939:15-16, 1947:149; Métraux 1946:465; Canals Frau 1953:291; Porto 1954(1):58).

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On the highest elevations of the uplands there are many rockshelters that were probably occupied until quite recently. Fourteen have been surveyed at Petrolandia (Figure 4:PT) (Rohr 1971:13) on the headwaters of the Itajai, and some more on the headwaters of the Taquari (Guatambu-Vacaria and Bom Jesus), São Francisco (Matematico Cave) (Serrano 1938:160) and Criuva (Chmyz 1965:35). A few of these rockshelters were, not long ago, still partially enclosed by bamboo walls. On the floors there are thin layers of charcoal and ashes, as well as perishable artifacts such as those made of vegetable fibers (pieces of string, netted bags, and baskets), wooden implements, bone punches and beads, shell and tooth pendants, and vegetable residues such as corn cobs and husks, pinhão shells, and gourd seeds. Baskets whose interiors had been plastered with clay have also been found. Pottery occurs frequently, but not always. Some of these rockshelters, particularly those whose entrances are located behind cascades, had also been used as cemeteries, with the bodies simply disposed on the floor. In earlier rockshelters with pottery (Guatambu), one dated A.D. 1100-1500 (Caí) complete burials have been excavated. Similar perishable artifacts have also been found preserved by waterlogging in a clay deposit and dated 950-1150 B.C. (Rohr 1967; W. Pianza, in Smithsonian Institution List of C^{14} Dates, n.d.). An aceramic rockshelter (Urubici) dated A.D. 850-1250 probably represents an occupation by Taquara potters under specialized circumstances not requiring the manufacture or presence of pottery (W. Piazza, in Smithsonian Institution List of C^{14} Dates, n.d.).

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In late historic times the Coroado and the Guayana did not have any pottery (Mabilde [1866, note 15] in Serrano 1937:234-235; Mabilde 1899:145-146; Serrano 1936:45-46). The pottery mistakenly attributed by Teschauer (1927; illustrated also in Serrano 1936:45:46) to the Caingang and "Bugre" is actually Guarani or copies from vessels of that subtradition. Mabilde, however, attributed to the Botocudo (Aweikoma) all the pottery found in Coroado territory (i.e., the Taquara pottery). That attribution generally has been followed (Métraux 1946:458; illustrated by Manizer 1930; Menghin 1957, 1960, 1967; Schmitz 1968:127; Piazza and Eble 1968; La Salvia et al. 1968:108, 1970:493; Miller 1971:54). Moreover, one site (Taquaruçu) has been identified by Caingang informants as the place of a village occupied not long ago (Miller, pers. com. 1968). However, pottery-making was discontinued after the raids on the settlers began (Henry 1941:172), and pieces made for an anthropologist are said to not resemble anything earlier (La Salvia and Schmitz, 1973:197).

On Nimuendajú's map (in Steward 1948:map 7) the area on the top of the uplands near the southeastern escarpments, occupied by the Pinaré in the first half of the seventeenth century and in later times by the Aweikoma (Botocudo, Bugre, Coroado, Shokleng, or Socre), coincides with the area where the earlier and more decorated Taquara pottery is found. The peripheral areas to the west, occupied in the seventeenth century by the Guanana (Guayana) coincides with the area where the late and less decorated Taquaruçu pottery are found.

The Aweikoma differed culturally from the Guayana (Itararé pottery) (Baldus 1957; Hicks 1966). They stubbornly resisted the encroachment

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first of the Guarani, and later of the Europeans. The Guarani never occupied their territory--except perhaps for marginal areas, and then only in late historic times--and never attained the core areas of the uplands. Therefore, in this area, pottery shows little or no evidence of acculturation. On the other hand, the Aweikoma apparently had contacts with the Charrua, who came all the way north to the lowlands at the foot of the escarpments. These contacts are suggested by the similarities between the decorative techniques of the former, which were probably adopted from the pottery of the latter (Vieira) because they do not appear on the other pottery of the same tradition farther north (Itararé, Una, etc).

Some, following Willey's (1971:448) suggestion, see the origin of Taquara in the Vieira pottery (Schmitz and Brochado 1972; Schmitz 1976a; Ribeiro and Silveira 1979:47), yet it is clear that the Taquara set of vessel forms is related to the pottery here attributed to the Ancient East Brazilians and the Caingang (Macro-Gê), specifically, Pedra do Caboclo. The pottery here attributed to the Charrua, for instance, Palo Blanco, Entrerríana, Ribereños plásticos, and Vieira has a totally different shape set. Nonetheless, Willey is probably right about the decoration. Punctations, nail-incisions, and incised parallel lines or chevrons appear more than two thousand years before in Palo Blanco. Pinching, brushing, and incised patterns of rows of diamonds or triangular and rounded pendants filled with punctations, gashes, nail-incision or fine-line cross-hatching characterize the still undated Entrerriana Style of the Río de La Plata estuary, which had extensions up the Uruguay River. However, the discussion of the contacts is

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complicated because there are only a few C^{14} dates for the earliest times. It is possible that the preceramic inhabitants of the southern uplands first got the idea of pottery-making from the Una potters farther to the north in a kind of stimulus diffusion, and started moulding their vessels within baskets. However, in the earliest known sites (A.D. 350-500) the basket-made vessels are found with the coiled or hand-modeled ones; therefore these basket-made pots represent the survival of a traditional technique, which probably reached to proto-historic or even historic times as suggested by the baskets interiorly plastered with clay. The nail-incised, pinched, and punctated decorations likely represent a later imitation of the basket impressed patterns.

The influences were probably reciprocal because--if the incised geometric patterns of the late, less decorated pottery (Taquaruçu, Guatambu, etc., ca. A.D. 1000) seemingly came from Palo Blanco or from the Entrerriana Style, filtering up the Uruguay--basket impressions appear around the same time in the Vieira II pottery of the mounds farther south down the coast (Schmitz 1976a; Ribeiro and Silveira 1979:47). Net-impressed sherds are found on the surface of other mounds of the area, for instance, Camaquã (Schmitz et al. 1969; Schmitz and Becker 1970; Brochado 1974), Cerritos (Schmitz et al. 1967:10; Schmitz 1968:128; Schmitz and Brochado 1979:14, 1972) and Ceibos (Prieto et al. 1970).

Miller (1971:56) points out that some characteristics of the Taquara pottery, especially the decoration, form a continuation into late historic times in the Neobrazilian (caboclo) pottery of the area (e.g. Monjolo).

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The Pedra do Caboclo pottery show an outstanding relationship to those areas on the uplands where the mean temperature for the warmest month (January) is under 25-24 degrees Celsius, that is, cooler than most of lowland South America at that time of the year. For instance, all of Amazonia, the Paraná-Paraguay Valley, the Chaco, and part of the Pampas have January temperatures above 24-25 degrees Celsius, reaching to 28 degrees Celsius and above. Most of the Pedra do Caboclo sites are inside the area that, in January, is enclosed by the isothermal line of 24 degrees Celsius, and all the rest are nearby. That is, some sites overflowed from the uplands into the nearby low lying river valleys and along the coast.

The problem of the similarities between the so-called Itararé, Casa de Pedra, Taquara, and Taquaruçu "traditions" have been discussed many times (Schmitz 1968; Miller 1971:54; Chmyz 1971:100; Schmitz and La Salvia 1973; Chmyz 1976; Ribeiro and Silveira 1979:41), but never competely solved. Miller proposes that Itararé and Taquara, which he called the pottery of the Araucaria area, should be treated as subtraditions of the same (pre-Caingang) tradition. Other people agree that there is only one tradition, but almost all attribute the differences basically to environmental reasons.

Figures 4 and 5 (inset map) show how the sites with plain, less decorated, and more decorated pottery are distributed in subparallel zones, the amount of decorated sherds per site increasing from north to south. I have just demonstrated that the plain pottery diffused from north to south, and I think that at least some of the plastic decoration

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found in the southernmost section of the uplands was adopted from the Vieira Subtradition of the Palo Blanco Tradition, found on the lowlands farther to the south. Hence, it follows that, after the plain ceramics had reached their southern boundary and their makers had met the Charrua potters, the plastic decoration they adopted diffused some distance back to the north, decreasing in popularity through space and time. Except for the evidence of a few sherds, the plastic decoration never reached farther north than the Iguaçu Valley.

The completely or almost completely plain Pedra do Caboclo ceramics probably began diffusing to the southermost section of the uplands ca. A.D. 1, before the earliest C^{14} dates so far recovered because, by A.D. 50-200, this pottery apparently already had reached the headwaters of the Uruguay, near the southernmost limits reached by that tradition. Even if that pottery (Guatambu) already showed some incised decoration, all of its vessel forms are clearly derived from those found farther to the north. The same can be said of the Candoí pottery of the Middle Iguaçu (A.D. 400-500), which shows some incised and impressed decoration. However, by the same time (A.D. 400-700), a completely plain pottery (Casa de Pedra) is found in the lowest levels of the earliest Guarani sites of the area. Afterwards, a related pottery, showing some red slip and unmistakable Guarani influences in some of its vessel forms (Itararé) is found intrusive into levels of later Guarani sites, for example, in Cambara sites, A.D. 800-1200 (Figures 6 and 15).

The ceramics found to the south of the Casa de Pedra Itararé area show the plastic decoration I referred to before. The diffusion of these techniques and motifs of decoration probably followed two routes:

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1. The first going up the Upper Paraná, beginning before A.D. 400-500 (Candoí, Cantu, and Eldoradense) reaching the Middle Iguaçu (Candoí) and the Middle Piquiri (Cantu) by A.D. 1000-1600. There the decoration--punctations (Cantu and Candoí) nail-incisions, including pinching, brushing, and net or basketry impressions (Candoí)--is observed in less than 10% of the sherds in any site, and is said to have been applied to the typical Itararé set of vessel forms;
2. The second route of diffusion climbed up the southernmost escarpment of the uplands, beginning before A.D. 350-500 (Taquara and Caxias; Erveiras at A.D. 900-1200). The decoration, consisting also of basketry and net-impressions and their imitations by means of nail-incisions and punctation, then diffused northward through the lower elevations of the uplands, the more decorated pottery (up to 80% of the sherds in the sites) reaching the Upper Uruguay (Taquara) and moving also some distance north along the coast (Taquara, Osório, and Jaguaruna).

In later sites less than 30% of the sherds are decorated, although some decoration diffused still farther to the north, crossing through the upper elevations of the uplands to the northeast, to reach the headwaters of the Uruguay (Guatambu and Xaxim, A.D. 1450-1650, Urubici and Vacaria). Nevertheless, decoration apparently declined through time even in the core area, probably not surviving the A.D. 1200-1400 period when the pit-houses were abandoned.

Therefore, in the southernmost section of the uplands we will have three branches, all derived from the Pedra do Caboclo Tradition:

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1. Completely plain or only occasionally decorated pottery: Rio Verde, Casa de Pedra, Ibirama and Caí, in the interior, and Araquari, Piraí, Enseada, Rio Lessa and Base Aérea on the coast.
2. Ceramics exhibiting possible Palo Blanco influences in their plastic decoration: Candoí, Cantu, Taquara, Caxias, Erveiras, Taquaruçu, Xaxim, Guatambu, Urubici, Vacaria, Itapiranga and Giruá (in the interior), and Tapera, Jaguaruna, and Osório (on the coast).
3. Cermaics showing Guarani influences in some vessel forms and in the red slip: Itararé and Açungui.

These three branches continued to exist contemporaneously, and at least the last two reached late historic times in the ceramics of the modern Aweikoma or Botocudo (Branch 2) and the Guayana (Branch 3).

This study of what I now designate the Pedra do Caboclo ceramic tradition was accomplished using the published data and my own research on archaeological materials that I have just demonstrated to be affiliated with this tradition. My materials comprise surface collection and/or excavation units from around 300 sites. The chronological framework is based in 92 radiocarbon determinations (Figure 6).

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CHAPTER 6

THE ARATÚ CERAMIC SUBTRADITION

The second wave of ceramics that spread into Northeastern and Eastern Brazil is represented by the pottery described as the Aratú, Sapucaí, Cachoeira, and some of the Urú Traditions, which are subdivided into fifteen or seventeen different phases. Beginning in Northeastern Brazil and moving in a clockwise direction, these phases are: Aratú; possibly Curaça and Cabrobó in the interior and on the coast of Bahia; Itanhém-Itaúnas, Guarabu, and Jacareípe, on the coast of Bahia and Espírito Santo; Sapucaí, Jaraguá, Itaci, and Ibiraci, on the headwaters of the Rio Grande, a tributary of the Upper Paraná; Paraopeba, on the headwaters of the Paraopeba River, a tributary of the Upper São Francisco; and Mossâmedes, Cachoeira, Itaberaí, Urú, Uruaçu, and Jaupaci, between the headwaters of the Araguaia, the Tocantins, and the Paranaiba. There are also sites in the area of Lagoa Santa, on the headwaters of the Río das Velhas, as well as on the Pardo and Grande Rivers in São Paulo (Figure 7). The differences between all these manifestations are, in most cases, very slight, and everything indicates that they belong to the same tradition, that is, that all these ceramic complexes had the same origin. The most important differences between them can be attributed to borrowings from or contact with the pottery of the Urú Tradition (Carajá) and the Tupinambá Subtradition, in later, probably even almost historic times.

More than 200 sites are known, but only a few have been excavated. As we have seen (Figure 7) they are spread over most of Northeastern

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Brazil and the eastern section of the uplands, as well as on parts of the adjacent coast. The sites bearing those ceramics that I describe as the Aratú Subtradition are found scattered throughout the area previously occupied by sites with the ceramics that I have classified in the Pedra do Caboclo Tradition. However, they are never found in proximity, suggesting that the inhabitants were occupying different ecological niches (Figure 4) and perceiving their territories differently (Flannery 1976). Because the earliest C^{14} dates for sites very far apart are almost in the same time range (Figure 9) I will simply follow a geographical order in describing the materials I have classified in the Aratú subtradition, beginning with what has been described as the Aratú Phase, found in Northeastern Brazil (Figure 7:A) (Calderon 1969:161-172, 1971:167-170; Brochado et al. 1969:18; Perota 1971). More than 60 sites are known, but only a few have been excavated. Most of the sites are dispersed all over the area drained by the Middle and Lower São Francisco, and by the shorter rivers that flow between that river and the coast. Some sites have also been reported to the north of the mouth of the São Francisco in Bahia, Sergipe, Alagoas, and Piauí.

Most of the sites are very large, with abundant sherds. Large cemeteries are common, containing up to, or more than, 50 primary urn burials of adults and children. Occasionally, urns are found isolated; most occur in small groups. Some urns are filled with shells, and there are offerings of small polished celts. The habitation sites and cemeteries are usually on the tops of low hills, at low elevation (50 m), but towards the interior, in the uplands of the Chapada

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Diamatina and west of the São Francisco River, they may be found at elevations of up to 500 m or even more. On the coast, some sites are found even on the beaches, near mangrove swamps; these are typical shellmiddens with quantities of shells and fish bones.

Most of the sites are in the coastal rain forest (mata atlântica) or in the transition between the rain forest and the tree savanna (cerrado), characterized by a hot and humid climate, almost without a dry season, of type 6a Gaussen, or As, Af, or Am (Koppen). A few sites--on the coast, north of the mouth of the São Francisco, on the uplands of the Chapada Diamatina, or west of the São Francisco--are in the mesophilous forest or the cerrado, characterized by hot, semi-humid climates with a dry season of 3-6 months, classified as types 4b, 4c, or 4d by (Gaussen) or as Aw and Bsh by Koppen. Nevertheless, Calderon (1971:169) points out that all sites are in areas of relatively deep and fertile soils, with sufficient rainfall for agriculture. The distribution of surface materials in the habitation sites suggests large houses arranged in a circle around a central plaza, and sometimes the accumulations are deep, evidently the product of successive occupations.

The pottery is tempered with coarse or fine quartz sand, containing abundant particles of graphite. The pottery is well-smoothed, with red or coffee-colored surfaces, rather thin-walled for its size (5-10 mm) and plain. Some vessels, especially the burial urns, are coated with graphite. Few sherds show corrugation, incision, non-obliterated coils, or modeled nubbins near the rim; however, decoration with one cord-marked line impressed or incised near the rim, which is rare on the coast, is more common west of the São Francisco.

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The set of vessel forms comprises globular constricted pots with direct rims (Figure 8:1) and large, pear-shaped jars, with constricted mouths (2) used as urns for primary burials. The larger ones (75 cm high, 65 cm in diameter, and 45 cm at the mouth opening) were for adults, and the smaller ones (36 cm high, 33 cm in diameter, and 23 cm at the mouth opening) were for children.

The burial urns were covered by deep conical bowls, sometimes with lobed rims or spouts (4) or by large sherds. There are also some globular constricted pots with a short collar (5) or an everted rim (7), deep rounded bowls with flat bottoms (16), and flat griddles or dishes (8), as well as globular jars with a narrow straight neck, decorated with non-obliterated coils (9), and open bowls with an everted rim (11). To summarize then, the set of vessel forms of the Aratú pottery subtradition comprises the Pedra do Caboclo pottery forms 1, 2, and 4, to which most of the Una pottery vessel forms, such as 9, 11, and 16 have been added.

The pottery of the Aratú Subtradition had been C^{14} dated from ca. A.D. 700-900 to late historic times (Figure 9:1-19). In all likelihood, it originated somewhere to the northwest, on the boundaries of Amazonia, sometime well before A.D. 700-900. Unlike the other styles of the Pedra do Caboclo Tradition, it maintained the large vessel forms characteristic of its early stages. Form 5 (Figure 8), was probably borrowed from the Tupinambá pottery, which is found in the upper levels or on the surfaces of some sites. Moreover, Tupinambá sites (Itapicuru) have been found scattered among the Aratú sites throughout Northeastern Brazil, particularly around the Reconcavo (Bahia). Spindle whorls made

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from perforated sherd disks and tubular clay pipes are also reported.

On the coast, the lithic artifacts are small polished stone celts, nut-breakers with pitted depressions, hammerstones, small notched scrapers, sandstone grinding stones, and large flakes. Large stone mortars have also been found in some sites. In the interior, west of the São Francisco, there are more lithic artifacts; besides the small polished celts and/or adzes, there are chipped axes, long, heavy, and thick scrapers, large scraper-knives, and small, retouched flakes.

Two cemeteries on the banks of the lower São Francisco (Figure 7:CU) have some burials in fetal position accompanied by small, rounded bowls, and some in squatting position with the head protected by similar bowls or pots. In all cases the temper is coarse sand. Ceramic pipes in fish-form, and stone lip-plugs were also found with the burials (Calderon 1966:110). A C^{14} date places what has been described as the Curaça Phase at A.D. 900-1150 (Simões 1972) (Figure 9:1).

Some other cemeteries and two habitation sites a short distance down river (Figure 7:CB) produced many secondary burials in globular, slightly constricted, scraped or brushed pots (Figure 8:1), and tall, constricted, periform corrugated urns (2), covered by bowls or by other pots or large sherds. Most of that pottery is tempered either with coarse or fine sand, sometimes mixed with mica speckles, but some sherds are fine and polished with litte perceptible temper. The burials are accompanied by stone beads. There are also flaked scrapers, axes or cleavers, pitted hammerstones, mortars, and pestles (Calderon 1967:110, 1969:167). These materials, described as the Cabrobó Phase, have been mistakenly assigned to the "Tupiguarani" Tradition. However, they are

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clearly related, in their set of vessel forms, to the other plain pottery of Northeastern and Eastern Brazil.

Forty-six other sites found along the coast from Bahia de Todos os Santos to as far south as southern Espírito Santo, show slight variations from those previously described as the Aratú Phase, and have been subdivided into four different phases.

Itanhém. (Figure 7:IN) Six sites (Calderon 1974; Perota 1971b:2).

Itaúnas. (IU) 36 sites, dated from A.D. 800-950 to late historic times (Perota 1971a:152, 1971b:5-7, 1972) (Figure 9:10-12) later reclassified as the same phase: Itanhém.

Guarabu. (GU) Two sites (Perota 1971a:152, 1971b).

Jacareípe. (JC) Two sites, dated from A.D. 1300-1400 to early historic times (Perota 1974) (Figure 9:13-17), probably the same as the Camburi Phase (Perota 1971b).

Many of these sites are smaller than those of the Aratú Phase, with less sherds, and one is a rockshelter (Itaúnas). Sometimes there is less graphite (Itaúnas) or no graphite at all in the temper (Guarabu and Jacareípe), a difference controlled by the geological environment, and instead finely-ground sherds (Guarabu and Jacareípe) or shells (Itaúnas) are substituted. Potters no longer smoothed exterior surfaces and, for cultural or ecological reasons we cannot understand, ceased applying graphite coating (Guarabu and Jacareípe), instead using some sort of slip or (Guarabu), or coarse scraping or brushing (Itaúnas). In the Guarabu phase, the former pattern of plain pottery is still followed. All the other phases show an emphasis on pseudo-decorative or decorative

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techniques, but these are still concentrated near the rim. Except for simple, non-obliterated coils, nail incised or nicked, incision, punctation, fine cross-hatched incision, which are traditional; decorations such as red slip and red lines over a white slip (Itaúnas and Jacareípe) are clearly imitations of the Tupinambá pottery (Cricaré), which is found capping many of the Itaúnas sites.

As to the vessel forms (Figure 8), globular or oval jars with a short vertical or insloping neck (3) were added to the characteristic ones described before (1, 2, 4, 7-9, and 16). Short, conical cups with direct rims (10A), and deep pots with an everted rim or incurved walls (12) are futher innovations. All these are clearly related to the Una pottery and were probably adopted from it after contacts along the southern section of the coast, where Tangui and Itaúnas sites in the same time range (A.D. 750/800-950) are found intermixed. The globular, constricted pots with a short collar (5) disappear altogether as well as, in later times, even the pear-shaped burial urns (Jacareípe).

Perforated spindle-whorls and clay elbow pipes also appear, as well as small polished stone celts, hammerstones, flakes, and one glass scraper (Itaúnas).

The eight known C^{14} dates (Figure 9:10-17) indicate that, except for the earliest date for one site ascribed to the Itaúnas Phase (A.D. 800-950), most of the sites are late, ranging from A.D. 1150-1250 to historic times. Some are actually historic settlements--Jesuit missions or haciendas--and their outlying dependent villages (e.g., Nova Almeida: 1610-1630).

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Farther to the southwest, in the beginning of the southern section of the uplands, on the headwaters of the Paraná (Rio Grande) as well as on those of the São Francisco, there are more than twenty sites with ceramics obviously in the same subtradition as that in the interior and on the coast of Northeastern Brazil. Nevertheless, because of variations in the relative amounts of the fine and coarse parts of the same sand temper, the pottery from these sites was arbitrarily subdivided into five different phases. The aplastic involved is composed of quartz, feldspar, and hematite granules with some mica speckles.

Sapucaí. (Figure 7:S) seven sites (Dias 1971a:179-141).

Jaraguá. (J) three sites, dates A.D. 1000-1150 (Dias 1971:133; Dias and Carvalho 1978:239 (Figure 9:18-19).

Itaci. (IC) nine sites (Dias 1971a:138).

Ibiraci. (IR) three sites (Dias 1974:108).

Paraopeba. (PR) (Dias 1975:15).

These twenty sites have been gathered together by O. Dias in a tradition named for the first of these phases: Sapucaí.

The climate there is of type Cwb (Koppen) or 4c (Gaussen), mesothermal, with cool summers and winter rains, 1500 mm of rain annually, and a dry season of 4-5 months. Most of the sites are large and--on the gently undutating relief of the uplands, at about 700 m elevation--are found on hillsides, near small streams, at the transition between the tropical broadleaf forest mixed with some Araucaria pines, and the open grasslands. The environment is the same as that of sites

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with pottery of the Una style of the same tradition. In at least one case, the pottery has been found in a subterranean or semi-subterranean pit-house like those found in the southern section of the Brazilian uplands (Jaraguá).

Within this southern cluster of closely related phases of the Aratú Subtradition, the pottery, abundant in most sites, is dark colored or red (Itaci). It is generally rather coarsely scraped, except that of Jaraguá, which is typically well smoothed. Less than 5% of the sherds have a red slip. Decoration techniques such as black painted lines on buff, finger-punching (Jaraguá) and incised lines (Sapucaí) are exceedingly rare. A few sites have sherds with brushing, ridging, white slip, nail incision, finger-punching, corrugation and rim-nicking (Itaci and Sapucaí). These sherds were made in imitation of the pottery of the Tupinambá Subtradition, or are actually Tupinambá trade sherds. The source of Tupinambá influence has been found in some sites farther up the Sapucaí River (Belvedere) (Dias 1975).

If we attempt to account for the set of vessel shapes of these Southern ceramics, we note that to the characteristic Aratú Phase forms, and to those forms found in the sites of its southern coastal extension previously discussed, open conical bowls with an everted rim (Figure 8:11) were now added. Tall conical beakers or cups with direct or flaring rims (10A and 10B) are further addtions, suggesting some relations with the ceramic ware of the Pedra do Caboclo Tradition, which also has these forms, specifically in the ceramics made by the previous occupants of the area. However, forms 4, 5, 6, and 9--usually characteristic of the phases of the Aratú tradition--are not found.

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There are also a few lithic artifacts in the sites. They include chopping tools, denticulates, small and large flakes and nuclei, small, polished or pitted axes or adzes, spherical and oblong hammerstones, mortars and pestles, as well as nut-breakers with pitted depressions, pounders, grinders, and polishers. Only rarely are chipped stone knives found. Local collections show that the highly polished crescent-shaped axes could also have been related to these groups.

The sites of the Ibiraci Phase differ somewhat because they are smaller, and contain relatively few sherds, none of which are decorated. The vessel shapes include only open and constricted bowls and there are no related lithic materials, except for one fixed boulder used for polishing.

The Gê-speaking Catagua of southern Mina Gerais are said to remember coming up the São Francisco and expelling the previous inhabitants of the headwaters of that river and of the adjacent Rio Grande (Dias and Carvalho 1978:239).

Little is known about the Paraopeba Phase ceramics (Dias 1975:15), which appears to be related to the Ibiraci. Temper is crushed, fine sandstone instead of sand. In all likelihood, part of the pottery found in the Lagoa Santa archaeological area is related to these materials. However, because of the large size of the vessels and the thickness of the sherds, it cannot be classified in the Pedra do Caboclo Tradition. Junqueira and Matta (1978:117) illustrate for the Paraopeba Phase ceramics some clearly Aratú Subtradition vessel forms, such as the large pear-shaped urns.

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Farther south, in the basin of the Grande and Pardo Rivers, the same characteristically large (e.g., 82 x 70 x 33 cm) and small (e.g., 36 x 33 x 23 cm) pear-shaped burial urns (2) have been found in more than five sites. These burial urns are also covered by large bowls, and sometimes accompanied by other bowls with lobed rims or spouts (4), ceramic spindle-whorls and small polished celts. Some sherds have painted lines on a slip, forming simple motifs said to be different from those of the Tupinambá Subtradition (Pereira Junior 1957:313-357; Calderon 1974:151).

Farther into the interior, in the area between the headwaters of the Paranaiba and the Araguaia previously occupied by the sites of the Pedra do Caboclo Tradition (Jataí), as well as on the adjacent area of the headwaters of the Tocantins, there are around 40 sites with pottery in the Aratú Subtradition. These cermics have been assigned to three different phases.

Mossâmedes. (Figure 7:M) 33 sites on the drainage of the Urú (Tocantins) and Claro (Araguaia) rivers, as well as other within the watersheds of the Meia Ponte and Dos Bois rivers (Paranaiba), are dated from A.D. 700-1050 to the seventeenth and eighteenth centuries (Schmitz, Wust, Barbosa, and Basile Becker 1974; Schmitz 1976/7:7; Miranda 1976:32-34; Wust 1976:37; Fernsternseifer and Schmitz 1976:53; Barbosa, Schmitz, and Miranda 1976/7:50-51; Schmitz, Barbosa, Wust, and Mohelecke 1982:85-106) (Figure 9: 6 and 8).

Itaberaí. (IB) Two sites (Schmitz, Wust, Barbosa, and Basile Becker 1974; Schmitz 1976/7:10-11; Barbosa, Schmitz, and Miranda 1976/7:53).

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Cachoeira. (CA) Dated A.D. 950-1150 (Chmyz et al. 1975; Schmitz 1976/7:8) (Figure 9: 9).

To these sites should be added at least part of the 40 sites that have been described under three other phases--Urú, Uracu and Jaupaci--assigned to a different tradition, the Urú Tradition.

Urú. (U) Seventeen sites on the drainage of the Urú River (Tocantins) and two on that of the Paranaiba, dated A.D. 1150-1500 to the seventeenth century (Schmitz, Wust, Barbosa, and Basile Becker 1974; Miranda 1976:32,34; Wust 1976:35-36; Fernsternseifer and Schmitz 1976:53; Schmitz 1976/7:9; Barbosa, Schmitz and Miranda 1976/7:53).

Uruaçu. (UC) Six sites on the Almas River (Tocantins) (Schmitz, Wust, Barbosa, and Becker 1974; Wust 1976:34,36-37; Schmitz 1976/7:10).

Jaupaci. (J) 14 sites on the Río Claro (Araguaia) (Miranda 1976:31,34; Moehlecke 1976b:42-48; Schmitz 1976/7:9). See also Schmitz, Barbosa, Wust, and Moehlecke (1982:85-106) and Schmitz (1982:41-84).

Most of the around 80 sites are found within the large "islands" of humid forest that occupy rugged and more elevated zones interspersed in the tree savanna (cerrado), what is called the "mato grosso" of Goiás, including the Serra Dourada. Some of the Mossâmedes sites have also been found within the gallery forests that follow the course of the rivers through the cerrado. Most of the sites occupy the sides or the top of slight undulations on low hills at between 600 m and 800 m elevation, far from the major rivers. The sites are shallow, but cover large areas, and have from one to nine concentrations of sherds. As is

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the case with the Aratú Subtradition in Bahia, the distribution of surface materials in the habitation sites suggest 8-9 large houses arranged in a circle around a central plaza. The Uruaçu sites occupy stretches of *várzea* at the bottom of narrow valleys; one is a rockshelter. The open sites are rather small and shallow, but contain many sherds.

Pottery is rather coarsely scraped, generally plain, and tempered with coarse sand with mica speckles, as are all other ceramics of the Pedra do Caboclo Tradition; the temper has also a variable admixture of siliceous bark ashes (*caraipé* or *caripe*) (Freire 1954; Carneiro 1974).

The Mossâmedes sites have only a few forms (Figure 8:1-3, 7, 10B and 11) the more characteristic being the large pear-shaped jars up to 1 meter tall (2) and the open rounded bowls. Some of the Urú, Uruaçu, and Jaupaci sites have the same set of forms, only with 10A instead of 10B. In other, later sites, probably after A.D. 1300, there are also those forms that characterize what is called the Urú Tradition: griddles (8): large, open, flat-bottomed bowls with inflected walls and out-turned, strongly reinforced, almost flat rims (except in the Jaupaci sites) (13); and necked jars (9). These vessels have, instead of the rounded bottoms characteristic of the Aratú Subtradition, small, flat, foot or ring bases. Perforated bases (Urú), and stringholes near the rim (Urú and Uruaçu) are rare.

All these ceramics are completely plain, except for a few sherds showing nicking around the rim, or small modeled nubbins (Mossâmedes, Urú and Uruaçu). Nicking around the foot (Urú), and modeled lugs (Jaupaci) are even rarer; however, red slip, which is rare in the Urú

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and Uruaçu sites, covers more than 45% of the sherds in the Jaupaci sites, where simple, globular, constricted forms also predominate. In the Mossâmedes, Urú, Uruaçu, and Jaupaci sites there are also clay spindle-whorls and cylindrical engraved clay stamps, probably used for body painting (pintadeiras). European mould-made elbow clay pipes appear in late Mossâmedes sites.

The only lithic artifacts that occur in all sites are pecked, semi-polished, or polished stone celts, sometimes grooved (Urú), and hammerstones. In some Mossâmedes and Urú sites, beautifully polished anchor-axes and stone dishes are found. The Urú and Uruaçu sites have mortars and pestles, palm-nut breakers, and chipped stone axes. Polished knives and grinders appear only in the Uruaçu sites, and polished T-shaped lip-plugs (tembetá) of quartz occur only in some Mossâmedes sites.

All those sites dated between A.D. 700-1050 (Mossâmedes) (Figure 9:6-9) lack the vessel forms that characterize the Urú Tradition; all those dated after A.D. 1150-1350 (Urú, Uruaçu, and Jaupaci) have these forms. As the earliest sites of the Urú Tradition in the area have been dated A.D. 1100-1250 (Aruana), everything seems to indicate that the pottery of the Aratú Subtradition had been influenced by the Urú in the area between the headwaters of the Araguaia and those of the Tocantins. However, more to the southeast, on the Upper Paranaiba, the Mossâmedes pottery apparently remained basically unchanged to the seventeenth or eighteenth century.

Contacts were also maintained with the Tupinambá (Ipora) beginning ca. A.D. 1300-1400 (Mossâmedes) (Figure 17:28), and the Itaberaí pottery

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is thought to represent the result of some kind of acculturation, in later times, between the Aratú and Tupinambá subtraditions.

The Cachoeira pottery looks more like those of the eastern section of the uplands (Sapucaí, Jaraguá, Itaci, and Ibiraci) and was probably derived from them. Even if its beginnings are in the same time range (ca. A.D. 950-1150) (Figure 9:7) it appears to represent a rather different and more diverse array of the vessel shapes than are common to the tradition as a whole. The only common vessel forms (Figure 8) are 1, 3, and 11; the characteristic forms 2, 7, 8, and 10 are absent, but some forms absent from the eastern section of the uplands, viz., 4 and 12, are present here. Some other forms--such as a tall jar with a constricted neck and an everted rim--a constricted pot with a cambered rim (5) and an open carinated bowl with an everted rim, represent in all likelihood borrowings from the Tupinambá or the Guarani pottery. Truncated-conical flat-bottomed bowls (16) some with pedestal bases also probably represent a borrowing from the Urú (Carajá) pottery, where this kind of footing is very common.

Temper is the same: coarse or fine sand mainly composed of quartz granules, but sometimes containing mica speckles. Only a few sherds show a line of punctations or of nail incisions near the rim. Vessel form 1 sometimes has an incised line around the mouth. Aside from a perforated polished stone disk, there are only some retouched flakes, hammerstones, scrapers, and grinders.

The Southern Cayapó (Gê proper) with the Carajá on the Upper Araguaia, and the Canoeiro (Tupian) between the Upper Araguai and the Tocantins, composed the indigenous groups who occupied the area in historic times.

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Far to the west, at Descalvados, on the Upper Paraguay (Figure 7:D), Petrullo (1932:115-120) excavated a cemetery with many large burial urns. The cemetery is part of an extensive site whose limits were not determined. The terrain is slightly elevated, so that during the rainy season it forms an island in the flooded Pantanal, but even in the dry season reamins surrounded by a lagoon.

The burial urns are completely plain and clearly relate to the Aratú Subtradition. The large, restricted, conical jars of Form 3 (Figure 8), have bulging bodies, like in Mossâmedes, but often have a taller neck, separated from the body by one unobliterated coil juncture. These jars measure from around 80 cm in height and diameter to 123 cm in height and 97 cm in diameter. The rounded restricted pots of Forms 1 and 7--that is with a direct or everted rim--are somewhat smaller, and in a few cases have crude handles. All these vessels were covered by inverted bowls similar to form 16, but more open. One of these bowls shows a decoration of crosshatched red lines painted on the interior surface. In some cases burial urns were stacked one upon the other, both containing fragmented bones. Small bowls, the largest measuring only 10 cm in diameter, were interred near the burials but not clearly related to any one of them. These bowls have a rounded bottom, straight, thick walls, and thick rolled rims accentuated by incised lines, between which there are painted bands of broad red lines forming parallel zigzags that are filled-in triangles, rectangular sectioned-off figures, crosshatchings, and hachured triangles. Surface finds difficult to place are: biconical pottery spindle whorls, polished stone celts, beads and pendents, and conical bone points with a concave base.

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The site is near Eastern Bororo territory, but the former indigenous population is not known.

The pottery from the Cururu River, a tributary of the Middle Tapajós, far to the northwest in Amazonia (Figure 7:CU) described by Hilbert (1958) is very similar to that of the Aratú Subtradition. It is almost completely plain and, even if the sample is restricted, the set of vessel forms corresponds closely to those described as 1, 2, 3, 7, and possibly also 16 (Figure 8). Sizes are also in the same range as the Aratú. The site is in Northern Cayapó territory, and the sets of vessel forms are more like those attributed to the closely related Southern Cayapó (Mossâmedes) than to those attributed to other Gê groups, such as the Catagua (Jaraguá, Sapucaí, Itaci, and Ibiraci) or the Cariri (Aratú). For instance, the restricted-mouth pots and jars of Forms 2 and 3 are more bulging and sometimes more restricted. As with the Mossâmedes, the Cururu pottery is tempered with sand and caraipé. Moreover, the larger vessels were used as burial urns, as they habitually were in the Aratú Subtradition.

The study of what I call the Aratú Subtradition was accomplished using the published data and my own research about the archaeological materials that I have demonstrated to be affiliated to this subtradition. These materials comprise surface collections and/or excavated units from around 150 of the some 200 sites that have been allegedly surveyed. The chronological framework is based in 19 radiocarbon determinations (Figure 9).

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CHAPTER 7

THE PALO BLANCO CERAMIC TRADITION

7.1 The Palo Blanco Style

The earliest C^{14} dated ceramics on the southern section of the Atlantic coast come from the southern shore of the Río de La Plata estuary. In the Palo Blanco site (Figure 10: Pb) pottery sherds have been deposited with shells that form long litoral ridges. These old beach lines parallel the modern beach (cordones) and exhibit the typical stratification brought about by tides. The ridges are composed mostly of Erodona mactroides Daud., Mactra isabeliana D'Orb., Urosalpinx rushi Pils., and Cynbiola tuberculata and have been attributed to the Querandínense sea level, the highest point attained by last maritime transgression, that is, the Post-Pampeana or Holocenic one. These shells have been naturally deposited, but the sherds--well worn from rolling upon the shore--were allegedly redeposited at the highest level attained by the sea and are, therefore, older than the shells.

One radiocarbon measurement obtained from shells date the formation of the oldest shell ridges to around 4000 B.C., but the ridges where shells are found with sherds in the same levels were deposited from ca. 3000 to 1000 B.C., as has been indicated by three C^{14} dates also obtained from shells. After that time, a humus deposition began to cover the shell ridges (Ciglian 1966; Cigliano et al. 1971b) (Figure 12: 1-3).

Palo Blanco pottery, found in four sites, is tempered either with sand or with hematite granules, and is poorly fired. Vessel forms are

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very simple. Medium and large, deep or shallow bowls, up to 40 cm in diameter, open or slightly restricted, showing slightly rounded or flattened bases, are the rule. Holes near the rim are quite frequent (Figure 11: 1-5). Some open cylinders or inclined truncated cones with openings at both ends, sometimes constricted, sometimes flaring (9), could be interpreted as pot-rests.

All decoration is by incisions or punctations. Incisions sometimes are done in a kind of drag-and-jab or surco rítimico, but more often are simple. Both incisions and punctations create series of parallel straight or wavy lines, as well as very simple geometric patterns, such as parallel zigzags and incomplete or incipient step-frets. These designs are developed in zones parallel to the rim. Occasionally, there is rim-nicking as well.

In the humus level, some Palo Blanco sherds have been found mixed with sherds of another, related pottery, described as the Punta Indio Phase. In this case, some Palo Blanco sherds are red slipped, brushed, or pinched in vertical lines.

The Punta Indio pottery has been estimated sometime after 1000 B.C. because of the position it occupies within the humus layer, but stylistic considerations would place it still later, probably around the same time range as the Cultura Entrerríana. Sherds have been reported in other old beach lines at nearby Punta Lara Norte where the same stratigraphic differences have also been detected, but a Guarani burial urn and sherds were intrusive into the shell layers (Bruzzone 1931; Howard and Willey 1948:29). The same kind of pottery has also been reported at Los Vascos on the Middle Paraná (Serrano 1972:15).

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Up river, at Salto Grande (Figure 10: Sg) on the Middle Uruguay, three or four sites have pottery described as the El Dorado Phase, which has basically the same vessel forms and incised decoration (Salto Grande inciso) as Palo Blanco, but the temper is sand, mixed with crushed shell and hematite granules. Some red slip occurs, but rim nicking is almost absent (Figure 11). Lithic materials found in the same levels are similar to those in the previous La Paloma preceramic phase, represented by three smaller sites on the two highest fluvial terraces nearby. The La Paloma materials are basically a denticulate flake industry with some pebble artifacts, such as scrapers, gravers, punches, axes, and chopping tools of unifacial or bifacial work, all obtained by percussion flaking only. Small faceted stones with polished or pitted hemispherical depressions (piedras con hoyuelos) and small stemmed and barbed arrow points are found, rarely, in the preceramic levels, as are bone punches. In some sites, there are thin levels of shell (Ampullaria sp.). Stratigraphic evidence places the La Paloma preceramic sometime before 500 B.C. In the ceramic levels there are also nut cracking stones (piedras con hoyuelos), small ground sandstone slabs (estecas), and flat mill stones (piedras lenticulares) (Cigliano 1968:5; Rodriguez 1969, 1970, 1971; Caggiano 1971; Cigliano et al. 1971a:135, 1971b:100; Serrano 1972:30; Baeza et al. 1977:71; Diaz 1977:156).

Small stone slabs engraved with rows of geometric rectilinear designs (placas grabadas) are frequent on the Middle Uruguay, as well as farther south in Southern Buenos Aires (San Blás region) and in Patagonia. At Salto Grande, the engraved stones are apparently related to lithic La Paloma-like materials (Guidon 1977:197), although the

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designs are clearly related to the more complex incised decoration of the Entrerríana pottery. Similarities to the pictographs of Uruguay (e.g., Maestre de Campo) and to the incised designs in the Puerto Basilio pottery have been noted.

A more closely related pottery from the same area, described as Conjunto Salto Grande, is tempered with sand mixed with cauxi-like siliceous sponge spicules, similar to Amazonian cauxi, but obtained from Uruguaya corralloides Bowerbar or U. repens, which are naturally found in the local clays, or with sand and hematite granules. This pottery is plain or has some red fugitive paint, and incised motifs like those in Palo Blanco. The set of vessel forms is basically the same, but includes also globular restricted pots, some of them with spouts (Figure 11: 8), and oval dishes with everted rims. Two C^{14} dates place this complex ca. 500-300 B.C.; however, another C^{14} date from another cut in the same site (Aruera) places it ca. A.D. 700-900 (Baeza et al. 1976, 1977:71; Diaz 1977:156) (Figure 12: 4-6).

Still another related pottery style found in four sites nearby, situated on the lowest fluvial terrace of the Uruguay and described as the Cerro Chico Phase shows the same characteristics, but the incised decoration is absent. Rim nicking or punching is more frequent, and red painted lines, even if rare, do occur. Moreover, the sites are small shell-middens composed predominantly of Felipponea iheringi, which is now extinct, and Asolene megastoma. Three C^{14} dates, obtained from shells, place the associated pottery between A.D. 800-1250 (Figure 12:7-9). Some incised sherds have been found on the surface of these sites. Only a few stone flakes are found with the pottery

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(Cigliano 1968:6; Rodriguez 1969, 1970, 1971; Caggiano 1971; Cigliano et al. 1971a:102, 1971b:134).

Everything seems to indicate that the Conjunto Salto Grande, found in the islands, represents two successive occupations by bearers of the same pottery tradition, a situation also noted on the adjacent bank of the river. One occupation produced an incised pottery that is the same or closely related to that of El Dorado, and can be dated ca. 500-300 B.C. This sponge spicule tempered pottery has been described by Serrano (1932, 1946c, 1955:29) as Salto Grande incised and later as the facie Salto Grande of the Cultura Entrerríana (Serrano 1972:27). It has been also reported by Company (1951), Freitas (1953a), Figueira (1957), and Muñoa (1965).

Downriver, on the Lower Uruguay, as well as on the Lower Río Negro, a similar pottery has been described as phases Yeguada and Vizcaíno (Figure 10: Yg and Vz) (Schmitz et al. 1967:14; Schmitz 1968:127; Boretto 1968, 1969; Boretto and Bernal 1969; Boretto et al. 1973). The incised motifs relate to to other complexes of the early part of the Palo Blanco Tradition, but are more frequently done in a kind of stippled (drag-and-jab) punctation (surco rítimico) than in simple lines or punctations. There is also some rim nicking or pinching, as well as rare small adornos and stringholes near the rim. A kind of crude red slip that left many hematite granules adhering to the surface is fairly common. The set of vessel forms, measuring from 10 cm to 40 cm in diameter, includes tal pots with slightly inflexed walls and overturned rims, and bowls whose openings are slightly triangular or oval instead of circular (Figure 11: 10). The lithic materials show the same

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characteristics as those of El Dorado, but some bola stones, mortars (morteros), axes, scrapers, hammerstones, etc. also occur, as well as a few bone punches and points. The time range of these ceramics is not known, but in any case they must be earlier than A.D. 1300, the time of the arrival of the Guarani in the area.

A later occpation of the Salto Grande region is characterized by the set of vessel shapes shared by early Palo Blanco pottery, but is otherwise almost completely plain. These ceramics are found in small shell-middens situated on the lowest fluvial terrace and in the islands (Cerro Chico). Plain pottery has been also reported from two other sites on the Middle Uruguay (Puerto Las Cachuelas and Santa Lucía). These sites also contain abundant evidence of stone industry: scrapers, knives, arrow and spear points, cores and flakes, as well as polished lenticular sling stones (Serrano 1932:30-62).

The lithic materials of the earlier preceramic La Paloma were carried over into the later El Dorado ceramic phase, the first ceramic of the Middle Uruguay sequence. Therefore, it is clear that the Palo Blanco pottery was adopted by these preceramic peoples.

Upriver from the Salto Grande, the pottery described as the Ibirapuitã Phase (Figure 10: Ip) is found in eight sites on the lower and middle reaches of the Ibicuí River, but not on the banks of the Uruguay proper. It is clearly related to El Dorado. The temper is sand and hematite granules. Most of the pottery is plain, but some punctations occur along with incised lines, spatula impressions, and rim nicking. In the sites there are also flaked and polished lithic artifacts, such as: bifacial knives, scrapers, denticulates, triangular

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stemmed and barbed arrow points, palm-nut breakers (quebra-coquinhos), grooved bola stones, flat milling stones with shallow oval depressions (almofarizes planos), cylindrical manos, hammerstones (trituradores), and lenticular sling stones (pedras de funda). These materials are related to those of the preceramic Itaqui Phase, and very similar to those found with the El Dorado pottery.

Farther north along the Uraguay, mainly just below the mouth of the Ibicuí, the Itaqui lithic materials are found in many sites on the river banks. These represent a somewhat richer aspect of the preceramic La Paloma materials downriver. Partially overlapping the Itaquic sites in geographic range, we find the Ibirapuitã site (Miller 1969:15). This subtradition had a long development from sometime after 7000 B.C. to at least 1700-1400 B.C. (Hurt 1980). The pottery that is intruded into Ibirapuitã is still undated, but should not be earlier than that of the incised El Dorado style found downriver. It could be dated sometime after 300 B.C., but is probably not later than A.D. 1000, when the Guarani (Icamaquã) (Miller 1969:18) began moving down river (Brochado 1973a). The pottery of the late Ibirapaitã has been compared to the ceramica Ibicuena, part of the facie Ibicuí of the Cultura Entrerríana (Serrano 1958:119-121), and to the vessels and lithic artifacts attributed by Serrano (1963: plate 42: b, c, f, plate 43) to the Charrua. Here, too, it appears that the pottery was adopted by the preceramic inhabitants (Itaqui) who produced arrow points of the Umbú Tradition (Ribeiro 1979: 484; Hurt 1980).

Another related style, found in large artificial mounds built in the nearby swampy areas between the Lower Paraná and the Middle Uruguay

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called Esteros del Iberá (Figure 10: Ib) is still undated. The fabric is sand tempered and shows the simple vessel forms and incised decoration of typical Palo Blanco pottery. One of these mounds, near Lake Ibera, contains levels of shellfish (Diplodon sp.) (Rizzo et al. 1977:71).

It is thus possible to establish a ceramic tradition for the Lower and Middle Uruguay and the Lower Río Negro stemming from the Palo Blanco and Punta Lara Norte ceramics of the southern shore of the Río de La Plata estuary (ca. 3000-1000 B.C.). These evolved into such ceramics as El Dorado and Salto Grande (ca. 500-300 B.C. to A.D. 800), Yeguada, Vizcaíno, Cerro Chico, and Ibirapuitã, as well as into those ceramics found at Medanos de Colon, Puerto Las Cachuelas, Santa Lucía and the Esteros del Iberá. Therefore, this sequence spans the entire time range from 3000 B.C. to historic times (Figure 12: 1-9).

In Cerro Chico times, extending up to European contact, small middens accumulated and in the Esteros del Iberá the pottery is found in large habitation mounds. Elsewhere the sites are open. In this terminal part of the sequence, the incised decoration practically disappeared and the lithic artifacts carried over from preceramic times were reduced to a few flakes. The sets of vessel forms, on the other hand--at least in the ceramic styles for which we have sufficient evidence--did not change very much, if at all.

The later pottery (Ibirapuitã and Cerro Chico) can be attributed to the historic Charrua, who occupied that area (Serrano 1936: 33, fig. 5, 1940, 1955:88, fig. 2; Canals Frau 1953:235-238; Becker and de Cebey 1978:146, map 4). Therefore, this sequence must represent the

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development of Charrua pottery. Serrano (1936:66-71, 87-89) made some attempts to relate Charrua to Caingang. Greenberg (1960:794) relates Charrua to Guaycuruan under the Macro-Panoan group (B) of the Gê-Pano-Carib phylum (III); Loukotka (1969:151) classifies it among the languages of the Paleo-American tribes. Troike (pers. com. 1983) proposes its inclusion, as one of the earliest forms, in his Old La Platan group of languages.

Later occupations of the Lower Río Negro and the Lower and Middle Uruguay are represented by pottery with more complex designs, which will be described below in the discussion of the Entrerríana pottery style. The final occupations of eastern Uraguay are represented by the pottery of the Ribereños plásticos and that of the Guarani, both C^{14} dated there after ca. A.D. 1000, (Diaz 1977) (Figure 12: 7). The affinities of the very distinctive Puerto Basilio pottery (Gualeguaychu) still cannot be determined (Serrano 1955:35, 1972:30).

Another sequence, parallel to that of the Middle and Lower Uruguay, can be constructed for the Río de La Plata estuary and the Lower and Middle Paraná, with an extension up the Middle Uruguay. This sequence developed from the same earliest Palo Blanco pottery, but diverged gradually. As Howard (1948:81) noted, the area reflects little stylistic variation, and the few styles present are widely distributed and remarkably uniform.

On both the shores of the La Plata estuary there were some early sites, most of them now destroyed, that yielded ceramics. The included pottery is related to that of Palo Blanco and El Dorado, decorated only with zigzag incised lines, punctations, and fingernail markings. The

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occupation of these sites, where the sherds were in the humus layer, has been attributed to the Aimarense horizon (Rusconi 1928). Pottery similar to that of Palo Blanco and El Dorado also has been reported on the banks of the Lower Paraná, north of the Delta, and on Arroyo El Rey. These sites showed no evidence of bone industry, and only a crude flaked stone industry was present (Serrano 1955:24, 1972:5, 6, 14, 15). These sites have never been dated; however, Serrano's (1933, 1955:22, 1972:5) and Willey's (1971:471, Note 123) suggestions that these ceramics represent an earlier horizon in the ceramic evolution of the area has been indicated by the C^{14} measurements that place Palo Blanco and El Dorado from ca. 3000-300 B.C. (Figure 12: 1-5).

The plain ceramics from other sites on the Lower Paraná, such as Naré and Curuzu-Chali, as well as those from the Lower Bermejo, are also considered early by Serrano (1955:22, 1972:5) but they are clearly not in the Palo Blanco Tradition because their most common vessel forms are large globular pots.

7.2 The Entrerríana Style

This ceramic style has been described by Serrano (1933, 1946, 1955, 1972) initially as Cultura Básica del Litoral, and later as the Cultura Entrerríana. Alternatively, some of these ceramics have been described as the El Cerrillo Style by Howard (1948:81) and as the Punta Indio Phase by Cigliano et al. (1971b). Pottery of the Entrerríana Style is distributed along the Lower Paraná, including the Delta, both shores of the Río de La Plata estuary and the Middle and Lower Uruguay, extending south through the Pampa and the Atlantic coast of Buenos Aires, into

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Patagonia, as far as Río Negro and Chubut (Lothrop 1932:157, 185-188; Serrano 1972:19) (Figure 10: Er).

The Entrerríana, in its broadest sense, has been described from many sites in more than thirty locations: Barranqueras (Serrano 1972:30), Victoria (Ambrosetti 1893:249-265); Río Carabelas del Medio (Torres 1911), El Cerrillo (Lothrop 1932:146-162); Arroyo Sarandí (Lothrop 1932:162-182); Branzo Largo (Gatto 1939); Ibicuí (Aparicio 1928); between Colon and Paso Paysandú (Serrano 1955:29-33; 1972:28); Gualeguaychu (Serrano 1936: fig. 18; Greslebin 1931); La Blanqueada (Freitas 1953a; Sosa 1957; Muñoa 1965); Maldonado, Puerto de Las Tunas (Penino y Solazo 1927); Nueva Palmira, Punta Chaparro (Fontana 1928); Punta Piedras (Vignatti 1931); Palo Blanco, Punta Indio A, Barrancas, and Cantera Gorch (Cigliano et al. 1971b); Punta Lara South (Bruzzone 1931); Villa Lugano B (Rusconi 1928); Río Las Conchas (Cezar 1895); Río Matanzas (Basavilbaso 1937); Laguna de Lobos (Marques Miranda 1934); Laguna Juancho (Chascomus) (Ibarra Grasso 1967:595); Huacal (Outes 1904); and the San Blas region (Outes 1907; Torres 1922:521-528).

Some temporal and/or stylistic divisions have been suggested, such as the separation between the Cultura Básica del Litoral and its continuation into historic times, the Cultura Básica del Litoral persistente, (Serrano 1946). Another division was suggested by Howard and Willey (1948:35).

Later, Willey (1971:467) suggested only two phases: El Cerrillo and Arroyo Sarandí. Serrano (1972:5.17) divides the Cultura Entrerríana into four facies: 1) Ibicuí, on the Paraná Delta, comprising the ceramica Paraná, ceramica Ibicuena, and ceramicas grabadas y pintadas of

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his previous Cultura Básica del Litoral, and comparable to Willey's El Cerrillo Phase; 2) Sarandí, on the Paraná Delta and Lower Uruguay, comparable to Willey's Arroyo Sarandí Phase; 3) Barranqueras, on the Lower Bermejo, near the Middle Paraná; and 4) Laguna de Lobos, in the Salado Basin, are also tentatively indicated, the latter including part of the facie Salto Grande of the Middle Uruguay, among which is the ceramica Paso Paysandú (Serrano 1955:23).

Most of these divisions were based on the presence or absence of traits such as a bone or stone industry, painted sherds, and/or European materials. However, the data we have do not warrant any such divisions because most of the accounts are too sketchy, except for listing as historic those sites that have European materials such as iron, glass, or cattle bones.

Most of the sites appear to be concentrated along both shores of the La Plata estuary and on the Middle and Lower Uruguay with extentions to the south through Buenos Aires and into La Pampa; only a few have been found on the Lower Paraná and on the Delta, and those appear to represent an impoverished version of the former (Figure 10: Er). However, the Punta Indio pottery, from the easternmost sites on the south shore of the estuary, did not have the drag-and-jab incised lines that are characteristic of all the others, but are similar to them in almost every other respect. It is clear that not only space but also time is responsible for these differences, but as we do not have any C^{14} dates, nothing definitive can be said about space-time discrimination. As an hypothesis to be tested, historic sites, such as Arroyo Sarandí, even though they lie in the Parana Delta, are more

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similar to other sites on the estuary than to related sites on the Lower Paraná, which would presumably be older.

Most of the sites are low middens containing fish bones and some shell that accumulated either in swampy areas or on top of the riverbank, the coastal ridges (albardones), or sand dunes. The pottery is commonly tempered with sand, sometimes with an admixture of crushed shell, but crushed sherds also occur (Punta Indio) and mica speckles are frequent in the paste which is, in most cases, imcompletely fired. On the Middle Uruguay the paste contains sponge spicules from Urguaya coralloides, and on the Lower Bermejo the temper appears to be crushed sandstone.

The set of vessel forms is basically the same as in Palo Blanco and El Dorado, but some sites on the shores of the Río de la Plata estuary have yielded a few flared or necked rims (Figure 11: 7), small vertical loop handles or lugs (2), and spouts (8). Common on both shores are oval or boat shaped dishes, often exhibiting a rotational symmetry, and castellated, wavy, notched, nicked, or punctated rims, as well as the characteristic cylindrical or conical hollow pot rests that are sometimes decorated by incision (9).

Most of the pottery is actually plain but, in the published sherds, the decoration always forms bands circling the vessel near the rim. The simpler designs, composed of parallel straight or zigzag incised lines, sometimes enclosed between parallels, are similar to those in Palo Blanco and El Dorado, but some other designs are more complex. The incised lines are simple or stippled (drag-and-jab punctation or surco rítimico: Paraná punteado en surco, Paraná Pavon grabado, and Laguna de

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Lobos inciso punteado) (Serrano 1955:26). Drag-and-jab lines, however, do not appear in the Punta Indio sites. Incised lines sometimes enclose stepped bands, rows of diamonds, triangular or rounded pendants filled with simple or toothed stamped punctations, gashes, or nail incisions. Some of the punctations are actually impressions from a spatula, sometimes denticulate. Punctations may be very closely arranged in zones (Paraná punteado libre, similar to Paso Paysandú punteado) or form stepped bands (Ibicuí punteado). Lines executed by short parallel incisions or gashes, broad-line incised lines (Las Conchas surcado), and fine-line crosshatching, as well as red or white slip (sometimes polished), wide, straight, or zigzag bands painted red on natural on the interior of the vessel, incised red-zoned painting (ceramicas pintadas y grabadas), and red lines painted on a white slip appear only in some of the sites on the shores of the estuary and, in some cases, also farther south in the interior or along the coast of northern and southern Buenos Aires (Salado River Basin and San Blás Region). Large lozenges in black or black-and-red-on-natural (Paso Paysandú pintado) appear only on the Middle Uruguay at Paso Paysandú.

Ground or polished stone artifacts, such as palm-nut breakers or hammerstones pitted on opposite sites (piedras con hoyuelos), pounding stones (sobadores), grinding stones (manos), grooved or ungrooved bolas stones, and sandstone grinders (estecas) appear almost everywhere. But a chipped stone industry composed of axes, scrapers, chisels, knives, drills, and retouched flakes, as well as large and small, stemmed and unstemmed, triangular arrow or spear points, and ground stone artifacts such as grooved axes, flat mill stones with shallow polished depressions

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(molinos planos), deep mortars, lip and ear plugs, and small slabs with geometric engraved designs (placas grabadas), is characteristic only of some of the southernmost sites in La Pampa and Buenos Aires. However, small unstemmed triangular arrow points and evidence of a chipped stone industry do appear in a few sites on the shores of the estuary and on the Middle Uruguay (Paso Paysandú). On the other hand, wavy instead of straight incised lines (Ibicuí inciso) and a bone industry comprising awls, punches, points and pins, fish-stringers, lance and arrow points, atlatl hooks, and perforated deer horns (some decorated by carving), are characteristic of the Paraná Delta sites, even if a few also appear elsewhere.

Some relatively complex incised designs composed of imbricated lozenges and steps with nail incision, as well as bone points and punches are characteristic of the sites of the Lower Bermejo near Barranqueras. Corrugated sherds and sherds with net and cord impressions also appear in some of these sites and are said to be related to the modern Mbaya-Caduveo pottery (Serrano 1972:30). Pottery beads and shell disks and pendants seem to be common everywhere.

Other ceramics believed to be related to the Entrerríana have been found far to the northwest, into Córdoba (Serrano 1955:27,38), and at Yucat, on the Río Tercero and between that and the Río Cuarto, where the type called Yucat grabado is similar to Paraná Pavon grabado, but the engraving is executed between relief stripes. This appliqué technique is attributed to influences from the Sierras do Córdoba, influences that appear also in the bone and stone industries (Serrano 1955:27,31-50). Influences from the Entrerríana appear even farther south, in northern

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Patagonia, on the Atlantic coasts of Río Negro and Chubut, in the form of incised and punctate sherds in that style (Serrano 1955:24) (Figure 12).

The regional development just hypothesized, from a quite simple incised and punctate pottery (Palo Blanco and El Dorado) to a more complex one with zoned punctations and drag-and-jab incised lines (Entrerríana), follows Serrano's (1933) and Willey's (1971) suggestions. However, there are no C^{14} dates for any sites of the Entrerríana. The Punto Indio pottery is dated sometime after 1000 B.C., and the El Cerrillo site was estimated by Lothrop (1932) to date after A.D. 100. Actually, it is difficult to place the Entrerríana in time. Some of the sites are capped by Guarani pottery, which is represented in the area by the Arroyo Malo Style and the Martin Garcia Phase, and therefore should date from before A.D. 1300 (Menghin 1962; Lafon 1971; Cigliano et al. 1971a; Brochado 1973:25). Some other sites produced European materials, which indicate that the Entrerríana pottery style lasted into historic times. The development outlined before obviously calls for some more time for its completion; nevertheless, because we are not sure about the actual time depth of the Entrerríana ceramics, I will designate them simply as constituting a ceramic style, not a subtradition.

Serrano (1972:6) points to influences of the Entrerríana upon the pottery of the historic Comechingones of Córdoba, and vice versa; these influences can be accounted for by the historic relations between the Querandí and the Comechingones. Therefore, Serrano (1955:38) reasons that these sites, being historic and related both to the Guarani and to the Comechingon, must have been Querandí villages, because the Querandí

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were occupying that area in historic times (Serrano 1936:33, fig. 5, 1940, 1955:88, fig. 2). However, the historic Querandí were by no means occupying all the area where the sites attributed to the Entrerríana have been found. Nevertheless, the area settled by them on the southern shore of the estuary and on the Delta appears to have been the central area for the diffusion of the Entrerríana to other groups to the north, along the Middle Paraná, and to the south, in the interior and along the Atlantic coast. The Querandí spoke a still unidentified language, possibly related to Charrua and to Chaná (Serrano 1940, 1947, 1955:38; Lothrop 1946b). Another possibility is the relation of Querandí to Guenaken (Het) of Northern Patagonia (Gonzalez and Perez 1972:128). The Querandí have always been described as non-agricultural fishermen.

7.3 The Style of the Ribereños Plásticos

Another ceramic style attributed by Serrano to what he called the Alfareros or Ribereños plásticos, and tentatively described by Willey (1971:465) as the Malabrigo Phase, is found in many sites at more than 15 locations. Most of the sites are on the banks of the Middle and Lower Paraná, distributed from near the mouth of the Paraguay at Laguna Brava in the eastern fringes of the Chaco area, to the beginning of the Paraná Delta at Campana (Figure 10: Rp1-Rp6).

All these sites are large midden accumulations upon natural knolls on the river flood plain and contain shell fish, bird, reptile, and mammal bones, and charred palm nuts.

There is much literature dealing with these ceramics, most importantly: Ambrosetti (1894), Aparicio (1922, 1923, 1925, 1928,

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1928-29), Badano (1940, 1955), Diaz (1977:156), Freitas (1953a), Frenguelli and Aparicio (1923), Gaspary (1950), Gonzalez (1939, 1947) Lothrop (1932), Outes (1918b), Palavecino (1948b), Schmitz, Ceruti, Gonzalez, and Rizzo (1972), Serrano (1922, 1927, 1930, 1932:10, 1934, 1946b, 1954, 1955, 1961, 1972), Torres (1907:60-109, 1911), Howard and Willey (1948) and Willey (1971:465).

Most of the vessels have very simple shapes, predominantly subglobular or hemispherical pots or bowls. Some bowls are oval or boat shaped with a rotational symmetry and wavy or nicked rims (Figure 11). They have a fairly complex geometric decoration executed by means of simple or drag-and-jab incised lines, and rows of punctations, fingernail or spatula impressions, as well as red slipping and bands painted red on natural on the interior of the bowls. As such, they are not different from those of the Entrerríana Style, and the different pottery types are even called by the same names, except that the incised and punctated bands are generally less complex. Rim holes also occur and many of these vessels are characteristically decorated by zoomorphic adornos, joined to the rim. Most of them represent parrots, but many other birds, mammals, and reptiles are also depicted. Human representations are quite rare. Most of these adornos are either modeled and solid, and were used as lugs (Figure 11: 5, 8, and 11), or are hollow, forming spouts. Others are folded or flat and cut from the rim (1 and 5). When they are double, they look to the inside of the vessel (5). When single, they look outward. In this case, there is frequently a corresponding tail on the opposite side and therefore the vessel is transformed into the effigy of the animal when seen from above

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(3). These adornos are elaborately decorated by simple and stippled or drag-and-jab incised lines (surco rítimico), punctations, stamping, or cord-markings, and are painted red. Globular, very constricted pots, sometimes with a short decorated conical neck and small, vertically attached handles, or zoomorphic or plain lugs also occur (11). In some but not in all sites, there also occur short bell-shapped or cylindrical ceramic artifacts, open at both ends, or else closed at the top but with side vents called alfarerias gruesas, campanas, or campanuliformes. Many of them are topped by the same modeled and incised zoomorphic adornos (9). These artifacts can be interpreted as pot-rests elaborated from simpler ones and with thinner walls characteristic of the Entrerríana. There are also grooved pottery net-weights and beads.

In some sites, instead of a bone industry of points, punches, perforated deer horns, and harpoons (similar to those described for the Entrerríana), a crude chipped stone industry is found. Bola stones and sandstone abraders (estecas) occur.

Serrano (1955:35; 1972:37) proposed a division of the pottery of the Ribereños plásticos into seven facies or styles that are, from north to south along the Paraná:

1. Cayastá, in the eastern fringe of the Chaco area (Figure 10: Rp1): Cayastá and Laguna Brava;
2. Malabrigo, in northern Santa Fe (Rp2): Malabrigo, Goya, Esquina and Reconquista;
3. Las Mulas, in southern Santa Fe (Rp3): Las Mulas, San Javier, El Ombu and Hernandarias;

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4. Los Galpones, near Las Mulas (Rp4);
5. Las Conchas, in Entrerios (Rp5);
6. Arbol Solo, in the Saladillo River near Naré (Rp6);
7. Los Marinos, near Rosario: Los Marinos and Las Tejas (Rp7).

Serrano did not include in his facies some other sites found farther south in the Paraná Delta, such as Gaboto (Torres 1907:108-109), Cerro Grande (Gonzalez 1939), Ibicuí (Aparicio 1928) and Campana (Torres 1907:60-89). Two more sites are on the Lower and Middle Uruguay, the later occupations of La Blanqueada (Freitas 1942) and of Salto Grande at Aruera (Diaz 1977:156). Some materials connected with the Ribereños plásticos, chiefly campanas, have been also found on the northern shores of the Río de La Plata estuary (Figure 10: Rp).

Serrano (1955:36) implies that the influences responsible for the pottery of the Ribereños plásticos were moving down river; therefore, the spatial changes indicated from one facies to the next would correspond also to changes through time, and the ordering from north to south of his proposed facies suggests the following developmental changes.

One of these developments seems to lead from the initial predominance of hollow, modeled, or folded zoomorphic adornos used as spouts, to the predominance of solid, modeled zoomorphic adornos, used as lugs. Afterwards, there are only lugs folded and cut from the rim, and most of them are not zoomorphic. Another such development leads from the initial predominance of cord-impressions over drag-and-jab incised lines, to the predominance of drag-and-jab lines, which could

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have started as an imitation of the former. Afterwards, there are more punctations and wide-line incisions, or incisions alternating with punctations, much as in the Entrerríana. The designs evolve from those relatively simple to the more complex ones; in the latter, red painted bands were added to the interior of the vessels, and afterwards became simpler again. Initially, farther to the north, there were only small simple campanas or pot-rests, sometimes called campanitas, like those from the Chaco-Santiagueño area. Then the classic campanas appear and became very common, only to decline and become rare or disappear in some facies but not in others.

It is also possible also to glimpse another development, during which a crude chipped stone industry composed of axes, scrapers, pounders, and knives is replaced by a bone industry that flourishes, then declines; the bone industry is then succeeded by another crude stone industry in some facies but not in others. Loop handles on bowls appear only in the north. Globular constricted jars with loop handles, lugs, or basket-like handles appear only in the center section, whereas oval or boat-shapped bowls with wavy rims appear only in the south.

The Facie Las Mulas, occupying the central section, appears to represent the apex of the development uniting more modeled and incised solid adornos with more complex drag-and-jab designs, red banded painting, campanas, and globular constricted pots. A complex bone industry is also characteristic. Both facies located at the beginning of the Delta (Arbol Solo and Los Marinos) are described as local developments representing later influences of the Riberefios plásticos upon the Entrerríana Style; some sites of the latter are located in that area, and some are farther south in the Delta.

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Zoomorphic adornos, spouts, campanas, drag-and-jab incised lines, and lugs also appear in the sites of the Delta, as well as in those on the Lower and Middle Uruguay and of te Lower Río Negro, that is, La Blanqueada (Freitas 1953a), Salto Grande (Diaz 1977), Yeguada and Vizcaíno (Boretto 1969; Boretto et al. 1973). However, in all those sites there are only a few of these items, and it is difficult to ascertain the way in which the Ribereños plásticos elements relate to the rest of these sites, because they could have been exclusively late and only superficial.

The only known stratigraphic analysis of that pottery in any one site has been attempted at Mini I (Goya) by Schmitz, Gonzalez, and Rizzo (1972a, 1972b). They observed a gradual decline of the slightly restricted globular or hemispherical vessel forms, and of the incised designs with zoned painting. The decline correlated with an increase in the proportion of the large open bowls with thickened rims, and of the modeled adornos with cord impressions, many of them used as spouts. The fact that with the passing of time fewer sherds were decorated, the complex incised motifs were substituted by simpler ones, and the former variety of modeled zoomorphic spouts gave way to only a few stereotyped styles, indicates an artistic impoverishment of the local pottery. The time range for these changes is not known, but the later part of the process was probably hastened by the coming of the Guarani, whose influences are detected in the pottery of the site. Therefore, a date after ca. A.D. 1300 is indicated (Brochado 1973a).

Still undated ceramics with a very simple geometric decoration by cord-impressions below the rim, possibly related to the drag-and-jab

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decorated pottery of the Entrerríana Style and of the Ribereños plásticos, but without zoomorphic adornos, have been described from different places. On the banks of the Lower Salado, at Los Molles, almost plain globular pots, distinguished from other pottery of the area by their flat or concave bases, show cord-impressions or punctations near the rim. Sherds with net and basketry impressions, as well as rare loop-handles, also occur. Serrano (1932, 1954, 1955, 1972:35) attributed that pottery to the cultures of the Los Porongos and Northern Córdoba region, a view further attested to by the typical bone arrow points.

Similar ceramics have been described from three more sites farther north on the Upper Bermejo (Fock 1962; Willey 1971:456) (Figure 10), as well as from the Pilcomayo (Ryden 1948) and from the Upper Paraguay (Boggiani 1900; Willey 1971:457). The pottery from one of these sites reveals Andean influences, such as lugs and flat-bottomed bowls, but those from the other sites have only the simple subglobular vessel forms common on the Middle and Lower Paraná, as well as stringholes for suspension, white slip and cord-marking, and incised and punctate decoration in bands below the rim (Fock 1962).

Nordenskiöld (1932:30, fig. 3) called attention to what he perceived as dramatic resemblances between some of the modeled and incised zoomorphic adornos of the Middle and Lower Paraná and others found in the Antilles at Trinidad, in Amapa at Wakany, and in Amazonia near Santarém at Cuipiranga and Acai, attributing all them to the spread of Arawak potters along the principal interconnected waterways of Lowland South America. To put it in more current terms, Nordenskiöld perceived

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Barrancoid affinities in this plastic tradition. Nevertheless, in all likelyhood the alien influence detected in the pottery of the Ribereños plásticos did not came down the Paraguay-Paraná from some hypothetical Arawakans up river, but rater southeastward down the Salado, from the Chaco-Santiagueño sub-area of the southern lowlands of the South Andean archaeological area (Willey 1971), as proposed by Palavecino (1948). When this issue is viewed from the Upper Amazon, one immediately notes that the similarities of the style of the Ribereños plásticos are not to the Barrancoid phase Hupa-iya but to the adornos of the Pacacocha, Nueva Esperanza, and Cumancaya Phases (Brochado and Lathrap 1980). This style of adorno and a set of vessel shapes largely cognate with the Palo Blanco Tradition are the clearest indication of the arrival of the Panoans from Eastern Bolivia into Eastern Peru. I suspect these stylistic parallels do have historical significance and might support Greenberg's (1960:794) contention that Panoan and Guaycuruan are related.

Bennett et al. (1948:125), using Wagner's (1934) published evidence, described two pottery styles: Bislín Incised and Crude Urns, as being the earliest in the archaeology of the Chaco-Santiagueño (Figure 10). In hypothesizing that the incised ceramics were earlier than the painted ones, they followed Casanova (1940) and Canals Frau (1940). Gomez's (1966a, 1966b, 1970) stratigraphic excavations suggest again the precedence, accepted also by Ibarra Grasso (1967:340,586) for what he calls the Cultura Sayanitense. Therefore Willey (1971:223), following Gonzalez (1960), brought both these styles together in his Las Mercedes Phase. Sites are found along both the Dulce and Salado Rivers, in the

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Chaco-Santiagueño. The simple bowl forms and incised and punctate decoration of the Bislín Incised Style are very similar to those of the pottery of the Lower Paraná and the Río de La Plata estuary. Gomez (1966) subdivides the incised pottery into two groups. In Antajé the designs--double or triple zigzags, pendant triangles filled with gashes or punctations, and nicked rims--and most of the vessel forms are as simple as those of El Dorado and Punta Indio. In Mercedes the more complex step-frets, filled with fine hatched or cross-hatched lines are more like those in the Entrerríana Style. These incised ceramics have been viewed as similar and in some way related to those of the South Andean archaeological area, such as Cienaga, Candelaria, Condorhuasi, San Francisco and Tebenquiche (Serrano 1931:10; Casanova 1940; Canals Frau 1940; Gonzalez 1960; Gonzalez and Perez 1972:60; Ibarra Grasso 1967:591; Willey 1971:223). On the other hand, the sharply constricted globular pots or jars with zoomorphic or plain lugs of the Crude Urns Style, which were used for child burials (Bennett et al. 1948:125, plate 10) seem to be somewhat later. Presumably, they are related to such painted pottery as Cortaderas, Sunchituyoj, and Averias (Gomez 1966a, 1966b, 1970) and are similar to the same kind of pots from the Ribereños plásticos. Modeled and incised, red painted zoomorphic adornos that change the small simple bowls into animal forms, as in the Ribereños plásticos as well as plain campana-like artifacts, also occur at that later time. Accordingly, one site of the seemingly late Facie Los Marinos is the only place where child burials in urns not related to the Guarani have been found in the Litoral (Serrano 1922, 1931:10).

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The time range for the still undated Las Mercedes pottery has been estimated, by comparison with the similar C^{14} dated Cienaga pottery, as reaching from ca. A.D. 1 to 600, being earlier, therefore than Sunchituyoj and Averias (Gonzalez 1960 1964; Gonzalez and Perez 1972:37, Cuadro 1.1. 45, 60; Willey 1971:201, fig. 4-4).

As to the origin of Las Mercedes, most people believe in a diffusion from the Southern Andean area down (Gomez 1966:26; Ibarra Grasso 1967:591) but Serrano (1931:10) and Willey (1971:223) consider reciprocal influences to be more likely the case. Nevertheless, the fact that the incised decoration and the bowl forms are earlier in Palo Blanco and El Dorado (ca. 3000-300 B.C.) indicates to me that the incised bowls of the Bislín Incised or Antajé Style derived from the Lower Paraná and moved northwestward up the Dulce and Salado Rivers to the Chaco-Santiagueño, and maybe from there to the Southern Andes. It is thus possible that Candelaria and Cienaga are part of the Palo Blanco Tradition.

On the other hand, the sharply constricted globular pots, the modeled and incised zoomorphic adornos, and the campanas (Figure 11) possibly diffused later from the Chaco-Santiagueño down the Salado to form the style of the Ribereños plásticos through its coalescence with the previous Entrerríana Style. Therefore, the pottery of the Ribereños plásticos is believed to be later than that of the Entrerríana, upon which the influences from the Chaco-Santiagueño were grafted. Lugs and spouts, most of them zoomorphic, changed but little the simple vessel forms characteristic of the Palo Blanco Tradition and were also applied to the pot-rests, producing the zoomorphic campanas.

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The characteristic drag-and-jab incised decoration, even if rare, does occur in Palo Blanco, but its increase in popularity occurred only after the end of El Dorado. That is, after ca. 300 B.C. and perhaps only after ca. A.D. 100 in the Entrerríana pottery style.

Most of the sites of the Ribereños plásticos Style have been tentatively dated as being late prehistoric, but the Middle Uruguay is the only place where that pottery can be dated by C^{14} dates. At Salto Grande (Aruera), it must date from after ca. A.D. 1000, but before the Guarani pottery appeared (Diaz 1977) (Figure 12:7) that is late prehistoric, around A.D. 1300 (Brochado 1973a).

Some other sites also produced Guarani pottery, for instance, Arroyo Las Conchas (Figure 10: Rp5) and Serrano (1972:7) attributes some of the red-on-white painted decoration, as well as some zoned forms in the set of vessel of the Ribereños plásticos, to the Guarani influence. Arroyo Las Conchas also produced European materials and is attributed to the seventeenth or eighteenth centuries (Serrano 1934).

We are not sure about the actual time span of the pottery of the Ribereños plásticos, the maximum estimated duration being between A.D. 1000-1300 and the seventeenth or eighteenth centuries. Therefore, I will describe that pottery simply as a ceramic style. Nevertheless, the suggested development from the Entrerríana to the Ribereños plásticos, prompted by two-way influences to and from the Chaco-Santiagueño, leads me to suspect that both styles span a longer time range than most people have previously suspected, and actually constitute a subtradition--in this case a decorated one--of the otherwise generally plain or less decorated Palo Blanco ceramic tradition.

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Serrano (1955:54, 1961:82) attributes the characteristic pottery of the Riberefios plásticos to the agricultural Chaná: Beguá, Timbu, Coronda, Quiloaza, Mocoreta, Mepene, etc., which in historic times occuppied all the area where that pottery has been found (Serrano 1936:33, fig. 5, 1940, 1947:53, 1955:53, 88, fig. 2; Canals Frau 1953:257; Gonzalez and Perez 1972:132; Becker and de Cebey 1978:135, map 1). The Chaná spoke a still unidentified language, possibly related to Charrua and to Querandí, that Serrano (1936:66) attempted to relate also to Caingang. According to others, Chaná is related to Guaycuruan (Aparicio 1932:82).

7.4 The Vieira Subtradition

The pottery I will call the Vieira Subtradition, directly related to that of the Palo Blanco Tradition, appears in mounds along the Atlantic coast of Uruguay and Southern Brazil. We still do not fully understand the relation between these mounds (with or without ceramics) and the preceramic shell middens (sambaquís) found more to the northeast along the adjacent stretch of the coast. The sambaquís represent an earlier kind of coastal adaptation, at a time when there where more shellfish than later. These conditions probably lasted from 3000-3200 B.C. to A.D. 200-500 (Hurt 1980) or even until A.D. 1000-1200 (Uchoa and Garcia 1979:94). Moreover, as the earliest C^{14} dates for each dated sambaquí are progressively more recent, going from northeast to southwest, that kind of coastal adaptation must have spread down the coast from near the Tropics but did not extend beyond the end of the stretch of the coast that is backed by the coastal mountain ranges or Serra do Mar (Schmitz and Brochado 1972:10; Schmitz 1978:108; Hurt 1980).

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The mounds (cerritos or cômoros) in Uruguay and Southern Brazil represent a later kind of adaptation to the same general environment, but in which shellfish were not so plentiful. These mounds are artificial constructions used as habitation sites. They were built in swampy areas, sometimes now completely filled by alluviation. In contrast to the sambaquís, they were found not only near the coastal lagoons, but also near rivers, particularly around their headwaters. Accordingly, instead of shellfish, the mounds contain either large quantities of fish bones, mixed with earth and ashes, or only earth and a few bird or mammal bones, depending upon whether they are near the coastal lagoons, far from them on swampy areas along the course of the rivers, or on the headwaters. Some think of these mounds as an extension of the sambaquí tradition after shellfish were no longer as plentiful as before and or into areas where they never had been plentiful (Schmitz and Brochado 1972:10).

The Uruguayan adaptation seems to have spread in the opposite direction along the coast, that is, from southwest to northeast. At least its characteristic pottery, Vieira, spread in that direction from ca. 300 B.C. onwards. But we are not so sure about the preceramic mounds; at least some appear to have been earlier than the earliest ceramic bearing mounds of the same area, but others were not. For instance, three C^{14} dates indicate that the preceramic Lagoa Phase extended at least from 600 B.C. to A.D. 100, but its beginning has been estimated ca. 2000 B.C. because the earliest C^{14} date appears to be near the end of the phase (Schmitz and Brochado 1972:4).

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The preceramic materials have been divided into three phases:

1. Chuí, around the southern end of Mirim (Merín) Lagoon;
2. Lagoa, around the southern end of Patos Lagoon;
3. Piraçã, on the headwaters of the Ibicuí and Vacacaí Rivers.

Of these only the Lagoa Phase has any C^{14} dates.

The preceramic mounds, or the preceramic levels below the ceramic bearing ones, are characterized in all of these phases by palm-nut breakers (piedras con hoyuelos or quebra-coquinhos), hammerstones (percutores), small, cylindrical, flat millstones (moedores), short, cylindrical manos (maos-de-pilao), grinders (moletas), and stone flakes, sometimes denticulate. Bone points are common. In the Lagoa Phase there are also faceted or grooved bola stones, small grooved net-weights, and a few scrapers. In the Patos Phase on the Río Negro the Ibicuí and the Vacacaí river valleys small stemmed and barbed stone arrow points are plentiful; in other sections they are rare. Arrow points are, however, much more common in some open sites found near the areas covered by mounds (Schmitz et al. 1967:14,15; Schmitz and Becker 1970; Schmitz and Brochado 1972:10; Miller 1969). On the surface of many of the preceramic mounds, a few sherds of Vieira pottery indicate some later reoccupation.

The Vieira Subtradition pottery stemmed from something like the relatively early pottery of the Palo Blanco Tradition found along both shores of the Río de La Plata estuary, and estimated to date from before ca. 500 B.C. Next probably came the almost plain pottery found in the

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mounds or cerritos built along the coast on the flat grasslands subjected to frequent flooding around the lagoons Mirim, Mangueiras, and other smaller ones more to the southwest, called banados de Rocha (Figure 10: bR).

More than 500 of the mounds have been counted. They usually form clusters near the small coastal rivers, but some, to the west of the Mirim Lagoon, were built on higher ground not subjected to flooding and even on the low foot-hills. These mounds measure from 10 m or 20 m to 50 m or more in diameter, and their heights vary from 0.5 m or less, to 3 m. They are formed mainly of earth mixed with mammal, bird, or fish bones; shellfish are relatively rare. All the excavated mounds have preceramic levels, described as the Chuí Phase. As the same lithic artifacts were carried over into the later ceramic phases, everything indicates--as in the case of the Middle Uruguay sequence--that here, also, preceramic populations adopted the Palo Blanco Tradition pottery.

The pottery found in the mounds to the east of the Mirim Lagoon has been described as the Cerritos Phase (Schmitz et al. 1967:10; Schmitz 1968:128; Schmitz and Brochado 1972, 1979:14) (Figure 10: Cr).

There are still no C^{14} dates but it is believed that the beginnings of that pottery should date from before ca. 300 B.C. It is tempered either with very fine or very coarse sand. Vessel shapes and dimensions are the same as in Palo Blanco (Figure 11), including the holes near the rim, but it is almost plain; only occasionally are sherds decorated with rows of punctations near the rim.

The pottery found west of the Mirim Lagoon has been described as Ceibos but it is very much the same (Figure 10: Cb). However, some

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deeper subglobular or cylindrical pots occur (Figure 11), as well as rare sherds showing rows of finger punchings (ceramica digitada) or of punctations (Ceibos Ponteada) (Prieto et al. 1970). Surface finds that are difficult to place include large, polished or ground, grooved stone axes, deep mortars, polished pounders or sobadores, and small sandstones slabs or estecas. The presence of cattle bones indicate that some mounds are historic. In open sites, near the areas occupied by mounds, the same lithic materials are found, plus small stemmed and barbed arrow points, scrapers, knives, punches, burins, small bifaces, and flakes. These open sites appear to be late, because in many, if not all of them, there are also Guarani pottery and European materials.

The pottery described as the Torotama Phase (Figure 10: Tm) is found more to the northeast, along the same coast, in a few mounds (also called cômoros or cerritos) built near the southern end of the Patos Lagoon. It has been C^{14} dated ca. 1-100 B.C. (Figure 12: 10) but is estimated to have begun ca. 300 B.C. and to have lasted until the beginning of the next ceramic phase, ca. A.D. 1 (Schmitz and Brochado 1972). This pottery is very much the same as that just described, except that it is tempered always only with very fine sand.

Because the earliest C^{14} date for the previous preceramic Lagoa Phase found in the same area, and sometimes even in the lower levels of the middens that contain the Torotama pottery, is only ca. 400-600 B.C., it is not clear if here, too, the pottery of the Vieira Subtradition has been adopted by preceramic groups. But comparing the situation with that on the Middle Uruguay--where the related preceramic phase called Itaqui began after ca. 7000 B.C.--and given the estimate of ca. 2000

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B.C. for the beginning of the Lagoa Phase, I would suggest that here that was the case too.

The pottery described as the Vieira Phase (Figure 10: V) is common. It is found in around 60 middens or cômoros, forming clusters in the same general area, near the southern coast of the Patos Lagoon and other smaller coastal lagoons. These middens measure from 15 m to 100 m in diameter, and their height varies from 0.5 m to 2.5 m. They are composed of earth, thick layers of ash, fish bones, crustacean remains, charred palm-nuts, and, rarely, shellfish remains, mammal, or bird bones. Most of the excavated middens yielded ceramics throughout; a few yielded ceramics only in the upper levels. In any case, pottery is much more plentiful here than in the other Palo Blanco Phases.

All the lithic artifacts are small: polished quebracoquinhos, hammerstones, or batedores; small grooved bola stones, or even smaller net-weights; and a few chipped scrapers. Bone and shell pendants, disc-shappped beads, and bone points are common. The presence of the same lithic artifacts in the ceramic levels indicates that, here again, preceramic populations adopted the pottery of the Palo Blanco Tradition. Surface finds more difficult to place include large polished or ground axes, small polished celts, and flat stones with large, shallow or deep, polished oval depressions, often on both sides (moinhos or almofarizes planos).

The Vieira pottery is also very much the same as those just described (Figure 11), but the coarse sand temper seems to have increased through time; surface finishings or pseudo-decorative techniques such as unobliterated coils, scrapings, and very slight

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finger-punching (digitada) are common. Three C^{14} dates place it from ca. A.D. 550-650 to A.D. 1000-1200 (Figure 9: 11-13), but it is estimated to have begun ca. A.D. 1, after the previous Torotama Phase, and to have lasted until late historic times, that is, the first half of the eighteenth century. Its total duration has been split into three subphases.

Vieira I. ca. A.D. 1-1000. This is almost completely plain, with some sort of finger-punching all over that may also have been simply the result of using the paddle-and-anvil technique in vessel construction.

Vieira II. ca. A.D. 1000-1300. At this time, punctations, nail incisions or spatula impressions, corrugations, and basket impressions forming bands near the rim became common; the first three techniques were possibly copied from the Guarani pottery, which began to appear in the region from ca. A.D. 1000 onwards. The Guarani groups settled on the higher ground near the low-lying area occupied by the mounds. Basket impressions are believed to have come from the Taquara pottery of the uplands, where they are known from ca. A.D. 50-200 onwards (Schmitz 1976b). Besides the simple bowls there are some tall vessels with inflected walls (Figure 11: 7).

Vieira III. ca. A.D. 1300-1700 and after. These sites, most of them open sites instead of middens, have been attributed to the historic Charrua-speaking Minuano, Minuané, or Guinuane, who occupied all that coastal stretch when the Portuguese first settled there at the

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begginning of the eighteenth century (Schmitz and Brochado 1972; Brochado 1974; Becker and de Cebey 1978).

Most of the habitation middens of the Torotama and Vieira Phases were related to successively lower levels of the shrinking coastal lagoons, a circumstance that permits chronological ordering. Those farthest from the modern coast line are preceramic, and those next to them are the earliest ceramic occupations (Schmitz and Brochado 1972:5; Schmitz 1976b). Many of these sites were later reoccupied by the ubiquitous Guarani, who began spreading into the ecological niche formerly occupied by the Charrua and Minuano, probably after ca. A.D. 1000 (Naue et al. 1968; Schmitz and Brochado 1972; Brochado 1973).

Some other open, shallow sites (not middens) found capping consolidated sand dunes farther inland from the shores of the coastal lagoons reveal a mixture of Vieira III, Guarani, and European pottery, as well as metal, glass, cattle bones, and small, stemmed, and barbed arrow points. These fully historic sites, described as the Bojoru Phase (Figure 10: Bj), date from the eighteenth, and perhaps the beginning of the nineteenth century (Naue et al. 1968:45; Schmitz and Brochado 1972; Brochado 1974).

More to the north, around one hundred mounds have been plotted in a swampy area along the western shore of the Patos Lagoon, near the lower reaches of the Camaquã River, but generally not in the immediate vicinity of the beaches. There, the mounds are more isolated and large clusters appear to be less common. The mounds measure from 15 m to 50 m or more in maximum diameter because most are oval, and their height

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varies from 0.5 m to 2.5 m, rarely more. They are composed mainly of earth, small lens of ashes, mammal bones, and, rarely, charred palm-nuts. Stratigraphic cuts reveal clearly how these mounds had been built upon small natural eminences by piling earth taken from the surface, usually from only one side, where the borrow pit still can be seen.

All the lithic artifacts are small. Besides those common ones already described, there are some small, crude, stemmed and barbed arrow points, denticulates, flakes, and rarely, scrapers. Surface finds of the same large stone artifacts already mentioned for the Vieira Phase are common. The preceramic occupation of the mounds has been described as the Patos Phase (Schmitz and Brochado 1972). Ceramics are found only in the upper levels of some mounds, if at all, and except in rare cases, are represented by only a few sherds. The ceramics are more varied than those of the other phases because, besides a pottery in the Vieira Subtradition--that, in this case, is sometimes red or white slipped--there are also Guarani-like sherds. These Guarani-related sherds are tempered with very coarse sand, and show flattened corrugations and nail incisions, red slip, and red-on-white painting. Sherds resembling the Taquara ceramics of the Pedra do Cabolco tradition are also found in these mounds. These show the characteristic fine sand temper and closely arranged nail incisions and punctations, or maybe net-impressions (Schmitz et al. 1967; Schmitz et al. 1968; Schmitz and Becker 1970:4; Schmitz et al. 1970b:507; Schmitz and Brochado 1972) and indicate extensive interaction with the Gê related inhabitants of the adjacent uplands.

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Here the adoption of pottery by the preceramic inhabitants seems to have occurred only very late, not before ca. A.D. 1000, when the Guarani appeared for the first time at the southern end of the Patos Lagoon, during the Vieira II Phase, or possibly even later, at the end of the eighteenth century (Brochado 1974:45). Finger punched, that is digitada pottery of the Vieira Subtradition has also been found on top of consolidated sand dunes on the shores of the lagoon.

Still farther westward, on the swampy bottoms of small closed valleys in the southern escarpments of the crystaline shield of Rio Grande do Sul (called Serra do Sudeste) at an elevation of 200 m to 400 m, around 10 very small and shallow middens have been found, measuring from 5 m to a maximum of 30 m in diameter. The lithic materials include only a few end scrapers, denticulates, and flakes. The few, very eroded sherds--most of them tempered with fine sand--are plain, or show unobliterated coils, flattened corrugations, finger punchings, or closely arranged punctations. Vessels appear to have been small. That material has been described as the Piratini Phase (Brochado 1974a:84) and these sites apppear to have been related to those near the lagoon at Camaquã (Figure 10: Pt).

Ceramics in the Vieira Subtradition have been found in middens similar to those of the nominant phase, near the northern end of the Patos lagoon, and in scattered mounds, containing mostly shellfish, on the long sand bar to the east, between the lagoon and the Ocean. On the nearby Atlantic coast, scattered finds have been reported as far north as the foot of the southern section of the Brazilian Uplands (Arno Kern and Guilherme Naue, pers. com.).

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Everything indicates that the Vieira Subtradition pottery was spreading along the Atlantic coast of Uruguay and Southern Brazil, from southwest to the northeast, all the way from the northern shore of the Río de La Plata estuary to the foot of the Brazilian Uplands. That kind of adaptation flourished around the southern end of Patos Lagoon, the only place where a large number of middens have been found in the immediate vicinity of the shore. Here, possibly some sort of agriculture had been adopted; we still do not know of which kind and when.

The ceramic sequence of Vieira Subtradition is clearly related to the Charrua-speaking Minuano, Minuané, or Guinuane who, in historic times, were known to roam throughout that area (Becker and de Cebey 1978:146, map 4).

Similar pottery has been found in more than 100 mounds built in the swampy areas or frequently flooded grasslands around small lakes on the headwaters of the Río Negro, at Bajé and Rivera (Figure 10: Rn), at Dom Pedrito, on the headwaters of the Ibicuí which drains to the Uruguay River, and at São Gabriel on the headwaters of the Vacacaí, which drains to the Jacuí but flows to the Serra do Sudeste, at elevations between 100 m and 150 m. On the Río Negro headwaters, the mounds are clustered in groups. They are oval and measure from 7 m to 8 m maximum diameter, and range from 0.5 m to 2.5 m high. These mounds are composed of earth, ash, and animal bones. Lithic artifacts are common everywhere in the area: stemmed and barbed stone arrow points, scrapers, knives, flakes, and grooved bola stones. Vessels are thick, plain, and have holes near the rim (Santos 1967:8; Schmitz and Becker 1970:19).

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On the headwaters of the Ibicuí and Vacacaí (Figure 10:Pç) the mounds are also oval, having the same dimensions, but whereas some are as shallow as 0.5 m, others are as high as 8 m. As in the previous case, many of them have been built on the foot-hills, far above the floodplain. They are composed of earth, mammal bones, shellfish, and charred palm-nuts. The lithic material, described as Piraçã Phase, includes axes, arrow points, flakes, bola stones, and polished lenticular sling stones. Bone points occur. Only a few sherds have been found on the surface of some mounds, but they are more plentiful in nearby open sites, which also have stemmed and barbed arrow points (E. Th. Miller, pers. com.).

All these plain pottery just described should be attributed to the Charrua-speaking Yaró and Minuané who, in the seventeenth and eighteenth centuries, roamed through that area (Serrano 1936:5; Becker and de Cebey 1978:146, map 4).

The mounds along the Atlantic coast seem to have been occupied only seasonally. Schmitz (1976b) points to the fact that in Vieira Phase middens there are no bones of the fish that are plentiful in winter, indicating that the coastal middens were not occupied that part of the year, possibly because of the cold southeasterly winds. The inhabitants surely moved inland, possibly to the sheltered valleys in the nearby Serra do Sudeste, where the Piratini Phase sites are found. The application of standard archaeological nomenclature thus seems to have resulted in two names for complexes that are just seasonal manifestations of the same ethnic unit.

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Most of the sites bearing the pottery that I have demonstrated to be affiliated with what I call the Palo Blanco Tradition are artificial mounds in low-lying areas. This makes them easy to locate, for instance, by means of air-photos; accordingly, it is said that some 900 of them have been counted. However, the study of the archaeology of the Vieira Subtradition was accomplished by combining the published data and my own research at the 250 or so mounds that have been actually surface collected and/or excavated.

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CHAPTER 8

INHABITANTS OF EASTERN SOUTH AMERICA BEFORE THE ARRIVAL OF THE GUARANI AND TUPINAMBA

8.1 The Ancient East Brazilians and the Caingang

8.1.1 The Spread of the Pottery of the Pedra do Caboclo Ceramic Tradition

The earlier pottery of the Pedra do Caboclo ceramic tradition does not have the same homogeneity as that of the Aratú Subtradition or the Urú Tradition, which will be treated later. Moreover, the C^{14} dates for the preceramic lithic complexes, which are very similar to the lithic artifacts associated with early pottery, indicate that the same groups had inhabited those areas for thousands of years before the arrival of the pottery. The earliest pottery of the Pedra do Caboclo Tradition was therefore in all likelihood, diffused by adoption, that is trait unit intrusion (Lathrap et al. 1956), being transmitted from one group to the next. Experiments conducted by H.W.M. Hodge (1965:118, fig. 3) show that serial copying does indeed produce the changes and divergence exhibited by the several branches of the Pedra do Coboclo Tradition as they spread southward (Figure 5). Ceramics carried by massive movements of peoples, such as was probably the case with the pottery of the later Aratú Subtradition and the Urú Tradition, maintain their uniformity through the full range of the ethnic expansion.

In the Figure 6, the 92 radiocarbon determinations dating the pottery of the Pedra do Caboclo and Mina traditions have been arranged, from right to left, in the same approximate order that the dated sites

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range from north to south through Eastern South America. Dates for sites whose pottery has been described under different ceramic styles have been organized under their proper headings, and in each successive style dates generally have been arranged from earliest to latest. It is easy to see that in each of these clusters the dates succeed each other in closed sequences. The numbers under each bar serve to indicate, on the inset map, the approximate position of the site from which the dates come. The north to south, that is, right to left cline in decreasing age precisely indicates the north to south diffusion of the Pedra do Cabolco Tradition.

In Figure 5, sets of characteristic vessel forms are shown under the heading of each style described. In each of these sets forms have been arranged vertically, from bottom to top, following the order in which earlier ones disappear and new ones appear. These sets have been arranged, from right to left, in the same approximate order in which the areas occupied by each of the styles are ranged from north to south in Eastern Brazil. Because beginning dates for each style are generally later as one moves south, each set has been also vertically displaced upwards from right to left so that their progressively higher location indicates this time gradient. This chart therefore displays the sets of vessel forms of each style in the same way that dates are displayed in the chart of radiocarbon determinations (Figure 6).

It can be seen plainly in the chart of vessel forms (Figure 5) that each group adapted the borrowed pottery to its own culinary needs, thus accounting for the differences between styles, characterized mainly by the successive invention and spread of new vessel forms and the borrowing of others from neighboring groups.

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To the six earlier forms present in the Pedra do Caboclo Style (Figure 5: 1-4, 6B, and 15), ten new ones were successively added (5, 7-14, and 16). Forms 7, 10A, 10B, 11, 13, and 16 were added to the set of vessels of the Una Style, form 12 appears first in the Jataí Style, and form 14 in the Taquara Style, that is, it was added only near the southernmost limit of the range of the tradition.

At the same time some of the forms were abandoned. Form 15 appears only in the Pedra do Caboclo Style. Forms 4 and 16 disappear from Una Style times onward. Consequently, they fail to appear south of the area occupied by that style. Form 3 apparently does not exist in the Jataí and Itararé Styles, but reappears again in the Taquara and Taquaruçu Styles. Because form 11 disappears from Itararé Style times onward, we did not find it south of the area occupied by that style. The vessel form sets of the later pottery are almost completely different from those of the earlier. Nevertheless, plotting together all these sets of vessel forms shows clearly that they are part of the same tradition developing through time and space (Figure 5). The arrows connect the same vessel form in the vessel sets of different styles, and indicate their transmission from one to the other.

Form 5 (Figure 5) was probably borrowed from the Guarani (Figure 14: 10b), and form 8 (Figure 5) possibly from the Tupinambá (Figure 16: 14). Form 9 seems to represent a borrowing from European pottery. Therefore, these three forms have been left out of the flow chart at the top of Figure 5.

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The invention of new vessel forms was accomplished mainly by developing certain dimensions of existing vessels at the expense of others, and surely was related to the need to adapt them to different food habits. It is easy to see on the chart that what were formerly globular vessels became taller and conical or cylindrical through time.

It is important also to point out the variations in vessel size through time and space (Figure 5). Vessels that are very small in the earlier part of what is called the Mina Tradition became somewhat larger in what is believed to be its later part (Areão). In the following Ananatuba, Pedra do Caboclo, and Una Styles vessels are medium sized, the largest measuring as much as 30 cm to 40 cm in diameter or height. In the succeeding styles Jataí, Itararé, Taquara, and Taquaruçu cognates of the same vessels appear in very small versions, rarely larger than 20 cm in diameter or height. Only in a few classes do some vessels attain larger dimensions. For instance some pots in Itararé measure 35 cm in diameter by 40 cm in height; large beakers or cups in Taquara and Taquaruçu can be as tall as 35 cm; and some large bowls in Taquaruçu attain diameters of up to 40 cm. We also have to remember that the range of sizes for each class of vessels is not always given in publications, and often only the largest size that vessels in a particular class may reach have been illustrated.

The development of plastic decoration south of the Iguaçu River (to the north the pottery of the same tradition is almost plain; Figures 4 and 5) can be explained as a case of borrowing from the Vieira Subtradition of the Palo Blanco Tradition. Another explanation will be advanced later in this thesis.

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It is clear that the simple cermaics of Eastern South America that have been described as the Pedra do Caboclo, Papeba, Una, Casa de Pedra, Itararé, Taquara, and Taquaruçu "traditions" are actually historically related, deriving, as I have demonstrated, one from the other in and orderly fashion and in the order just indicated. I therefore conclude that they all can be rightfuly included in the same ceramic tradition: the Pedra do Caboclo Tradition. This is cleary a very inclusive taxonomic unit and, if I were being precise in these matters, `supertradition´ or `phylum´ would be a better term.

I have already argued in this thesis that all the early pottery of Eastern South America must have ultimately developed from an even earlier and simpler Amazonian ceramic tradition which, in all probability resembled the pottery of the Mina Tradition that I described in Chapter 5. Therefore, the ceramic tradition I am proposing here may just as well be called Mina. It also could be called the Taquara Tradition because this pottery, from Southern Brazil, was the first to be described. Nevertheless, I will call it Pedra do Caboclo from its earliest dated style in Northeastern Brazil.

The groups of related pottery described by others as "traditions" could also be viewed as subtraditions branching out from the same initial tradition because, after their beginning, each shows partially independent developments. Because this is not primarily an exercise in taxonomy, I have used the terms `subtradition´ and `style´ more or less interchangeably, but `subtradition´ is most appropriate for the Aratú pottery, which I will demonstrate was carried by migrating groups rather than spread by trait unit intrusion to preceramic peoples.

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At this point it is time to attempt to trace an overall view of the pattern shown by the spread of the Pedra do Caboclo Tradition pottery into Eastern Brazil.

By 1000 B.C. or even before, Amazonian influences--paleoamazonian in Menghin's and Susnik's terminology--began trickling down into Eastern South America. These influences were represented archaeologically by the appearance in the previous lithic sites of relatively simple pottery such as those described as the Pedra do Caboclo Style in the interior, including Pajeú and Papeba pottery, and as Periperi in the coastal shellmiddens, including Cajaiba pottery (Figure 4: PC, PJ, PB, PP, and CJ). These early ceramics point to a derivation from an earlier, single, extremely simple ceramic tradition of Amazonia which, as I say above, must have been somewhat like the pottery described in the Mina Tradition. Such pottery must have had its beginning in Central Amazonia long before 4000 B.C. because, at the mouth of the Amazon river system (Figure 6: 1), the beginning of Mina Tradition has been dated 3500-3300 B.C.

The Pedra do Caboclo and Periperi pottery have been dated 1000-800 B.C. on or near the coast of Northeastern Brazil (Figure 6: 17, 39, and 41). The fact that cognates of some characteristic vessel forms of the Pedra do Caboclo Style have been detected in what as been called the Ananatuba Tradition of Marajó, C^{14} dated at about the same time (15), seems to reinforce this date.

However, the existence of two already slightly different pottery styles at this early time, one in the interior and the other on the coast, seems to indicate that there were two kinds of adaptation. The

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maritime adaptation, related to mangroves and having as the predominant activity the collecting of shellfish and palm-nuts, was obviously derived from the same kind of adaptation found from at least 4000 B.C. near the mouth of the Amazon and, in Maranhão in the Mina Tradition. It was therefore transmitted down the coast around the shoulder of Northeastern Brazil, but did not expand beyond Southern Bahia (Figure 4: UR, MN, TR, AR, PP, and CJ).

Another kind of adaptation was related to the ecotone between the coastal rain forest and the semi-dry vegetation of the immediate interior, including the cultivation in forest clearings, sometimes also showing some coastal orientation, as in Papeba (Figure 4: PC, PJ, and PB).

These Pedra do Caboclo Style ceramics likely enough spread up the southern tributaries of the Lower and/or Middle Amazon, with the cultural matrix undergoing some kind of ecological readaptation on the boundary between Amazonia and the cerrado area. When pottery spread farther southward it was transformed and diversified through time and space, giving rise to such related styles as Una, Itararé, Taquara, and, ultimately, Taquaruçu (Figures 4 and 6).

The 77 radiocarbon dates so far known (Figure 6: 16-92) seem to indicate that the routes of spread of early pottery through Eastern South America can be reconstructed as shown in Figures 4 and 6.

The pottery of the Pedra do Caboclo Style was first adopted by preceramic groups long settled in Northeastern Brazil (Figure 4: PC, PB, PJ, and GG). It diffused up the São Francisco from the areas north of the river, and between 100 B.C. and A.D. 1 variants of this style were

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adopted by other preceramic groups on the upper reaches of the river (Figure 4: LP, UI, PR, LV, LS, and P). From the headwaters of the São Francisco southward there were apparently two main routes of spread, one easterly following the highest areas of the uplands just inland of the coastal escarpments (Figure 4: UN, RV, CP, etc.) and another westerly moving down the Paraná Valley (Figure 4: JT, CP, and CT). Pottery was very rapidly adopted by the preceramic inhabitants of the uplands, because in the same time range between A.D. 1 and 200, when the earliest pottery crossed from the headwaters of the São Francisco to the headwaters of the Paraná, at the beginning of what I call the Una Style (P), a related pottery was already found on the headwaters of the Uruguay farther south, marking the beginning of the Taquaruçu Style (Figure 4: G; Figure 6: 44, 45, and 69).

On the Paranapanema Valley the Una Style changed to what I call the Itararé Style, and the southward diffusion of the Pedra do Caboclo Tradition was halted only when the southern lowlands had been reached at the foot of the escarpments of the Brazilian Uplands; this probably happened ca. A.D. 400. By that time contacts maintained by the bearers of this tradition with carriers of the Palo Blanco ceramic tradition of the lowlands farther southward (Figure 10) possibly resulted in the adoption of a characteristic plastic decoration, giving birth to what I call the Taquara Style, including Taquara, Caxias, and Erveiras, dated from A.D. 350-500 to A.D. 1200-1400. This decoration appears also in some complexes of the Itararé Style, such as Candói and Cantu, dated from A.D. 400-550 to historic times.

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Beginning ca. A.D. 500 the Una Style spread east and southeastward, crossing the Serra da Mantiqueira down to the Paraiba Valley, and probably down that river, or crossing the Serra do Mar to the coast, where it is represented by such complexes as Mucuri, Tangui, Una, and Jabaquara (Figure 4: MC, TN, UN, and JB).

Subsequently the other plain and decorated pottery also crossed the raised margin of the uplands to the nearby coast, beginning with something like the plain pottery of what I call the Itararé Style, including such complexes as Piraí, Araquari, Enseada, Río Lessa, and Base Aérea (Figure 4: IT, A, P, E, RL, and BA). Sometime afterwards the decorated pottery of the Taquara Style also crossed to the coast, including those described as Osório, Tapera, and Jaguaruna (Figure 4: T, O, TA, and JG).

This means that pottery was adopted not only by the preceramic groups of the uplands, but also by at least some of the preceramic groups that were still building the coastal sambaquís, such as at Forte Marechal Luz (Araquari pottery). Pottery was also adopted by other coastal groups who were not actually sambaquí-builders, including such complexes as Jabaquara, Base Aérea, and Tapera. In many other instances, the presence of Pedra do Caboclo Tradition sherds in the upper levels or on the surface of sambaquís or other otherwise preceramic coastal sites represents later reoccupations rather than adaption.

In the valleys of the Paranapanema and Iguaçu on the uplands, later Guarani influences upon the formerly plain pottery, probably starting ca. A.D. 800, resulted in the Itararé Style, comprising such complexes

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as Itararé and Açungui, which survived to historic times (Figure 4: IT, AÇ).

In the Upper Uruguay Valley farther south, the decline of decoration in the Taquara Style gave rise, by ca. A.D. 1000 to what I call the Taquaruçu Style, comprising such complexes as, Guatambu, Taquaruçu, Xaxim, and Vacaria (Figure 4: G, TC, X, and VC). These spread downriver from the uplands into the lowlands far to the west, in the form of what has been described as Itapiranga, Eldoradense, and Girúa (IT, EL, CR). The Taquaruçu Style eventually replaced the Taquara Style even in the uplands, and survived until historic times.

Around the same time pottery also spread northwestward to the area between the Paranaiba and the headwaters of the Araguaia, where it is represented by what I call the Jataí Style (Figure 4: JT). Possible influences from the Taquara and Itararé Styles, as well as from the Urú Tradition, made it one of the more divergent styles with respect to its set of vessel forms. One possible explanation is that Jataí represents the northward displacement of some ceramic making group of Southern Brazil, rather than the diffusion of pottery among already settled preceramic populations. Some other sites such as Gentio Cave and Lapa Pequena also might be related to the Jataí Style (Figure 4: UI and LP).

The diffusion of the Pedra do Caboclo ceramic tradition can be modeled in still another way. The more westerly route of diffusion down the Paraná might not be simply a branching of the more easterly route through the uplands, but could have extended all the way from the mouth of the Amazon, up the Tocantins and/or the Araguaia, and thence down the Paraná to the Upper Uruguay (Figure 6: inset map). This possibilitiy is

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suggested, among other things, by:

1. The smaller size of the vessels in such relatively late styles of Southern Brazil as Jataí, Itararé, Taquara, and Taquaruçu; (Figure 5).
2. The presence of incised decoration in these same styles, and the pottery of the Una and Pedra do Caboclo Styles, farther north on the uplands, is pratically plain.
3. The almost synchronous beginning dates for the Una and Taquaruçu Styles in faraway places (Figure 6: 44, 45, and 69).
4. The early radiocarbon date for one possible member of the Pedra do Caboclo Style on the Upper Tocantins (Figure 6: 16).

Therefore such styles as Jataí, Taquara, Taquaruçu, and possibly Itararé could have been derived through the intermediation of the Una Style, as from a common ancestor to be found farther north, perhaps in the Middle Tocantins. The three branches, comprising (1) plain, (2) plastically decorated, and (3) possibly Guarani influenced pottery, are respectively represented by:

1. Pedra do Caboclo and Una Styles,
2. Jataí, Taquara, and Taquaruçu Styles,
3. Itararé Style (Figures 4 and 6: insert map).

These three branches continued to exist in parallel and, as we have seen, except maybe for Taquara, all the styles of these three branches persisted until historic times.

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It was by means of such long distance movement, usually by trait unit intrusions, that the ceramics of the Pedra do Caboclo Tradition eventually came to occupy an enormous area in Eastern South America, throughout which environmental conditions show great variations. They range from those created by hot, semi-dry climates, with 800 mm or less rain and from 4 to 5 or more dry months in the year, such as the climates of Northeastern Brazil (Cwb or 4c) through the hot and humid climates with more rain--1000 mm to 2000 mm--and only 3 to 4 dry months or less, which characterize Eastern and Central Brazil (Aw, Am, and Cwa or 4c, 4d, and 6b). Finally, there are temperate humid, climates with up to 2000 mm of rain, no dry season, cool winters with minimum temperatures between 12 and -8 degrees Celsius, frequent frosts and occasional snowfalls, which characterize Southern Brazil (Cfa and Cfb or 7a and 7b).

According to the climatic regime, the vegetation cover varies from the thorny scrub forest or caatinga, merging into to the coastal rain forest or mata atlântica in Northeastern Brazil. In Eastern and Central Brazil vegetation ranges from tropical savannas or cerrados to the transition from the tropical rain forest to dry forest or cerradão. In Southern Brazil, sites are found in subtropical forests mixed with pine, as well as in open grasslands with clumps of pine.

With respect to climate and vegetation it is important to note that most of the sites of the earlier (ca. A.D. 400), more decorated Taquara Style--Taquara, Caxias, and Erveiras--are inside or near the southern limit of the area of more continuous distribution of the mixed broadleaf-coniferous subtropical forests characterized by Araucaria

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angustifolia (Bertoloni) Ktze. The only exceptions are the relatively late coastal sites with such pottery as Osório, Tapera, and Jaguaruna, and those cases where Taquara Style sherds have been found in late Guarani sites, sometimes far south of that limit.

Sites with less decorated pottery, including those of the earlier part of the Itararé Style (ca. A.D. 500) as well as those of the later Taquaruçu Style (ca. A.D. 1000), are far outside or just on the eastern or western limits of the mixed broadlead-coniferous forests. Sites with the plain pottery of the later part of the Itararé, Style (ca. A.D. 800) are, with few exceptions, outside the mixed broadleaf-coniferous forests, occupying other biomes such as the subtropical forests or the beach vegetation.

Sites related to the mixed broadleaf-coniferous forests are found at higher elevations on the northern than on the southern limits of these forests, that is, above 500 m from Rio Grande do Sul to Paraná, and above 700 m on the Upper Mogi-Guaçu, Itararé, and farther to the north on the Upper Rio Grande.

The distribution is the same in cases when pottery is found inside pithouses, or even in the case of aceramic pithouses. Where their density is highest, on the headwaters of the Uruguay and Taquari, pithouses are associated with scattered pine clusters in the transitional zone between the bulk of the broadleaf-coniferous forests and the open grasslands. The correlation between the bulk of the distribution of the southern styles of the Pedra do Caboclo Tradition, such as Taquara and Taquaruçu, and the distribution of Araucaria is clear.

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This kind of association seems to indicate two things:

1. The importance of pine nuts (pinhão) in the diet of these groups, and;
2. The relatively late spread of pottery outside the area of concentration of that resource. In this last case two things could have happened:
   a. A decline in decoration, such as happens in the Taquaruçu Style. However, we cannot say that pottery became less important in such instances, because some of the largest sites, that is, those with more surface pottery, have pottery of this style. It is also in this style that vessels attain their largest dimensions. A possible explanation is that there was a decrease in the amount of pinhão gathered at the same time as there was an increasing reliance on agriculture, which resulted in larger cooking vessels.
   b. Guarani pottery may have influenced that of the Pedra do Caboclo Tradition, as apparently is the case in the Itararé Style.

The occupation of pit-houses throughout the southern section of the Brazilian Uplands was, in all likelihood, related to the relatively low winter temperatures, but also indicates that these groups must have followed a pattern of regular seasonal movements from permanent central base villages and, therefore, were not nomadic.

Outside the limits of the area of the more continuous distribution of Araucaria, coinciding with the distribution of Taquara Style sites,

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smaller patches of Araucaria are still found scattered all along the higher elevations. These run through the center of the area occupied by sites with the plain Una Style, from its southern limits on the Upper Mogi-Guaç u and Upper Paraiba, to its northern limits in Espírito Santo. However, no sites have been found inside these Araucaria patches.

It is not known what other influences entered Eastern South America from Amazonia with these ceramics. It is entirely possible that some new cultivars or improvements in agricultural practices were brought in. During the transition from preceramic to ceramic times, we have noted how the range and workmanship of the lithic artifacts declined in quantity and quality after the adoption of pottery, demonstrating the extent to which old patterns of life gave way to new ones. In spite of that, even in late historic times, some of these same lithic artifacts were still found in Pedra do Caboclo Tradition sites, indicating that the earlier ways of life had not been completely superseded.

Everything seems to indicate that these groups prefered to farm in the ecotone between the tropical forest and the more open country, such as the thorny scrub forest or caatinga of Northeastern Brazil, the tree savanna or cerrado and the restinga vegetation in the East-Central section, and on the ecotone between the subtropical forest and the grasslands or campo with clumps of pine in the southern section of the uplands. Nevertheless, agriculture must have been less intensive than in the Tropical Forest cultures and, likewise, other food-gathering activities also must have been very important. The collection of palm-nuts is still attested almost everywhere by the polished or pitted stone nut-breakers. Many sites on the coast, such as those of Una,

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Jabaquara, Osório-Taquara, Tapera Base Aérea, are small shellmiddens. Burned pinhão shells are common in the pit-houses of the uplands, and large polished stone pestles are believed to be related to the preparation of a kind of flour from roasted or fermented pinhão, which would permit its storage.

By A.D. 1 the Pedra do Caboclo ceramics were established throughout most of Eastern Brazil; however, a few groups appear never to have had any pottery. Frequently the adoption of pottery was very late, even among agricultural groups. For instance, most of the shellfish collectors responsible for the accumulation of the coastal middens or shellmounds (sambaquís) adopted pottery only after A.D. 1000. The linguistic affiliation of these shellfish gatherers has not yet been established, but they do not appear to be related to the preceramic groups who had earlier adopted pottery.

Temper changed little in the pottery of the Pedra do Caboclo Tradition, and any differences in composition or particle size can, with some exceptions, be viewed as related to their geographic spread and differences in available clays and aplastic materials, rather than to an orderly development through time.

In clear-cut opposition to the Amazonian Polychrome Tradition, characterized by dependent and independent vessels of complex contours in the sets of vessel forms of the Pedra do Caboclo Tradition, we observe a complete dominance of simple or inflected contours. Simple contoured forms are 1, 2, 4, 6A, 6B, 14, 16, 17, and 18 (Figure 5). Inflected forms are 3, 7, 10B, 11, 12, 13 and 15, (Figure 5). Composite contours are rare. As I have already mentioned, form 9 appears only in

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the Una Style and seems to be a late borrowing from European pottery, and form 5 seems to have been borrowed from the Guarani. Complex contours are completely absent.

The small number of sherds in the habitation sites indicate that vessels were rare in the villages. Moreover, about half of the sherds of the Pedra do Caboclo and Una styles have been found in burial sites in caves, which further indicates that pottery was not very important for culinary use. However, just as in Ananatuba, vessels in the Pedra do Caboclo and Una Styles are medium-sized and therefore could actually have been used for cooking. On the other hand, most vessels in the Jataí, Itararé, Taquara, and Taquaruçu Styles are very small, which indicates that even if these groups were fully agricultural from early ceramic or even preceramic times, boiled foods were not important. Instead, other cooking methods, such as earth ovens, must have been used.

Griddles or platters of form 8 are absent or rare and very small, being more like saucers. Flat-bottomed bowls or basins with strongly reinforced rims are also absent; therefore, we can say that the absence of unleavened bread or manioc waffers (beiju), and of manioc flour (farinha) characterized the patterns of food production of these earlier inhabitants of Eastern Brazil.

Pottery assumed progressively more importance. Vessel sizes also increase in some late expressions of the tradition, such the large jars of the Pedra do Caboclo Style, and the large bowls of the Taquaruçu Style. These larger vessels were probably related to an intensification of agricultural practices under Tupinambá or Guarani pressures. As the

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Amazonians preempted much of the hunting and gathering grounds of the earlier inhabitants, an intensification of the more productive economic patterns might be expected.

Occasional finds of ceramic spindlewhorls indicate that some of these groups produced textiles. Burials wrapped in burned textiles have been found, some of them early, possibly preceramic (Pajeú and Gongo) and others possibly late (Mucuri and Gentio). Beautifully polished crescent-shaped axes have been found in or nearby sites of the tradition, and have been generally attributed to the makers of the pottery.

Burial patterns changed through time and space, but the order in which this happened is not yet clear. Small caves and rockshelters were generally used everywhere. The earliest kind of burial found from Northeastern Brazil to near the Río de Janeiro was direct interment, extended or flexed, sometimes burned, but almost always wrapped in coarse textiles (e.g., Pindorama, Pajeú, Machados, and Gongo, between ca. 1000 and 100 B.C.). This pattern probably dates back to perceramic times. Another early kind of burial was in a squatting position with the head covered by an inverted pot (e.g., Gongo, 50-250 B.C.).

After ca. A.D. 500 there were secondary cremated burials in pots of the Pedra do Caboclo and Una Styles, deposited with grave offerings on ledges in rockshelters or caves. The pots were somewhat larger in the former than in the later style, which has only small vessels. These pot burials, however, could be attributed to the influence of the Tupinambá who appear in the area about the same time as the earliest of the burials.

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From the Tropic of Capricorn southward, burials in earth mounds, sometimes surrounded by earth walls, are fairly common from early times onward (A.D. 750-850; Cantu, Candói, Caxias, and Eldoradense), even if they are not obviously related to any pottery (e.g., Andirá, and at Ijuí). Direct extended burials in caves also occur (e.g., Caí; A.D. 1100-1500).

8.1.2 Ethnic and Ecological Concomitants of the Pedra do Caboclo Ceramic Tradition

Steward has pointed out that, in many cases, linguistic distribution suggests cultural history (Steward and Faron 1959:379). I will begin with the assumption that those groups who held sway over the largest and the most continuous areas ought to have been the last to arrive. This principle is exemplified by the large and continuous areas occupied respectively, by the Guarani and the Tupinambá. On the other hand, the earliest settlers, swamped by the newcomers, should now occupy the smaller, less desirable, and dispersed patches, representing refuge areas.

Most of the archaeological ceramics of Eastern South America, aside from those of the Guarani and Tupinambá, lasted until historic times; therefore, it should not be too difficult to relate them to known historic groups. Once the direct historical approach has been implemented, it is then possible to work backwards to prehistoric times. However, amazingly little precise information is preserved concerning the location of the aboriginal groups of Eastern South America at contact times, and there is little detailed ethnography on most of these groups. Maps organized by investigators such as Nimuendajú (Lowie

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1946), Mason (1948), Loukotka (1969) and Rowe (1973) agree only in general terms, in part because the location of these groups had changed through the more than 400 years, since the beginning of the sixteenth century. Predictably, groups such as those Troike and Lathrap (pers. com. 1983) call the Ancient East Brazilians, who were in all likelihood the earliest inhabitants, have been pushed from much of the former territory into discontinuous pockets or refugee areas as a result of being overrun by the invasions of the Guarani, Tupinambá, Gê-proper, and Cariri.

It is clear, for instance, that the sites of the Pedra do Caboclo Style in Notheastern Brazil are in the area formerly occupied by the Shurucu, whereas the Papeba sites are on former Tarariú territory. The one known site with Pajeú pottery is in Pancararu territory.

Most of the Una Style sites are found in areas that were, in the sixteenth and seventeenth centuries, occupied by the Goitacá, the same Indians described in the eighteenth and nineteenth centuries as Purí, Coroado, and Coropó; a few of them are found in areas said to have been occupied by the Mashacali or the Camacan (e.g., Lapa Pequena), or by the Guayaná (e.g., Jabaquara and Piumhí of the Mogi-Guaçu).

All those groups were agriculturalists; their pottery has been described and illustrated by Eschwege (1818:242), Wied-Neuwied ([1828] 1940:38), Ehrenreich (1886), and Métraux (1929; 1946). Moreover, some of their vessels have been compared to the sapucaia fruit (Lecythis ollaria), whose oval outline is actually very similar to form 2 (Figure 5), which is typical of the tradition. This is one more detail warranting this attribution (Alvim and Dias 1973:72; Dias 1976-1977, 1979:18).

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There have also been attempts to demonstrate relationships between skeletal material from Mucuri complex burials and the morphology of modern Purí groups (Alvim and Dias 1973:72; Alvim, Dias, and Toribio 1977).

Some sites on the Upper São Francisco (e.g., Piumhí and Unaí), and between the Paranaiba and the headwaters of the Araguaia (e.g., Jataí), are in Southern Cayapó territory. Because the Southern Cayapó were, in all likelihood, late arrivals in that area (ca. A.D. 900-1100), they can be dismissed as makers of the Jataí Style pottery. It is thus entirely possible that the ancestors of the historic Goitacá, Camacan, and other related groups previously occupied these areas previously. The Camacan were still found in historic times on the Upper São Francisco.

Farther south, in the southern section of the uplands, the area of dispersion of the Itararé Style pottery coincides closely with the area occupied by the Guayaná, whereas the Taquara Style sites coincide with the area formerly occupied by the Aweikoma or Botocudo, both being speakers of Caingang, a Macro-Gê language.

The Shurucu and Pancararu are thought to form isolated linguistic families. The Mashacali, Camacan, and Goitacá (Purí-Coroado and Coropó) have been considered Macro-Gê (e.g., Greenberg 1960:794) and if we follow Ehrenreich (in Lowie 1946:536-566), Tarariú is also similarly related. But for the present, all these languages had best be left as Ancient East Brazilian (in Troike's terminology) for reasons already stated.

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On the other hand, the Caingang or Southern Gê, including the Guayaná and Aweikoma, are clearly part of the Macro-Gê group of languages. In Loukotka's (1969) classification all these languages, including also Shurucu, are part of the same group, composed of what he called the languages of the Paleo-American Tribes. The areas formerly occupied by these languages clearly indicate that their speakers had been surrounded and isolated by the Guarani invasions (in the case of the Caingang) or by the Tupinambá invasions (in the case of the Ancient East Brazilians).

I have argued that the ceramics of the Pedra do Caboclo Tradition were produced, in Northeastern and Eastern Brazil, by speakers of languages of the Ancient East Brazilian group, and in Southern Brazil by speakers of languages of the Macro-Gê group. Furthermore, the continuity of the lithic materials from preceramic to ceramic times indicates that these ceramics were successively adopted by groups who were already in place. If we accept this scenario, then these groups, the possessors of the lithic industries related to the Itaparica and Humaitá Traditions, must have been the ancestors of the Ancient East Brazilians and the Macro-Gê, respectively. The available C^{14} dates for preceramic complexes suggests that the Ancient East Brazilians occupied Notheastern Brazil, in the Bom Jardim Subtradition of the Itaparica lithic tradition, from ca. 15,000 B.C. or, at the very latest, 9000 B.C.

The differences between the Itaparica and Humaitá lithic traditions have not yet been fully accounted for, but Hurt (1980) accepts both and thinks that the latter is derived from the former. Because the Itaparica Tradition is found in Northeastern and Eastern Brazil, and the

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Humaitá Tradition is found in Southern Brazil, there is a strong suggestion that the whole area was settled by groups moving from north to south. Moreover, the fact that from earliest times the Ancient East Brazilians and the Macro-Gê already possessed distinct if related lithic industries strongly suggests that they were separated 5000-4000 B.C. Around that time, the Humaitá Tradition came into being in Southern Brazil as a branch of the Itaparica Tradition farther to the north. I will argue that the same physical separation and isolation of the speakers, which produced the separation of the languages, also contributed to the branching of the lithic industries.

This said, we will have to envisage a time when the Guarani, the Tupinambá, the Gê-proper, and Cariri had not yet arrived and the bulk of Eastern Brazil was occupied by preceramic groups speaking languages that have been classified by Troike and Lathrap (pers. com. 1982) in the Ancient East Brazilian and Macro-Gê linguistic stocks. The preceramic groups developing there through many millenia had a long time to adapt to environments as different as the semi-dry areas of Northeastern Brazil, the tropical wet-and-dry cerrados of East-Central Brazil, the coastal rain forests, the xerophylous beach formations, and the subtropical broadleaf-coniferous forests of the southern section of the Brazilian Uplands.

It is possible that these preceramic groups already had some kind of incipient agriculture. Tubers such as yams (Dioscorea trifida or D. brasiliensis cará) and sweet potatoes (Ipomea batatas) were admittedly cultivated for millenia. The earlier occupants of Eastern South America were described in such models as Menghin's (1955-56,

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19757a, 1957b) as hunters-planters because of the Altoparanaense "choppers" that he believed to have been used as hoes for planting. The Altoparanaense industry, also described as the Tamanduá Subtradition of the Humaitá Tradition (Hurt 1980) is found only in the tropical forest that now occupies the southwestern section of the uplands. Nevertheless, stone hoes were not necessary to undertake the kind of farming operations that were easily performed by the historic aboriginal populations with only a crude dibble. Maize cultivation has been demonstrated to be very old; maize cobs and kernals have been found in preceramic levels dated ca. 3000 B.C. in the Gentio Cave on the headwaters of the Paracatu, a western tributary of the Upper São Francisco (Dias 1976-1977; and pers. com. in Schmitz 1982:218). Maize was probably consumed as a vegetable when still green, rather than stored as a year-round staple.

Agriculture also may be also surmised from, among other finds, polished stone celts in the Cajaiba shellmounds and stone mortars and pestles in Pequere shellmounds. The kind of agriculture developed by these preceramic groups, in all likelihood, was not very intensive and there would have been a corresponding emphasis on other food-gathering activities.

Palm nut gathering was prevalent everywhere, as attested by nut breakers with pitted or polished depressions, found in most sites of that time, as well as by the occasional finds of charred nuts. The distribution of the important palms may have been modified by human activity, as we know was the case with the peach palm, pejibaya. In the southern section of the uplands the gathering of Araucaria pine nuts or

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pinhão, is also likely a very old practice. The collection of shellfish in coastal or riverine sites likewise stems from preceramic times.

Coarse textiles made from wild plant fibers, found in Northeastern Brazil (e.g., Pajeú and Gongo), could be attributed to preceramic or at least protoceramic times.

Both archaeological and ethnographic evidence suggests that the makers of the pottery of the Pedra do Caboclo Tradition formed small groups, in most cases of probably no more than 40 people. As among the modern "marginal" populations of Eastern Brazil, there was probably an extreme separatism, each band claiming definite territories. Villages were small and very mobile. Only in some cases is there evidence of reoccupation of sites, with midden accumulation. More conspicuous are the pit-houses, which represent an adaptation to the lower winter temperatures at the higher elevations of the southern section of the uplands. These pit-houses were often reoccupied through time, marking the characteristic Gê pattern of life: a central village occupied year round by part of the population and a series of small camps occupied seasonally by the more mobile and physically vigorous members of the population.

Most of the pre-Tupinamba and pre-Guarani inhabitants of Eastern Brazil were probably agriculturalists. As an example, the Tarariú of Northeastern Brazil planted maize, beans, gourds, tobacco, and probably other cultigens near their settlements in the interior, seasonally moving to the seashore in search of palm nuts. A root called arrohu was baked and made into bread; another root, maybe yam or cará, was chewed to make an alcoholic beverage (Lowie 1946:564).

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Most scholars have attributed farming among these to influences from the Tupinambá or the Guarani. A more careful analysis indicates that such was not the case because, in most instances, maize, cará, and sweet potatoes were cultivated, rather than manioc, the staple of full-blown tropical forest agriculture (Lathrap 1962). A very early and distinctly cast Brazilian pattern of agriculture is thus strongly indicated.

That the Ancient East Brazilians were agriculturalists is further attested by the polished stone celts found in the Pedra do Caboclo Tradition sites in Northeastern and Eastern Brazil, both in the interior as well as on the coast (e.g., Papeba, Piumhí, and Tangui).

The Ancient East Brazilians, relying on vegetatively reproduced crops--cará and sweet potatoes--that are high in calories but low in protein and other essential nutrients, were forced to hunt extensively. This partial dependence on hunting led most scholars to characterize these effective ecotone cultivators as simple hunters and gatherers, an opinion that was codified in the organization of the Handbook of South American Indians.

In this connection it is important to mention that vessels forms that were medium-sized among the Ancient East Brazilians (Pedra do Caboclo and Una Styles) became very small once they spread all the way south to the Caingang (Itararé, Jataí, Taquara, and Taquaruçu Styles). In all likelihood this means that boiling food was less important for them, with an even greater reliance on the earth oven.

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8.2 The Gê-Proper and the Cariri

8.2.1 The Spread of the Pottery of the Aratú Subtradition of the Pedra do Caboclo Ceramic Tradition

The next pottery to appear in Eastern Brazil was that described under the heading of the Aratú Subtradition. As we can clearly see in Figure 8, the sets of vessel forms of this pottery are clearly related to those of the Pedra do Caboclo Tradition. The main difference is that Pedra do Caboclo vessels are generally small, and the corresponding sets of Aratú forms begin with the largest dimensions of the forms and become even larger. This observation has prompted me to describe the Aratú pottery as a subtradition of the Pedra do Caboclo Tradition.

The styles included in the Aratú Subtradition show an outstanding homogeneity over a huge area that extends from the Lower São Francisco southward to the Río Grande (on the Upper Paraná basin) and from the headwaters of the Araguaia eastward to the coast.

The earliest C^{14} dates from Aratú Subtradtion sites are later than those for the earliest pottery of the other Pedra do Caboclo Tradition sites, whatever the style. The earliest dates throughout the enormous area of dispersion of the subtradition are clustered together in the time range between A.D. 700-900, though there are some slight differences (Figure 9). The earliest dates for sites are: in the interior of Northeastern Brazil, A.D. 650-900 (Figure 9:2); on the Upper Paranaiba, A.D. 700-900 (6, 8); on the coast of Northeastern and Eastern Brazil, A.D. 800-950 (3). For those sites found farther south in the interior, the earliest dates are A.D. 950-1150 (18, 19), and for those on the coast they are A.D. 1300-1400.

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As we can see, the beginning dates are only slightly earlier for the northernmost sites than for the southernmost ones, and the sites on the interior are also slightly earlier than those on the coast.

The fact that the same pottery appears so suddenly in points so far apart strongly suggests that, instead of being diffused from group to group--as the other Pedra do Caboclo Tradition styles probably were--the spread of the Aratú Subtradition resulted from massive movements of peoples in a kind of outward colonization. The diachronic differences just described furthermore suggest that these groups advanced generally from the interior to the coast, and from north to south, up the São Francisco Valley as well as down the coast.

The Aratú Subtradition persisted into late historic times--that is, the seventeenth and eighteenth centuries--over most of its large, former area of dispersion, but on the coast of Northeastern Brazil it was superseded by the Tupinambá pottery. On the headwaters of the Araguaia, from ca. A.D. 1200 on, the Aratú pottery (Mossâmedes) began to show such a strong admixture with that of the Urú Tradition that much of the material previously judged to have belonged to the former have now been ascribed to the latter.

Except for Mossâmedes and related pottery, information is very incomplete about the sets of vessels found in many of the other sites of the Aratú Subtradition. The large size attained by many of the most characteristic vessels, such as deep conical bowls (Figure 8: 16) and globular constricted pots with direct or everted rims (1 and 7), indicates the reliance of the makers of this pottery on boiled or stewed foods. This development of boiling strongly suggests the extensive use

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of cultivated vegetable foods. On the other hand, large pear-shaped jars with constricted mouths (2 and 3) look suspiciously like those used by the Tupinambá and Guarani to brew beer from sweet manioc.

Medium-sized griddles (8) even if apparently not found in all sites, are erratically distributed over all the area occupied by the subtradition, except for the headwaters of the Araguaia (e.g., Mossâmedes and Itaberaí). This indicates a degree of reliance on bitter manioc prepared as unleavened bread or waffers (beiju), at least for some groups, in certain regions or during particular seasons of the year. Most of the pottery in the Aratú Subtradition is plain and almost all decoration and pseudo-decoration can be traced back to influences from either Tupinambá or Guarani pottery.

8.2.2 Ethnic and Ecological Concomitants of the Aratú Ceramic Subtradition

In order discover who made this pottery--keeping in mind what I have said about the possibility of relating archaeological pottery to known historic groups--I will now work backwards in time.

The ceramic industries of the Aratú Subtradition in Northeastern Brazil persisted up to late prehistoric times, when they had contacts with the Tupinambá ceramics on the coast. They must therefore represent the pottery of the known historic groups who were occupying the area before the arrival of the Tupinambá, and survived until late in neighboring areas.

We know enough about the Tupinambá pottery to discount the possibility that the wares of the Aratú Subtradition could be Tupinambá. Next to the Tupinambá, who were the last to arrive, the Cariri are the

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ones who occupied the largest continuous area in Northeastern Brazil, and they and other "Tapuya" (Lowie 1946a:553-556) also were known to have occupied the coast before being pushed to the interior by the Tupinambá. The distribution of the ceramics of the Aratú Subtradition east of the São Francisco, in Bahia and neighbouring States to the north of that river (Figure 7: A), coincides generally with the area occupied by the Cariri, including those parts of the coast that were occupied by the Shurucu, whose wares were said to correspond closely to the modern Cariri pottery (Lowie 1946a:558). Modern Cariri pottery had its base modeled from a lump of clay and its upper part was coiled and corrugated in the same way as the vessels of the later phases of the Aratú Subtradition, such as Itanhém on the coast.

The Cariri had pottery and were fully agricultural, growing manioc, maize, beans and cotton; therefore it is easy to attribute to them the large vessels of the Aratú Subtradition. However, down the coast south of Bahia de Todos os Santos, the area occupied by sites with pottery in the same subtradition such as Itanhém, Itaúnas, and Jacareípe (IN, IU, and JC), coincides generally with the area occupied in early historic times by the Botocudo (Gueren and Aimoré) the Mashacali, and the Patasho. The Botocudo have been described as hunters and gatherers who did not have pottery (Métraux 1946:532). The modern Mashacali wares are described as small, plain, globular pots (Métraux and Nimuendajú 1946:543). Therefore, either the agricultural Cariri extended farther south along the coast, or the Botocudo, Mashacali, or Patasho had pottery, at least until protohistoric times--a far less plausible interpretation.

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West of the São Francisco the Aratú pottery is found in the territory formerly occupied by such Gê-speaking groups as the Central Gê: Acroa and Sherente-Shavant (Figure 7: Aratú, A). In the eastern and central sections of the uplands the distribution of other pottery of the same subtradition--Sapucaí, Jaraguá, Itaci, Ibiraci, Itaberaí, Cachoeira, Urú, Uruaçu, and Jaupaci (Figure 7: S, J, IC, IR, M, IB, CA, U, UÇ, and J)--clearly coincides with the large territory occupied in historic times by the Gê speaking groups, called the Southern Cayapó and Catagua (cf. maps compiled by Loukotka [1939, 1968], Nimuendajú [Lowie 1946a], Steward and Mason [Mason 1948), and Rowe [1973]).

Little is known about the Southern Cayapó, who were first mentioned only ca. A.D. 1750 (Lowie 1946a:519), nor is there any reference to a Cayapó pottery. Because the Aratú Subtradition persisted there until it shows contacts with that of the Tupinambá in late prehistoric times (A.D. 1300-1400) and apparently lasted up until late historic times (as for instance at São Jose de Mossâmedes, in the seventeenth and eighteenth centuries) and because no other indigenous group is known to have occupied <u>all</u> that area in historic times, the Aratú Subtradition in that area must be attributed to the Cayapó.

The Sapucaí pottery of the headwaters of the Rio Grande (S) has been related to the historic Catagua, another Gê speaking group (Dias and Carvalho 1978:239). Moreover, European-influenced clay elbow pipes are plentiful in Mossâmedes sites apparently related to the Mission of São Jose de Mossâmedes, where the last Cayapo ´were living ca. A.D. 1780 (Lowie 1946a:478, 519).

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I anticipate that this attribution of the Aratú Subtradition to the Gê and Cariri will be criticized on the grounds that the Gê did not have pottery. The equation Gê = non-potters has long been reiterated in the literature (e.g., Lowie 1946a:479). The only cooking techniques listed for the Northwestern and Central Gê and the Southern Cayapó are steaming or baking in earth ovens, broiling on a spit, roasting on a grate, or stone-boiling in a pit filled with water. There is no mention of cooking-pots or, for that matter, urn burials; pottery-making is sometimes said to be absent, large gourds being used to hold water.

Now I will review the evidence in favor of the attribution. As I have pointed out above, the area of distribution of the Aratú Subtradition sites maps onto that occupied by the Gê and Cariri in historic times, and the latter did have pottery. We can exclude the possibility that the Aratú Subtradition represents the pottery of the Tupinambá, whose sites are found throughout most of the same area. It could not be said either that the pottery of the Aratú Subtradition was left by some earlier peoples than the Gê and Cariri, because: (1) it was made by groups with whom the Tupinambá had had contacts and who were superseded by them in late prehistoric times, as was the case with the Cariri; and, (2) it lasted up to late historic times and in those cases where it is possible to assign the historic sites to a specific aboriginal group it is, without exception, some Gê group.

Who else could then have produced the pottery that I call the Aratú Subtradition? So many sites with such abundant pottery, distributed througout so large an area, cannot be attributed to any small localized group.

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There are some more congruences. On the interior, most of the sites are found in the gallery forest or in large "islands" of humid forest amidst the cerrado environment, this being the traditional habitat of the Gê and where they do all their farming. Where it is possible to reconstruct them (e.g., in Bahia and Goiás) villages are found to be composed of up to 8 or 9 houses arranged around a circular plaza. Polished, crescent-shaped stone axes and T-shapped lip-plugs or tembetá, found in Mossâmedes, Urú, Sapucaí, Jaraguá, and Itaci are known to have been used by the Gê. Even if the Gê were said not to have practiced loom weaving, cotton was grown and spun into thread with either stone or clay spindle whorls, and these are commonly found in Aratú Subtradition sites. Moreover, the Cariri are credited with having a simple loom.

How, then, can the discrepancies be explained? Actually the Gê, even if there is some mention of them in the seventeenth or eighteenth centuries, have been described in detail only from the beginning of the nineteenth century onward (e.g., Ribeiro 1800-1823; Spix and Martius 1818-1819; Pohl 1818-1819; Saint Hilaire 1830-1851; Castelnau 1844; cf. Lowie 1946a:480). Thus, descriptions begin only after about three centuries of slave-raiding and massacre, during which their culture was changed drastically. Contacts with the Tupinambá could also have disrupted their culture.

Accordingly, revisions must be made in our existing characterization of the Gê and Cariri. For instance, urn burials were probably originally as widespread among them as among the Guarani, and probably more so than among the Tupinambá, who used only secondary basin burials, not primary urn burials.

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The conventional wisdom of scholarship has been that the Gê were there from earliest times. We have already seen that this is true of the Ancient East Brazilians and, to a lesser degree, of the Caingang. These groups had a well defined lithic tradition that was probably in situ long before the spread of any pottery into East Brazil. However, it is not true of of the Gê-proper or the Cariri, because there are no known clear preceramic antecedents of their lithic industries in their areas before their pottery appears.

The Curaça pottery, dated A.D. 900-1150, as well as the Cabrobó pottery of the Lower São Francisco, not far north from the northernmost known Aratú sites (Figure 7: CU and CB), are also in former Cariri territory, and appear in some way related to the Aratú Subtradition.

On the basis of these arguments I feel justified in attributing to the Cariri and Gê-proper all of what has been described as the Aratú, Sapucaí, and Cachoeira Traditions, as well as part of what has been described as the Urú Tradition--in all these cases using the taxonomic terminology of PROPANA--all of which I have subsumed in the Aratú Subtradition of the Pedra do Caboclo Tradition.

Loukotka (1969) classified Kiriri or Cariri, as well as Ze, that is, Northwestern and Central Gê, among what he called the languages of the Paleo-American Tribes. Greenberg (1960:794) classifies Cariri in the Equatorial group (D) of his Andean-Equatorial phylum (II), even though its relationship to Gê-proper is clear, as indicated by Rodrigues (pers. com.) as well as by Troike and Lathrap (pers. com. 1983).

The area of dispersion of the Aratú Subtradition west of the São Francisco generally coincides with the tree savannas or cerrados, and

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the dry forests or cerradoes of Central Brazil. These are characterized by "islands" of humid forest on more rugged and elevated zones, as well as by gallery forests along the rivers, and it is precisely this area that constitutes the habitat of the Gê speaking peoples (e.g., Schwerin (1970). The same pottery, therefore, ought to be found throughout the territories historically occupied by the Gê, that is, farther northward into the Parnaiba Valley, and westward into the area between the Tapajós and the Tocantins. This hypothesis appears to be confirmed by the presence of the Cururu pottery on the Middle Tapajós.

On the other hand, the territories occupied by the Cariri and related groups map onto those parts of the interior of Northeastern Brazil covered by thorny tree savannas or caatinga arborea. Along the coast their territories coincide with the gradation from the dry forest or agreste to the rain forests (mata atlântica and hileia bahiana). It appears that more of the sites are concentrated in the latter than in the former vegetation zone.

The cerrado habitats are characterized by low dry-season rainfall, poor soils, and scattered tree vegetation interrupted by sinuous bands of gallery forests along watercourses.

Some people, such as Gross (1974:537), argue that agriculture was practiced by most of the cerrado groups, but that it was restricted to the limited gallery forest lands and thus was not productive enough to support large settled groups the year round. Accordingly, many of these populations were sedentary only for that part of the year that included harvest time. For the rest of the year, villages dispersed into smaller hunting-and-gathering units in order to exploit game resources. The

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fact that many villages could be very large, up to 1200 people, is worth attention. On the other hand, it must be pointed out that the mobility period during the dry season was sometimes very short and certainly involved only the most physically actice members of the population. It is not known to what extent they had to move because of low agriculture productivity. Some people believe that most cerrado peoples could stay in the village the year round if they wanted to, and that only internal frictions prompted them to move in the dry season. Social structure was not able to integrate the larger groups throughout the year, and gave way at some point.

A characteristic Gê settlement pattern is that formed by a large central village and small seasonal encampment sites. This pattern is replicated in Aratú Subtradition village sites, at least in Bahia (Aratú), Minas Gerais (Sapucaí, Jaraguá, and Itaci), and Goiás (Mossâmedes). The distribution of surface sherds in those sites suggests a village plan of up to 9 large houses arranged in a circle around a central plaza. Another Gê characteristic replicated in the Aratú Subtradition is the existence of large sites within humid forest "islands", with smaller sites within the gallery forests along watercourses that cross through the cerrado. These latter sites often yield impoverished versions of the pottery, with respect to vessel sizes and the set of vessel forms. The proximity to the transition between the humid forest and the cerrado, or in the case of Minas Gerais, the open grasslands at higher elevation, also suggests the ecotone adaptation so typically Gê.

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Schwerin (1970:14) has called attention to the improper classification of the Gê-proper as "marginal", "marginal tribes", or "incipient agriculturalists". He attributes this to the Gê being viewed by the Europeans through the eyes of the Tupinambá, who indiscriminately lumped them with other non-Tupian enemy tribes as "Tapuya" (see also Lowie 1946:553-556). Actually, instead of being pushed from the valley bottoms to form small "islands" on the uplands--as the Ancient East Brazilians archaeologically represented by the Pedra do Caboclo ceramic tradition were--the Gê-proper occupied all the cerrado area of Central Brazil; in no sense is their distribution "marginal".

As I read it, Schwerin's hypothetical reconstruction of Gê cultural history fits well with at least part of the archaeological data. The Gê began to use Amazonian plants and agricultural techniques somewhere between the middle reaches of the Tapajós and Xingu, on the boundary between Amazonia and Eastern Brazil, that is, between the tropical rain forest and the cerrado. From there the only routes of expansion open to them led south and eastward, and the Gê therefore moved on until they occupied almost the whole of the cerrado (Schwerin 1970:map I). Therefore, the culture of the Gê-proper represents not "marginal" survival but, rather, a moderately late adaptation of the Amazonian pattern of agriculture to the extensive ectone niche offered by the cerrado.

The earlier adaptation, which diffused among the Ancient East Brazilian and the Caingang (Macro-Gê) was, as we have already seen, probably based on maize, sweet potatoes, and cará. The later adaptation brought by the Gê-proper and the Cariri probably had new cultigens, such

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as manioc. Moreover, the Gê-proper or the Cariri probably developed the cultivation of A. Cissus sp with enlarged starchy tendrils on their own.

In the model I am presenting here, I suggest that it was this later adaptation that generated demographic pressures prompting, in turn, the mass movements of the Gê and Cariri. These filled the vacant ecological niche represented by the possibility of employing the new pattern of agriculture in the vast cerrado area, which was hitherto exploited only by the earlier and simpler agriculture of the Ancient East Brazilians, or only by hunting and gathering.

I should also point out that at the time the Gê-proper received agriculture, they also received some of the Amazonian sets of vessel shapes. The Cururu pottery of the Middle Tapajós, found near the boundary of the cerrado, exactly where Schwerin places the Gê center of dispersion (Figure 7: CU), even if still undated, represents something very like the kind of pottery the Gê-proper should have received before spreading through Eastern South America.

During the transition from preceramic to ceramic, we can observe how lithic industries decline both in quantity and quality after pottery was adopted. This decline continues in such a way that there are almost no lithic artifacts in the sites of the late Aratú Subtradition, except for the highly polished stone crescent-shaped axes. Lithic artifacts are also almost nonexistent in the sites of the Urú Tradition, represented by the Carajá. This is what would be expected of groups coming out of Amazonia where stone artifacts were never important because of the lack of stone and the emphasis on cane, palm wood, and bone to overcome that environmental deficiency.

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Another question that might be raised is how is it that the same pottery apparently can be related to the Gê-proper and Cariri in Northeastern Brazil and, at the same time, be related to the Southern Cayapó, in the eastern and central sections of the uplands. The best explanation is that the pottery of the Aratú Subtradition developed from the same sources as the Pedra do Caboclo Tradition, but somewhat later, and somewhere northwest of Eastern South America, on the southern boundary of Amazonia. It could then have been brought south, initially following two parallel routes, which can be reconstructed in the following way (Figure 7):

1. Between the São Francisco and the Tocantins the pottery of the Aratú Subtradition was carried by massive invasions of Central and Northwestern Gê groups, ancestors of the modern Acroa, Shacriaba, Sherente-Shavante, Southern Cayapó, and Catagua. Sites of these groups are found west of the Middle São Francisco by, at least A.D. 700-900 (Figure 7: Aratú; Figure 9: 2). Farther southwest, on the headwaters of the Tocantins and of the Araguaia, near the central section of the uplands, these same groups began settling ca. A.D. 700-900. On the headwaters of the Paranaiba, their first settlements date from ca. A.D. 950-1150 (Figure 7: M, CA, and IB; Figure 9: 6-9). These Gê groups advanced all the way to the area between the headwaters of the São Francisco and of the Rio Grande (Upper Paraná), at the beginning of the southern section of the uplands, where their earliest dated settlements are in the time

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range A.D. 950-1150 (Figure 7: IR, IC, S, J, and LS; Figure 9: 18, 19). In so doing, the Gê occupied areas previously held by those Ancient Eastern Brazilian groups who, centuries before, had adopted such Pedra do Caboclo Tradition pottery as those defined by the Jataí and Una styles. All these groups, except the Jataí potters, were apparently wiped out by historic times.

The spread of the Aratú Subtradition and the advance of the relatively late wave of southward moving Gê speakers apparently did not proceed farther south than the Rio Grande Valley (Figure 7: A^1). This was because, at the relatively late time of their arrival (ca. A.D. 1000), they found the Guarani already in possession of the valleys of all the tributaries of the left bank of the Upper Paraná, from the Tietê southward.

Sometime between A.D. 1100-1250 the Carajá, archaeologically represented by what is called the Urú Tradition, advanced from the north up the Araguaia. Beginning ca. A.D. 1300, Carajá influences began to be felt in the Aratú Subtradition sites of the area (e.g., at Jaupaci, Urú, and Uruaçu). These dates imply a "carajaization" of some of the Southern Cayapó groups, who afterwards moved from the headwaters of the Araguaia northeastward to those of the Tocantins (Figure 7: Urú, AR, I, UÇ, J, and U).

Later, probably in the fifteenth century, the Tupinambá advanced up the São Francisco, crossing westward to the headwaters of the Araguaia (Ipora) (Figure 22: 28). Another Tupinambá branch possibly advanced around the end of the Serra da Mantiqueira, moving down the Sapucaí River (Belvedere). Contacts between the Southern Cayapó and

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the Guarani or the Tupinambá occurred along that extended meeting line, at least on the headwaters of the Araguaia, and on the headwaters of the Rio Grande (Figure 7: M and J). Farther south, Tupinambá and Guarani sites have been found on the Pardo and Turvo Rivers, on the Río Grande drainage, near sites bearing pottery of the Aratú Subtradition (A^1).

2. East of the Middle São Francisco (Figure 7: A and IN) the pottery of the Aratú Subtradition was apparently adopted by the Cariri, and perhaps by other related groups who were migrating at the same time and in the same direction, or who were pushed eastward by the migrating Gê groups.

The Aratú Subtradition arrived on the coast and the Cariri occupied most of the northern section of Eastern Brazil previously held by Ancient East Brazilian groups such as the Tarariú, Pancararu, and Shurucu who, more than one millennium before, had adopted the earliest pottery of the Pedra do Caboclo Tradition (Figure 7: A, CB, and CU). The Cariri also moved southward along the coast occupying some of the areas previously held by bearers of other Pedra do Caboclo Tradition pottery, such as the Goitacá (GU, IU, and JC). All these earlier inhabitants either disappeared, being destroyed or absorbed, or were pushed into rugged upland areas in the interior.

The Cariri must have arrived on the coast of Northeastern Brazil sometime before the arrival of the Tupinambá. The C^{14} dates suggest ca. A.D. 800-950 for this (Figure 9: 3 and 10), but because the arrival of the Tupinambá in that area has been dated in the same

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time range (ca. A.D. 800-900) (Figure 17: 21), the arrival of the Cariri on the coast must be pushed further back than the known C^{14} dates suggest, perhaps to long before A.D. 500.

During their southward advance down the coast, the Tupinambá pushed the bearers of the pottery of the Aratú Subtradition to their southernmost limits and into areas formerly occupied by the Goitacá (Figure 7: IU and JC). The pottery of the late dated Itaúnas and Jacareípe sites, some of the former being early historic settlements of the seventeenth century, shows strong acculturation with Tupinambá pottery, at least with regard to decorative or pseudo-decorative techniques, which are unexpectedly elaborate.

8.3 The Proto-Guaycuruans and Charruans

8.3.1 The Spread of the Pottery of the Palo Blanco Ceramic Tradition

I believe that the pottery of what I will call the Palo Blanco Tradition came from Amazonia to the grasslands of Southern Brazil, Uruguay, and Northeastern Argentina by 3000 B.C., moving down the Paraná-Paraguay river system to the Río de La Plata estuary (Figures 10 and 12). Afterwards, pottery of that tradition spread all over the Lower Paraná and the Lower and Middle Uruguay, as well as over the adjacent coastal areas. These ceramics were progressively adopted from ca. 1000 B.C. onwards by preceramic groups such as the ancestors of the Guaycuruans, who were already occupying the Middle Uruguay from at least 7000 B.C. in sites of what is called the Itaqui lithic tradition.

This reccurrent pattern of adoption of pottery by preceramic peoples is clear on the Middle Uruguay, where the preceramic phases Itaqui and

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La Paloma were followed, starting around 300-500 B.C., by the ceramic phases El Dorado and Ibirapuitã. The same is also probably true for the headwaters of the Río Negro, Ibicuí, and Vacacaí, where the preceramic phase Piraçã was followed by a pottery complex that is more conspicuous in open sites than in the mounds proper. The coastal sandbars, being of recent formation, were occupied only later by preceramic peoples, perhaps from 500 B.C. onwards. There, the same process recurs, from perhaps 300 B.C. onwards, in the consecutive Chuí - Cerritos, Lagoa - Torotama, and Patos - Lower Camaquã phases, in which the first is always preceramic and the second always has pottery of the Vieira Tradition, but with continuities in the lithic tradition.

As we have already seen, the lithic materials of all the previously cited preceramic phases are progressively more impoverished versions of those artifacts as compared with what was probably their earliest expression, the Itaqui Phase of the Middle Uruguay, that dates from around 7000 B.C. The same can be said of the lithic artifacts that accompany the following ceramic phases.

Even farther south, in east-central La Pampa and the Atlantic coast of southern Buenos Aires, the same lithic artifacts have been described, even if there is as yet no stratigrapic evidence confirming that they are earlier than the ceramics of the Entrerríana Style also found there. On the other hand, on the Río de La Plata estuary and on the Lower Paraná, there is no evidence of a preceramic on to which the pottery of both the Entrerríana and the Riberefios plásticos styles could have been grafted. Instead, some sites of these two styles are characterized by a very similar bone industry.

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We can point to at least four different lines of development followed by the Palo Blanco Tradition:

1. The Palo Blanco pottery found on the shores of the Río de La Plata estuary from 3000 B.C. onwards is almost completely plain, but a very simple incised and punctate decoration is found on a few sherds.
2. Subsequently, it is possible that sometime before 500 B.C. the same pottery had spread northwestward up the Salado River to the Chaco-Santiagueño (Figures 10 and 12), being the source of the simpler incised and punctate pottery found there, such as Bislín or Antajé. Later, it possibly entered the Selvas Occidentales and the Valliserrana sub-area of the South Andean archaeological area, constituting the earliest ceramics there, as has been suggested by Gonzalez (1963) speculating on the origin of the Candelaria Style. Even further expansions, such as Wankaraní (Cultura de los Tumulos) (Kolata 1983:245) in the southern Titicaca Basin now seems probable. Ponce (1970) offers a particulrly strong argument for a total disjunction between the Wankaraní culture of the high grasslands and the Chiripa with its lake-side, bottom lands orientation. The Pacacocha Tradition in the Peruvian Montaña now also seems a probable branch of an Eastern Bolivian style in the Palo Blanco Tradition. The appearance of the Pacacocha Tradition marks the arrival of Panoan speakers in the Ucayali watershed (Myers 1970; Lathrap 1984).

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3. Sometime before 500 B.C., the pottery of the Palo Blanco Tradition also spread northward, following three routes (Figures 10 and 12):
   a. Up the Uruguay River, as far as the Ibicuí, and into the swampy area between the Uruguay and the Paraná (Figure 10: Sg, Ip, and Ib);
   b. Up the Río Negro, tributary of the Lower Uruguay, as far as its headwaters and those of the Ibicuí and Vacacaí (Yg, Vz, and Rn);
   c. Up the Atlantic coast of Uruguay and Southern Brazil, as far as the foothills of the uplands (bR, Cr, Bj, V, Tm, and Pt).

   In the cases when the pottery of the Palo Blanco Tradition was probably adopted by preexisting preceramic groups, all decoration progressively disappeares. However, on the Atlantic coast in the later part of Vieira Phase, after ca. A.D. 1000, a new decoration, probably influenced by the Guarani pottery and therefore showing only corrugations and punctations, was adopted.
4. By contrast, on both shores of the Río de La Plata estuary and on the Paraná Delta, even if most of the pottery is still plain, the simple incised and punctate designs of the Palo Blanco Tradition were developed, in the Entrerríana Style, into more complex decorative patterns, most of them executed in drag-and-jab incised lines.

The Entrerríana Style spread northward up the Paraná as far as the Lower Bermejo, near the mouth of the Paraguay, and also up the Uruguay, where its influence is detected at least as far as Salto Grande (Figure 10: Er). The Entrerríana pottery also spread southward to the Salado

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Basin, and reached eastern-central La Pampa and the Atlantic coast of southern Buenos Aires. Its influence was felt even farther south, along the Atlantic coast, on Northern Patagonia.

Later, probably sometime before A.D. 600, after the Entrerríana had felt the postulated influences of the Chaco-Santiagueño who were moving down the Salado River, they flourished on the Middle and Lower Paraná, north of the Delta. This finds expression in the even more complex pottery style of the Ribereños plásticos, characterized by modeled and incised zoomorphic adornos used as lugs or spouts, and by constricted mouth globular jars. The influence of the Ribereños plásticos spread from that area to the shores of the Río de La Plata estuary, and up the Uruguay to its middle reaches, there impinging on the remnants of the Entrerríana, because both lasted until historic times (Figure 10: Rp and Rp1- Rp6).

Possibly some Entrerríana and Ribereños plásticos influence also diffused northwestward up the Río Salado, back into Santiago del Estero, and westward, up the Río Tercero and the Río Cuarto, into Córdoba, and even up the Paraguay, the Bermejo, and the Pilomayo, into the Chaco (Figure 10).

The Palo Blanco Tradition appears to have spread slowly up the Uruguay drainage by being successively adopted by the preceramic inhabitants, and never spread farther up river than the Ibicuí and the Aguapey (Figure 10: Ib and Ip).

The spread of the Vieira Subtradition up the Atlantic coast of Uruguay and Southern Brazil seems also to have been slow, because it took from sometime before 300 B.C. to probably sometime after A.D. 500

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to reach its northernmost limits. Therefore, that pottery apparently took from 800 to 1000 years to diffuse through a relatively short distance (ca. 1000 km).

Nothing is known about how long the occupation of the Lower and Middle Paraná by the Entrerríana and the Ribereños plásticos styles took. These styles apparently were adopted by groups already in possession of a simpler pottery in the Palo Blanco Style.

No clearly defined preceramic occupation has been found on the shores of the Río de La Plata estuary and no lithic artifacts were found with the Palo Blanco pottery in the shell ridges. Therefore, it is possible that here pottery was not adopted by earlier settled inhabitants, but rather brought down the Paraná-Paraguay river system by paleo-Amazonian peoples.

These paleo-Amazonians have been characterized by Lathrap (1977a) as fishermen who were already experimenting with plant cultivation long before this time. However, the environment on the Lower Paraná and on the estuary must have curtailed some of their farming activities, particularly those related to the cultivation of such tropical tuberous roots as manioc, sweet potato, and cará.

Almost all of the Palo Blanco Tradition sites are large or small middens, often large artificial mounds composed mainly of dirt, ashes, and fish bones, sometimes also containing crustaceoun remains and, more rarely, shellfish, mammal, and bird bones. These sites are generally found in swampy or flooded areas near lagoons, lakes, and rivers. On the other hand, the preceramic middens of Uraguay and Southern Brazil contain only dirt and a few mammal and bird bones, and are more commonly found some distance from the coast.

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The lithic assemblages of all the preceramic groups in the area comprise stone and bone arrow and dart points, and bola stones, which indicate a hunting economy complemented by collecting, as attested by the stone palm nut breakers. However, near the coastal lagoons, stone net-weights also indicate fishing.

Following the adoption of pottery the populations apparently began to concentrate in flooded or swampy areas near large bodies of water, and fishing became very important. Then, in some cases, agriculture was also adopted. Farther southward in La Pampa and Patagonia, the Entrerríana Style pottery is found in sites where the abundance of stone arrow and spear points indicates the prevalence of hunting activities.

Because the Palo Blanco tradition spread into Eastern Brazil from the south, while the Pedra do Caboclo Tradition spread there from the north, both finally met, probably not long before A.D. 500, along a line parallel to the foothills of the southern scarpments of the Brazilian Uplands (Figures 4 and 10).

8.3.2 Ethnic and Ecological Concomitants of the Palo Blanco Ceramic Tradition

Using the same criteria already used in the case of the Pedra do Caboclo Tradition, the pottery of the Vieira Subtradition can be traced to the historic Charrua (e.g., Yaró, Minuané etc.). That of the Entrerríana Style can be traced to the Querandí, and the Ribereños plásticos Style to the Chaná (Beguá, Timbu, Coronda, Quiloaza, Mocoreta, and Mepene).

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Given the postulated relationships of these languages to Guaycuruan or to Old La Platons, as indicated by Troike (pers. com. 1983), the earlier Palo Blanco Phase pottery could represent some proto-Guaycuruan speakers. If we accept this--given the continuity of the lithic industries from preceramic to ceramic times--the groups having industries related to the Itaqui Tradition must have been the ancestors of these proto-Guaycuruans (Old La Platans). The available C^{14} dates suggest that they were occupying Southern Brazil, Uruguay, and Northeastern Argentina from at least 7000 B.C.

Interesting enough, the boundary between the areas of diffusion of the Pedra do Caboclo and Palo Blanco ceramic traditions, respectively seem to have been determined by the areas dominated, to the north by those speaking languages related to Ancient East Brazilian and Macro-Gê, and to the south by Old La Platan or Guaycuruan. Nevertheless, influences from the Entrerríana Style also reached far to the south, into Northern Patagonia where, in historic times, different languages were spoken.

It is even more difficult to reconstruct the life ways of the early inhabitants of the area of diffusion of the Palo Blanco Tradition than those of the area of Pedra do Caboclo Tradition, because of the dearth of information about the historic groups. Ethnohistoric information is scanty for the time of contact in the sixteenth century, and only a little more is known about the following centuries, when most indigenous populations disappeared or completely changed their way of life.

It is difficult to determine whether the contact period Charrua had any agriculture. Nevertheless, the abundance of pottery in most sites

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of the Vieira Subtradition strongly suggests some farming, the nature of which we do not know. Agriculture might also be suggested by the large grinding stones, but these, as with the large grooved axes and small celts, are difficult to place in context.

In Vieira III times vessel size increases; however, we can can discard the use of the large bowls for farinha preparation because the Charrua lived too far south for manioc growing; instead the boiling, frying, or drying of fish seems more likely (Figure 11). Nut-breakers, stone net-weights, and bone points indicate that collecting, fishing, and hunting, as we would expect, remained important.

In historic times, the Charrua adopted the horse complex and developed a very distinctive culture of completely nomadic mounted hunters of wild cattle, while pottery-making was discontinued (Serrano 1936, 1946, 1947, 1955), a situation completely analogous to the development of historic Plains Culture in the High Plains of North America.

The Querandí were always described as non-agricultural fishermen (Serrano 1936:33, fig. 5, 1940, 1947, 1595:88, fig. 2; Canals Frau 1953, 1954; Gonzalez and Perez 1972:128), and the Entrerríana Style sites produce many fish-stringers and bone arrow points. Bone dart points, throwing-stick hooks, and bola stones indicate the continuation of hunting, and stone palm nut breakers suggest palm nut collecting. In spite of the relative abundance of pottery, fishing appears to have been their basic livelihood. Most of the vessel shapes are relatively large, open bowls that appear to be much better suited to activities such as frying or drying fish than to boiling vegetables (Figure 11). The

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icthiophagic activities of the Querandí were well known at the beginning of the sixteenth century when dried fish and oil extracted from fish were the staple trade items on the Lower Paraná.

The large artificial mounds from which the pottery of the Ribereños plásticos Style comes attest to a certain level of sedentarism. The abundance of pots and elaborate pot-rests (campanas) indicates the importance of cooked foods, and this coincides with descriptions of the Chaná, who were described in contact times as being fully agricultural with maize and squash as staples (Serrano 1936, 1940, 1947, 1955; Canals Frau 1953, 1954; Gonzalez and Perez 1972:132; Becker and de Cebey 1978). Vessel forms are still predominantly open bowls, but some more or less constricted pots seem to be related to the boiling of vegetable food. Globular constricted jars appear to have been used to hold water (Figure 11). Ceramic net-weights replace the stone ones and, together with bone harpoons, attest to fishing. Bone points, spear-throwers, and stone bolas are related to the continuation of the same kind of hunting described for the Querandí. The absence of stone axes in the sites and of forest cover over most of the area suggests that some kind of agriculture other than slash-and-burn was practiced by the Chaná and, in later times, perhaps by the Charrua.

The fact that vessels shapes basically did not change through more than four thousand years (Figure 11) indicates that the way of life of the groups producing them did not change through all this time. The simple decorative techniques and motifs of the pottery of the Palo Blanco Tradition also hardly changed throughout the ca. 4500 years between the beginning of the Palo Blanco Phase and late historic times

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in the eighteenth century. This is not so strange because, being so simple, there was not much to change.

We could speculate that the more agricultural peoples of the Middle and Lower Paraná, the Chaná, maintained and developed the decoration in what is called the style of the Ribereños plásticos. In contrast, the fishermen, hunters, and gatherers of the Paraná Delta and the Río de La Plata estuary (the Querandí) as well as those inhabiting the Uruguay and Negro Rivers and the Atlantic coast of Uruguay and Southern Brazil (the Charrua) permitted decoration to degenerate and eventually to disappear. This resulted in what I call the Entrerríana Style and the Vieira Subtradition.

The only significant changes seem to have occurred only around A.D. 1000, as a result of external influences emanating from Amazonia.

The ceramic style of the Ribereños plásticos was probably influenced by the post-Las Mercedes pottery of the Chaco-Santiagueño, coming down the Salado River. The Vieira Subtradition was seemingly influenced by the Guaraní who were moving down the coast in a spread that, as we will see, had taken them down the Paraguay and up the Paraná by ca. A.D. 100-500 and to the Atlantic coast by A.D. 1000. In both cases the set of vessel forms remained pratically the same; however, in the style of the Ribereños plásticos the simple bowls were embellished with modeled adornos, spouts, and lugs, and some vessels with strongly constricted openings did appear (Figure 11).

The previously mentioned meeting of the Palo Blanco and Pedra do Caboclo ceramic traditions in the foothills of the southern escarpments of the uplands actually represented the encounter of Macro-Gê and

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Guaycuruan-speakers, here represented by the Caingang and the Charrua, respectively. In historic times, Macro-Gê languages extended over all the Brazilian uplands from far north near the Amazon, with extensions even farther to the north into the Amazonian lowlands. The Guaycuruan languages were spoken in a large area in Southern and Southwestern Brazil, Uruguay, Paraguay, and Northern Argentina. As we already have seen, acculturation occurred between these populations as a consequence of their meeting.

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CHAPTER 9

GUARANI CERAMICS

9.1 Guarani Sites

The study of the Guarani ceramics is based on my published and unpublished fieldwork in the States of Rio Grande do Sul and Goiás (Brochado 1969b, 1969c, 1971, 1974a; Brochado and Schmitz 1972-1973, 1976; Schmitz and Brochado 1972, 1981a, 1981b, 1982a, 1982b, 1982c; Schmitz et al. 1968; Schmitz 1982c), the study of museum collections (Schmitz et al. 1970), most of it still unpublished, as well as the published research by other investigators listed in Appendix 1. All the Guarani sites or groups of sites are indicated in Appendix 1 and in Figure 13 with the same letters and numbers.

The area where sites belonging to what I call the Guarani Subtradition have been found forms a massive block (approximately 1,200,000 km^2) between the Atlantic coast and the Paraguay River, stretching from the Tropic of Capricorn to the Río de La Plata (Figure 1). As many as 830 Guarani sites have been surveyed. The largest number so far surveyed, 760, are in Southern Brazil, which includes the States of São Paulo, Paraná, Santa Catarina and Rio Grande do Sul. Seventy others are outside Brazil, in Uruguay, Northeastern Argentina, and Southern Paraguay. All Guarani sites are shown in Figure 13 and lie to the south of the boundary line that runs approximately parallel to and south of the course of the Tietê River.

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9.1.1 Fieldwork Done in the Area

Effective fieldwork began earlier in Southern Brazil than in East Brazil and fourteen investigators are, or have been, in the field for some time; this figure includes only those with published materials. In Southern Brazil, surveying has usually been undertaken along river valleys. In some regions this is done by boat, following one or both banks and landing in promising places. In other regions it is done by land, traveling along the dirt roads that often follow the rivers at some distance from their banks. In either case, stretches of from 10 km to 30 km have been surveyed; intervening stretches of about the same length, or somewhat longer, were not surveyed.

These methods do not warrant a description as systematic sampling, and only a few attempts have been made to locate all the sites in a given region, such as on the Upper Jacuí (P.I. Schmitz and collaborators, pers. com.). Approximately one-half to one-third of the length of the major rivers, as well as of the coast, has so far been surveyed. Survey far from the larger rivers has been conducted effectively in only a few places, such as: the watersheds of the Itararé, Upper Iguaçu, and Upper Ijuí; along the southern escarpments of the Brazilian Uplands; along some of the tributaries of the Jacuí and Sinos; and along the eastern escarpments of the granite shield of Rio Grande do Sul.

Nevertheless, even in Southern Brazil large areas have been neglected. Little is known about the Upper Paraná watershed between the Paranapanema and the Verde, or about the Middle and Lower Rio Grande. We do not know for sure if the few sites in that region are Guarani or

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Tupinambá (Figure 13: GP8 and GP12). Along the remainder of the course of the Upper Paraná down to the Paraguay, survey has been spotty.

Our knowledge of the sites along the Lower Paraguay, Middle and Lower Paraná, and Río de La Plata still depends almost entirely on fieldwork conducted during the last part of the nineteenth century and the first half of the present one, that is, reports published between 1880 and 1948. Many more Guarani sites ought to be found along the Lower Paraguay. The only published accounts about this area are Vera (1930, 1940), M. Schmidt (1932, 1934), and Vellard (1934). On the other hand, on the Middle and Lower Paraná and on the Río de La Plata, it seems that, relative to the amount of fieldwork done and to the large number of sites bearing ceramics of different traditions--that is, Palo Blanco--there were actually fewer Guarani villages than farther up the Paraná in Southern Brazil. Enough survey has been done so that this differential in site density is probably not an artifact of investigation.

No surveying has been yet conducted on the Middle Iguaçu and on the Ribeira do Iguape, which both ought to have been important communication links between the interior and the coast. Along the shores of the States of São Paulo and Paraná, intensive surveying has brought to light a large number of preceramic shellmiddens or sambaquís. The fact that only very few sites have been located bearing Guarani pottery seems to indicate that there were few Guarani villages there.

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9.1.2 Excavation of the Sites

With few exceptions, the thickness of the archaeological deposits does not exceed 30 cm to 40 cm, and generally is only 15 cm to 20 cm. Because most of the sites are on soils subjected to cultivation for a long time, the deposits have been deeply disturbed, and mixing of the materials likely occured. Where cultivation is still done by hoe, surface scatters of pottery are not destroyed so rapidly. Where cultivation is done using a plow pulled by bullocks, conservation is poorer and destruction is faster. Sites that have been mechanically plowed disappear in a few years.

Despite the thinness of the deposits, small, dispersed stratigraphic cuts--generally measuring only 2 m by 2 m in area--are excavated to test them. Systematic surface collections of potsherds and lithic materials are always conducted.

Despite the state of destruction of most sites, it is still possible to discern internal features such as specific activity areas, house sites, hearths, and burials in them. However, these are poorly reported in the literature on these sites.

9.1.3 Classification of Guarani Sites

The around 900 Guarani sites can be divided into three groups. The Guarani Painted group comprises the approximately 180 sites that produced either more painted sherds than sherds showing some kind of plastic surface finish, or about the same proportion of both (Figure 13: GP1-GP20). Seventy-six of those sites yielding about the same proportion of painted and plastic-finished sherds were formerly

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classified as being transitional between the Painted and Corrugated "Subtraditions".

The Guarani Corrugated group includes the roughly 650 sites that produced more sherds showing some kind of plastic surface finish than painted sherds. The most common plastic decorations are corrugation and, to a lesser degree, nail incision and others. Nearly always the relative proportion of plastically patterned sherds is larger than that of plain sherds (Figure 13: GC1-GC28, GC30-GC32, GC34-GC42, and GC44-GC51).

This group includes six sites formerly classified as being transitional between the Corrugated and Brushed "Subtraditions" (GC30). Also included are twelve sites that produced variable proportions of sherds showing European influences. These are the sites of former Jesuit missions or Reducciónes of the sixteenth and seventeenth centuries and their associated Guarani villages.

The Guarani Brushed group includes approximately 60 sites that produced relatively large proportions of brushed sherds (Figure 13: GE1-GE6). Twenty-seven of these sites produced variable proportions of sherds showing European influences, and represent villages or missions in the same time range as those above. Twenty other sites probably represent former villages of post Reducción returning Guarani. In the nineteenth century, Guarani groups from Northeastern Paraguay and Southern Mato Grosso State in Brazil returned to the regions they formerly occupied on the valleys of the Tibagi, Ivaí, Pirapo, Paranapanema, Iguaçu, Upper Paraná, Upper Uruguay, and Peixe. In the seventeenth century, these regions had been depopulated by the Paulista slavers called maloqueros or bandeirantes.

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Beginning in the seventeenth century, the Guarani pottery was replaced, in certain regions, by a new ceramic tradition called Neobrasileira or Neobrazilian by PRONAPA investigators. This pottery was derived from the Guarani through a process of acculturation with imported European wares. These acculturative processes began in the Spanish towns and Jesuit missions of the Paraguay, Paraná, and Uruguay watersheds in the sixteenth and seventeenth centuries.

In the eighteenth century, a different process of acculturation began in the Portuguese settlements around the coastal lagoons of Southern Brazil. In some of these later cases, the Neobrazilian Tradition apparently was also influenced by the local Caingang pottery represented by the Taquaruçu Style of the Pedra do Caboclo Tradition, such as in the Monjolo Phase of ca. A.D. 1700-1800, found on the Río dos Sinos drainage as well as on the nearby stretch of the coast of Rio Grande do Sul (Miller 1967:23-24; 1971:54). In other places, the Neobrazilian pottery was influenced by the Charrua pottery, represented by the last phase of the Vieira Subtradition of the Palo Blanco Tradition, such as in the Bojoru Phase of the southern coast of Rio Grande do Sul (Naue et al. 1968:141-152, 1971:91-122; Schmitz and Brochado 1972:6, 7, 21; Naue 1973; G. Naue, pers. com. 1970-1973). All the archaeologically known instances of acculturation that gave rise to the Neobrazilian Tradition have been summarized by Brochado (1974).

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9.1.4 Geographic Distribution of the Sites

The following table shows how the concentration of Guarani sites increases from north to south, attaining its height in the watershed of the Patos Lagoon and the adjacent stretch of the coast. South of it the number of sites dwindles rapidly; the latest and southernmost are along the southern shore of the Río de La Plata estuary.

Concentration of Guarani Subtradition Sites

Regions	Number of sites	Percent of sites
Tributaries of the Upper Paraná, Paranapanema, Ivaí, and Iguaçu	203	23
Upper Uraguay and Ijuí	254	28
Drainage of the Patos Lagoon and southern coast	384	43
Middle and Lower Uraguay, Middle Paraná, and Río de La Plata	55	6

The concentration of the sites that have been classified in the Guarani Corrugated group likewise increases from north to south--the bulk of the sites are between the Upper Uruguay and Patos Lagoon--and decreases again in the direction of the Río de La Plata. On the other hand, all the sites in the Guarani Painted group (Figure 13: GP1-GP20) are found between the Upper Paranapanema and the Upper Uruguay; their concentration increases from south to north. Therefore, the bulk of

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them are found north of the area of highest concentration of those in the Guarani Corrugated group. The sites that have been classified in the Guarani Brushed group (GE1-GE6) are concentrated only in the valleys of the Paranapanema and Upper Uruguay.

It is known that the Guarani sites are not all contemporaneous, but it is not yet possible to date each and every site accurately. Thus, the relative density of sites in a particular region, apart from being the result of the vagaries of sampling, might be interpreted as indicating either a greater density of indigenous occupation within a determined time span, or that this region was not so densely peopled but had been occupied for a longer span of time.

Some of the differences observed are probably more related to the intensity of fieldwork undertaken in each of the regions listed than to any other single factor. Other differences such as the lower density of sites along the Lower Paraná, Lower Uruguay and Río de La Plata probably reflect environmental factors. On the other hand, the concentration of the sites of the Painted group north of the bulk of the sites of the Corrugated group seems to be the product of cultural factors. Some Guarani groups stressed painting, and others corrugation, as a means of finishing the surface of their vessels.

9.1.5 Settlement Pattern

Flannery (1976:162) provides us with a useful distinction with regard to settlement studies. For him, settlement pattern--fundamentally an archaeological concept--is the pattern formed by the sites in a given region; it is empirically derived by sampling or total

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survey and is usually studied by counting sites, measuring sites, measuring the distances between sites, and so on.

He defines a settlement system, on the other hand, as basically an ethnographic concept, that is, the set of "rules" that generated the pattern in the first place. It cannot be empirically derived, but at least some of the "rules" can be deduced by simulation or the use of probabilistic models.

Little has been published about the settlement patterns of the Guarani. This is no doubt due to the paucity of the remains that archaeologists have habitually attributed to the very simple technological level of development of the Guarani. Actually, the blame must lie in the poor preservation of all organic materials under tropical conditions. Because most of the artifacts were of perishable materials, "of all the complex and specialized material culture which the Tropical Forest peoples had developed to cope with their environment only a few axe fragments and a vast mass of smashed pottery remain" (Lathrap 1970a:63).

Only rarely have sufficiently detailed data been published about the formal and functional classifications of the cultural evidence. Adequate formal and functional analyses must precede studies of the density and spatial distribution of the cultural items, that is, objects or artifacts in their site contexts. Ultimately, contextual studies lie at the core of anthropological understanding. It is precisely this information, which would allow us to attempt an accurate reconstruction of the functional patterns of individual sites, that is lacking.

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On the other hand, it is not difficult to find in the same publications data about what are called the ecological dimensions of the settlement pattern--that is, about the relationship of the sites to such characteristics of the environment as climate, natural vegetation, topography, and soils. Because the patterns observed are clear, I will attempt to describe them in this and the following sections.

9.1.6 Site Hierarchy and Functional Typology of the Sites

Because the site measurements in the published data do not always follow the same criteria, it is not easy to make precise comparisons between them. In general there is the feeling among investigators that areas of concentration of potsherds mark house-sites, based on the belief that sherds were simply thrown away inside or around the house. The relationship of the ultimate position of archaeological residue to the location of where particular tools were used has become a central issue in recent American archaeology. Relevant studies by De Boer and Lathrap (1979) and Zeidler (1984) have yielded differing, but by no means contradictory, conclusions. The problem is extremely complex and can only be attacked by the combination of fine-grained distributional studies with as complete an archaeological reconstruction as is possible. The Guarani data base does not preclude such analysis, but has yet to receive it.

The total area covered by these contiguous concentrations of sherds is believed to represent the total area formerly covered by the village. Data about the dimensions of these concentrations, for particular phases, is frequently omitted or, when given, pooled. Seldom can we

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determine the dimensions of each of the many sites that are included in the same "phase". In most cases only the maximum measurements observed are given, that is, only the size of the largest sites included in the "phase" being discussed are reported.

From the range of published reports the area covered by the Guarani sites varies from a minimum of approximately 100 m^2 to a maximum ranging between 20,000 and 50,000 m^2. In the sites I have surveyed in Rio Grande do Sul, a clear, if complicated, pattern can be discerned; this it will not be discussed here, because I do not know if it applies throughout the Guarani territory.

It is possible, then, to establish a provisional site hierarchy based on the estimates given of the size of each site. In some regions, such as the watersheds of the Jacuí and Ijuí, large sites on the banks of major rivers probably represent large central villages. Smaller sites somewhat farther inland and situated in hilly country are, as a rule, more recent than the earlier sites found closer to the rivers and probably represent outlying villages related to the central ones. Even smaller sites, situated farther from any river, near the top of the upland escarpments, are late prehistoric or even protohistoric, and represent tiny villages of marginal groups. It is also clear from the published data that sites fulfilled different functions. For instance, small sites found near the coast represent temporary seasonal fishing camps that have been identified by the presence of shellfish remains.

On the other hand, there were no sites used exclusively for burial among the Guarani. Urn burials are always close to habitation sites. Even places where the profusion of large sherds indicates the presence

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of broken burial urns cannot be classified as burial sites, because there are always other areas covered with the mixed refuse of large and small broken vessels that characterizes habitation sites close by. Therefore, as ethnohistoric accounts confirm, cemeteries were always part of the villages.

9.2 Vessel Forms

Differential preservation of material culture in the archaeological record, as well as bias in the literature, force us to use the attributes from the ceramic and lithic inventory to define Guarani culture. To describe Guarani pottery and contrast it with that of the Tupinambá, I have made use of positive comparisons drawn along many dimensions of variation, each one of which could have varied independently from the others (Lathrap 1962). The dimensions used can be summarized as: (1) the sets of vessels shapes; (2) the techniques of surface finishing; (3) the relative position of the decorative fields on the vessel surface; and, (4) the functional categories of the vessel shapes.

Until now, ceramic analysis has been used primarily as a means of establishing chronology or setting up sequences, and only recently have by a few researchers tried to establish culturally meaningful distinctions and to reconstruct diet. Accordingly, only a few characteristics of the pottery have been given importance and recorded in most of the literature published to date. These include criteria that can be judged casually and without magnification, such as color, hardness, texture, and the manner in which sherds fracture most easily.

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9.2.1 Techniques of Construction

In the publications of PRONAPA, temper has been deemed very important for pottery classification, and often all nonplastic inclusions in the paste are simply regarded as temper. What has been most often described as temper are sand granules, no doubt because they are easy to identify, but we are not always sure if sand was intentionally added to the paste or if it occurred naturally in the clay used. Variations in the granulometric range of the sand granules, their color, and their proportion in relation to the paste were often used to create pottery types that were believed to have had temporal significance. However, these variations might just as well be a function of local geological conditions, or even of idiosyncratic preference for different clays on the part of individual potters of the same community (a situation well documented among the modern Shipibo (Lathrap pers. com. 1983). Nevertheless, in some areas variations in the amount of sand in the paste could have been intentional, that is, due to deliberate addition of more aplastic material, showing changes through time reflecting changing preferences in shaping or firing techniques.

The presence of ground potsherds as temper has often been observed in the Guarani wares, and some investigators (cf. P.I. Schmitz, pers. com.) argue that it is a general characteristic of this pottery. However, the proportion of ground sherd temper to paste varies widely. Often ground sherd granules are so sparse that we could argue that they had no practical function in the paste. As occurs with many characteristics of the Guarani pottery, sherd temper practically

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disappears in late historic times, as in the ceramics of the Jesuit Misions and in even later settlements elsewhere.

Pratically all vessels were fashioned by coiling, the standard technique of vessel construction in which the walls are built up with superimposed rolls of clay. Because the manner in which sherds fracture most easily has usually been recorded, and because fractures are generally related to the way the coils were bound, these characteristics have been used to reconstruct the coiling technique. Frequent fractures on coil junctures demonstrate that this was the way vessels were built.

Coils were laid either spirally or as a succession of rings and important variations occur in many stages of the process. Some of these variations are specialized and have significant distribution in time and/or space. However, these will not be treated here because, being observed and described only for some areas, there is insufficient comparable data. Both length and diameter of the coils vary, depending on the size of the vessel and the desired wall thickness. In very large vessels with thick walls (i.e., more than 2 cm thick), double coils were often used. Very small vessels were frequently directly shaped by modeling.

9.2.2 Vocabulary of Vessel Forms

In contrast to the Tupinambá, there are no direct illustrations of any Guarani vessel from contact times; therefore all those used in this study come from archaeological contexts. The Guarani set of vessels shapes has been reconstructed from different sources: (1) Forms graphically reconstructed: (a) from the ca. 70,000 potsherds I have

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analysed so far, all from Rio Grande do Sul in Southern Brazil; (b) from graphic reconstructions and illustrations by other investigators. (2) complete vessels: (a) excavated during my own fieldwork in Rio Grande do Sul or measured and photographed by me in museum collections in the same and neighboring regions; (b) illustrated by other investigators in numerous dispersed publications.

The list of publications refered to above is as follows: Netto (1885), Ambrosetti (1895), Ihering (1904, 1907), Torres (1911, 1919), Mayntzhusen (19112, 1941), Métraux (1928, 1948), Vera (1930, 1940), Lothrop (1932), Schmidt (1932, 1934), Serrano (1937, 1972), Badano (1940), Aparicio (1948), Canals Frau (1954), Menghin (1957, 1960, 1962), Pereira Junior (1957, 1964, 1965, 1967), Schmitz (1959, 1971), Lamming and Emperaire (1959), Blasi (1961, 1967), Blasi and Chmyz (1963), Chmyz (1963, 1971), Chmyz and Piazza (1967), Rohr (1966, 1969), Miller (1969), Schmitz et al. (1970), Chmyz et al. (1968), Pallestrini (1968-1969, 1969, 1972-1973), Nigro (1970), Nunez Regueiro and De Lorenzi (1973), Leite (1975), Eble (1977).

I have derived the set of vessel forms I will here describe from more than 400 Guarani vessels. All descriptions follow Shepard (1967:224-255). From the study of these 400 vessels it is clear that the set of Guarani vessel forms is rich and varied, so rich that its variety cannot be completely accounted for here; Figure 14 illustrates only a small sample of the range.

The foremost distinguishing characteristics relating to shape can be generalized. What follows is a simplified description of what the Guarani regarded as a full set of dishes, illustrated in Figure 14.

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Rounded or conoidal vessels of simple contour, unrestricted (Figure 14:1), or restricted (2) are typical for bowls but rare for pots (13). On the other hand, independent restricted vessels with inflected contours, that is, showing convex and concave sections joined by a smooth curve, are typical for pots (9) but rarely for bowls (8).

Composite contours with a corner point, that is, a sharp projecting angle that marks the juncture of two parts of the vessel, the convex bottom and the upper part, which can be also convex (3), straight (6), or concave (7, 22), are typical for restricted (3) and unrestricted bowls (6, 7), but rare in pots (22). For all these vessels, the corner point commonly is described as a carination. On the other hand, composite contours in which a spheroidal body is topped by a short cylindrical (10a) or inverted conoidal collar (10b), or by a more elaborate neck (11), and in which the corner point is reintrant instead of protruding and takes the form of a groove, are very common for pots (10a, 10b, and 11). Vessels bearing a tall inverted conoidal collar are not so common (21).

Independent restricted vessels of complex contour are also typical as bowls (4 and 5), pots (12 and 13), and jars (14 and 15a-20). These can have two corner points, the reintrant one at the base of a simple or elaborate rim (4 and 5). More rarely they have more than two corner points, forming a scalloped profile (23). More common are vessels showing both corner and inflection points (12 and 14-19).

The simpler complex contoured vessels have the inflection point below the projecting corner point or carination (12). In this respect, some of the vessels classed as composite (3, 6, and 7) alternatively

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might be viewed as complex ones, because the rounded or conoidal bottom on close inspection often shows an inflection, however slight, towards the juncture with the upper part.

More common are those complex contoured vessels that have two inflection points, one below and one above the carination, at the base of what can be called the neck (14). These "necked" jars usually have more elaborate necks, at the base of which there is an inflection point or, more commonly, a reintrant corner point (15a-17). Common also, and typical of the Guarani pottery, are necked jars showing a tiered or "stacked-out" profile with multiple corner points, the lowermost of them taking the form of a carination, and the next ones reintrant, creating up to three superposed convex sections, commonly described as shoulders (18 and 19). The largest of these jars can reach up to 1 m or more in height and/or in maximum diameter.

In this general class of complex contoured vessels the superposition of sections of spheroids, forming the base in the case of some bowls--or of conoids, in the case of some jars--topped by sections of other inverted conoids, ellipsoids, cylinders, and/or hyperboloids, produce very complicated contours (4, 5, 14-20, and 23). Moreover, as most of these vessels are topped by an elaborate rim, exteriorly thickened or even cambered, and as the superimposed sections may be arranged in different orderings, the total number of possible combinations is very high; known vessels show a great range of variations.

As a general rule, in most of the inflected, composite, and complex vessels, each convex curve of the vessel profile, from bottom up, is followed by a concave one and any wide curve is followed by a short one,

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always forming asymmetrical S-shaped outlines (5, 7-9, 12, 14-20, and 22).

Small, restricted, double spheroidal jars in which the medial groove takes the form of either an inflection point (20) or a corner point (21) are less frequent but also typical of the Guarani pottery, at least in later times. Conoidal vessels with scalloped walls, however, are rare (23).

Everted rims (7-9, 14, 17, 19, and 23), exteriorly thickened rims (4, 5, and 15a), and more complex cambered rims (11, 15b, 16, and 18), are more common than simple straight rims (10A) or inverted ones (3, 10B, 12, and 20-22).

The Guarani vessels have, as a rule, rounded or, more commonly, conoidal bases and circular openings. Ellipsoidal orifices and flat bases are almost unknown.

To summarize what was of necessity a lengthy and complex discussion of the full ceramic requirements of a Guarani household, one might simply note that to a degree unknown elsewhere in the New World, the Guarani potters conceived of vessels in terms of a stack of sharply demarcated, horizontal zones or segments. De Boer and Lathrap (1979) have diagramed the workings of this mindset in the far simpler Shipibo-Conibo pottery. It is the extreme implementation of this principle of segmentation that makes Guarani ceramics unique.

9.3 Surface-Finishing Techniques

The sharply demarcated zones of the diverse vessel shapes offered a background on which a number of contrastive surface finishes could be

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executed. The exterior surface of Guarani vessels could have been: (1) simply smoothed; (2) modified by some kind of plastic decoration or pseudo-decoration; (3) slippped; (4) painted; or (5) smudged.

Obviously, the interior surfaces could be only: (1) simply smoothed; (2) slipped; or (3)painted.

9.3.1 Smoothing

In well preserved vessels or sherds the texture of the interior surfaces--and of the plain exterior surfaces as well--can be described as tactually smooth or smooth and compact, in the terminology of Shepard (1976:121) when applied to surfaces that have been finished by rubbing with a hard tool.

With regard to surface finish, it is worth mentioning here that in Guarani pottery the distinction frequently made between two general classes of pottery, viz., rough, or so-called utility or culinary ware, as opposed to a finely finished serving ware, cannot be applied readily. Vessels clearly used for cooking cannot be distinguished by their "roughness" from those obviously not used for cooking because of the polychrome painted decoration. Wall thickness also cannot be used as criteria for this dichotomization.

9.3.2 Plastic Surface-Finishing Techniques

The techniques of surface finish most often found on the exterior of the vessels are those resulting from various forms of plastic surface patterning; of all plastic techniques, corrugation is the single most important.

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Ceramics show a wide range of variation of corrugation with respect to size and rythmic organization. Often corrugation was used merely as a plastic decorative device applied to the outer surface of the vessel wall without any relationship to the bonding of the coils.

Investigators within the various parts of Guarani territory have used differing classificatory descriptions, each deemed useful for the particular localized problems of classification and interpretation. That the same criteria were not universally applied is justified, because the problems involved differ regionally. That is to say, the culturally contrastive variants within each complex varied from region to region.

The evaluation of these regional differences in corrugation far exceeds the scope of this thesis. Here, I can only summarize the practice of some Brazilian investigators who have established certain classes, types, and subtypes within the corrugation, as a means of classifying the sherds for the purpose of quantitative seriation.

In the description that follows the terms used to describe the different kinds of plastic patterning of the exterior surfaces are given also in Portuguese and Spanish, because most of the published accounts use these languages. The Portuguese terms have been drawn from Terminologia III (1976), and the corresponding Spanish terms from from Nunez Regueiro (1969).

First there is a general, if unstated, principle that segregates all cases when there is a real or apparent overlapping of coils, that is to say, when the individual indentation actually serves to bond adjacent coils; these are described as complex corrugation or complicated

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corrugated (Portuguese: corrugado complicado; Spanish: corrugado complejo). The subdivision of this class into types and subtypes has been based on different criteria:

1. The degree of relief shown by the corrugation.
2. The orientation of corrugations in relation to one another, e.g., imbricated corrugated (Portuguese: corrugado imbricado; Spanish: corrugado complejo obliquo).
3. If finger-tips or a spatula have been used to make the corrugations, e.g., spatulated corrugated (Portuguese: corrugado espatulado; Spanish: corrugado complejo espatulado).
4. If only finger-tips or also the edge of the nails were impressed in the paste, e.g., finger-marked or fingernail corrugated (Portuguese: corrugado ungulado; Spanish: corrugado complejo digito unguicular).

Most but by no means all corrugation results from the very technique of building the vessel by means of the superimposition of clay coils. Therefore the exterior overlapping coils were pressed upon one another by means of rythmic pressure applied with the finger-tips or a similarly shaped tool. In all the cases listed above compressions were applied diagonally across the outer surface of the vessel wall causing a plastic flow that forms the series of parallel, obliquely orientated ridges described as corrugation.

The last kind of corrugation listed (4) often results from the use of the pinched coil technique.

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Second, there is another observed if not precisely labeled class that includes all cases where the coils have been vertically superimposed with no, or very little, overlapping. This class includes what have been described as:

1. Simple corrugated (Portuguese: corrugado simples; Spanish: corrugado simple).
2. Simple nail-incised corrugated (Portuguese: corrugado-simples ungulado; Spanish: corrugado simple unguicular).
3. Non-obliterated coils (Portuguese: roletado; Spanish: rodeteado).

Almost all the kinds of corrugations seen in Guarani vessels belong to the first class, while those of the second class are only rarely seen. Except for the Panoan ceramics described under the Paracocha Tradition, and in particular the Cumancaya Complex, all other South American wares that show corrugation are of the second class mentioned above. In the first two cases, simple corrugated and simple nail-incised corrugated, compressions were applied vertically rather than diagonally across the outer surface of the wall and the result resembles parallel, slightly ruffled or pleated, ribbons.

Because there is frequently only apparent overlapping of the coils, the first class above actually includes both cases where corrugation was used to bond the coils together and was left showing on the outside of the vessel, or or where the original corrugation was scraped and a new one executed, which shows no relationships to the bonding of the coils.

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No classification has been devised based on the above distinction primarily because it cannot be established, without thin sectioning, for each and every sherd of a lot, an indispensible goal if a complete quantification of the lot is to be feed into a quantitative seriation.

The use of the technique of coiling as a device to build and form vessels is widespread in the Americas and elsewhere among pre-wheel potters, but the indentations used to bond the coils was, as a rule, obliterated by scraping and smoothing the external surface of the vessel. Even if corrugation does appear in some other archaeological complexes of Eastern South America, it is never very common or popular. Therefore, it is interesting that the Guarani employed corrugation widely, apparently as a conscious marker of their culture, as suggested by Métraux (1928a:246).

However, stated thus, the problem is not properly addressed because although they do not actually show any corrugation in their finished state, all vessels built by the coiling process must have shown something like corrugation in both their external and internal surfaces at the point in their manufacture before these were scraped and smoothed. Therefore, the problem is why the Guarani so often left unmodified corrugation when people of most other cultures obviously did not. Many factors can be invoked, such as: time limitations; the decorative value of the corrugation; and recognition of the functional value of corrugation--the many ridges increased the total external area of the vessel, allowing for more rapid absorption of heat when vessels were placed over open fires.

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Techniques of plastic decoration, much less popular than corrugation but still characteristically Guarani, are mentioned here in order of their importance. Fingernail punctations or nail-incisions (Portuguese: ungulado; Spanish: estampado unguicular) include all crescent shaped incisions obtained by the impressions of fingernails, or other similarly shaped instruments, upon the still plastic paste. Most nail-incisions are regularly aligned, usually in horizontal bands parallel to the opening, encircling the vessel, all pointing in the same direction, but in some cases they are haphazardly distributed. Nail incisions may take other forms. Pinchings or pinched (Portuguese: beliscado or pincado; Spanish: relevante digito unguicular en pellizcos) was produced when the still plastic surface was pinched with fingernails. Fingernail ridging (Portuguese: aerrungulado; Spanish: relevante unguicular asserrado) has been used to designate those cases where pinching was executed in continuous lines. Rim-nicking (Portuguese: entalhado na borda ou no labio; Spanish: achaflanado en el borde, labio dentado o asserrado) is the term applied when the rim or lip shows fingernail incisions, but sometimes it is used when the rim has been modified by other means such as by regularly spaced fingertip impressions, or has otherwise been cut or molded, sometimes in a zigzag fashion.

Punctations (Portuguese: ponteado; Spanish: inciso de punto simple) is a productive decorative mode. Usually the indentations are regularly aligned in bands encircling the vessel, but are sometimes haphazardly distributed.

Brushing or combing (Portuguese: escovado; Spanish: brochado) can be wiewed either as the result of scraping the surface with some hard

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multipointed tool as the final step in surface smoothing, not followed by any form of polishing, or a conscious attempt at decorating the surface. In either case, a corncob or similar tool was probably used.

In the first instance, brushing is found on the bottom part of some vessels of all periods. In the other case, all the body, or only the upper part, is brushed with decorative intent; this is common only in very late historic times, from the seventeenth to the nineteenth centuries.

All the other techniques mentioned below are rare but are occasionally found on pottery that is certainly Guarani. Simple incised lines (Portuguese: inciso; Spanish: inciso de linea) forming very simple motifs are found, although rarely. Motifs include continuous encircling lines, sometimes combined with other short, diagonally inclined lines, either simple or crossed, forming diamonds. More complicated motifs, as we shall see, are even rarer.

Residual, but still occasional productive modes of plastic decoration include: grooving or body fluting (Portuguese: acanalado; Spanish: acanalado); ridging (Portuguese: canelado; Spanish: mediocanado o en media cana); stamping (Portuguese: carimbado; Spanish: estampado); finger-punshing or fingertip punctations (Portuguese: digitingulado; Spanish: estampado digito unguicular); cord-markings (Portuguese: marcado com corda; Spanish: estampado con cuerdas); net-impressions (Portuguese: marcado com malha; Spanish: estampado con redes); fabric markings (Portuguese: marcado com tecido; Spanish: estampado con tejido); nodulations or applied nubbins (Portuguese: nodulado; Spanish: relevante digital en nodulos).

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9.3.3 Painting

Paint was applied either as an overall slip or as lines and stripes forming patterns or motifs. Guarani paints generally adhere well, ensuring their preservation even under very bad conditions. Technically, they obviously belong to the class of fired paints, that is, those applied before firing and receiving their adherence from it. Their pigments must be basically minerals which, being insoluble, form suspensions that leave thick deposits on the surface.

Continuous slipping, involving either red or white slip, is frequent on the inside of all classes of vessels and has a practical as well as a decorative use, rendering the otherwise porous walls impermeable. More rarely, slip was applied all over, covering both the interior and the exterior surfaces of some vessels.

The most common patterned, painted decoration is the characteristically Guarani bichrome or polychrome, which is composed of fine lines and wide stripes, painted in different tones of red and/or dark brown, and/or black, on a white, yellowish, or grayish slipped background.

Much less frequently employed was a bichrome painted decoration done in the inverted colors scheme, that is by white or black stripes rather than lines, painted upon a red slipped background.

Still more rarely one finds wide stripes or dots, finger-painted in red or black directly upon the natural surface without any slipping. These stripes commonly radiate from the bottom of the vessel or are arranged in vertical, parallel groupings around the body near the opening.

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9.3.4 Smudging

Smudging is the intentional blackening of the pottery surface caused by carbon and tarry products of combustion deposited on the vessel or on a particular surface of the vessel during the second firing at low temperature in a smoky, reducing atmosphere. It was common only in very late, probably even historic times, particularly in the Upper Uruguay region.

9.3.5 The Rules Defining Decorative Fields and Design Structuring

In polychrome painting, the method of design construction, that is the potter's procedure in outlining and treating space, can be easily reconstructed, because is follows a simple, well-defined plan.

In the case of polychrome painting, for the sake of visibility from a normal viewing position, that is, with the vessel lying on the ground, on unrestricted bowls the field of decoration is inside, extending to the lip (Figure 14: 1, 6-8). On jars and pots (10-12, 14-19, 21, and 22) as well as on some restricted bowls of composite or complex contour (3-5) the fields of decoration are on the outside, covering the upper part and the neck. The external decoration usually extends from the lip down to the vessels maximum diameter. On spheroidal pots (10 and 11) decoration is restricted to the neck area. Areas not normally displayed, such as the bottom part of most bowls, as well as the lower body of pots and jars are usually left plain or are just slipped.

On the outside of jars and pots, as well as of the above mentioned bowls, the field of decoration is structured with reference to the corner points of the contour, as well as to the end point at the mouth,

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being thus subdivided in continuous, encircling, bands parallel to the mouth. The primary structural lines of these bands are wide painted stripes that outline all the corner and end points. Even areas that show only smooth curves in some vessels but that have corner points in other vessels of comparable shape, are outlined by these stripes.

The formal aspects of the design, that is those qualities that define style, can be classified as graphic geometric. The wide stripes frame a white-slipped band that is filled with small, fine-line geometric units of design repeated in a straight line. Motifs can be described as: (1) transverse vertical or oblique lines; (2) regular and oblique zigsags forming running bands, chevrons, or linear diamonds; (3) stepped lines; (4) wavy or undulating lines; (5) normal or squarish scrolls or volutes; (6) stepfrets formed by rectilinear or curved meandering lines; (7) net patterns; (8)) scalloped U-shapped patterns; and, (9) concentric circles, ovals, squares, diamonds, and crosses.

All these units may be drawn in different orientations and usually form subparallel groupings, sometimes showing opposed orientations in consecutive panels of the same band, divided by transversal lines or left impinging on each other. Some motifs or patterns might be used complete or cut in half, e.g., 5, 6, and 9).

The encircling bands might be simple or multiple consecutive parallel bands showing the same or different patterns. Encircling bands are never used on the inside of bowls, except for the stripe bordering the rim, which usually also extends to the exterior. Instead of being organized in bands much the same motifs are repeated in two directions, creating a surface or regular all-over pattern. However, the bowl interiors are not commonly painted, usually receiving only a red slip.

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That linear elements are prominent in decoration is further attested by their elaboration. Lines are sometimes double, in some cases interconnected by other short transversal lines. Frequently, lines are underlined by dots, ticked, or reinforced in some stretches by small elongated solid areas of painting, like large dots, in the same or a contrasting color. The same elaboration is shown by the frequent use of multiple outlines around some of the motifs. The result is that the white slip always has the effect of a background from which the black and/or red lines and the wider stripes stand out sharply as the positive pattern. Because of this, the background does not seem to form an integral part of the design. In bichrome painting color relations are inverted (see above); although the white and black lines are wider than in polychrome painting, their positive relationship to the red slipped background remains the same.

The definition of the decorative fields receiving plastic decoration or pseudo-decoration also requires comment. Naturally enough, it is found only on the exterior vessel surfaces, being usually concentrated on the bottom part of bowls, and on the the upper part of pots and jars, extending from the lip, which is left plain, down to their maximum diameter. The bottom part of pots and jars is usually left plain, but may also be completely covered by corrugation or completely brushed.

The structuring of the field follows approximately the same rules as in the case of polychrome or bichrome painting. Most plastic patterning is applied in continuous, encircling bands, parallel to the opening, and these bands usually also stop or show a change of technique at the corner points.

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However, in the case of fingernail-ridgings, they are instead applied in oblique parallel groupings of bands. Grooving or body-fluting, as well as ridging, are both done in vertical parallel groupings.

The rather rare incised decoration generally repeats some of the same patterns and motifs of polychrome painting. The fine incised lines duplicate the painted ones, and tiny punctations sometimes even duplicate the painted stippling.

Plastic decoration is rarely haphazardly distributed, thus being more common in the case of some pseudo-decorations such as brushing and cord, net, or fabric markings.

Plastic decoration is never used together polychrome or bichrome painting, even on opposite surfaces of the same vessel. Nonetheless, red slipping is common on the interior surface of plastically decorated vessels.

9.4 Spatial and Temporal Distribution of Surface-Finishing Techniques

In Guarani sites from 50% to 90% of the sherds are decorated or show some sort of pseudo-decoration on their external surface. The most frequent technique of decoration or pseudo-decoration is corrugation with all its variations. Polychrome painting, white slipping, red slippping, and nail-incising occur in decreasing order of frequency. All other techniques are very rare and appear only in certain restricted areas and time ranges. For instance, rim-nicking, body-fluting, fingernail-ridging, brushing, and smudging appear to be rather late.

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Impressions of cords, nets, or textiles are found only in some sites on the Upper Iguaçu and on the Lower Paranapanema, dated to protohistoric times, and probably represent instances of acculturation, or even trade sherds from the Caingang-speaking groups, which are represented by the Taquara Style of the Pedra do Caboclo Tradition.

9.5 Other Clay Objects

Besides pottery vessels, in some Guarani sites other pottery objects have been found. Most of them are beads, which are generally spheroidal, biconical, or cylindrical and perforated through. On the other hand, the affiliation and temporal position of tubular clay pipes--some conical, straight, or slightly curved, some of the elbow type--found in or near Guarani sites is still not completely clear.

9.6 Lithic Artifacts

There are usually few well finished lithic artifacts in Guarani sites. These are well described and illustrated by Scatamacchia (1982).

Small polished celts, trapezoidal or petaloid in shape, measuring from 6 cm long, by 4 cm wide, and 2 cm thick to 16 cm long, by 5 cm wide, and 4 cm thick. The material is always a volcanic rock such as basalt, diabase, or melafire, more rarely gneiss. Some are completely polished, while with others only the edge is, with the middle part and the butt left only pecked.

Labrets or lip-plugs (tembetá) are generally made from very hard, highly polished stones, such as quartz, either of the hialine or "milky" variety. Three shape categories can be distinguished:

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1. Most of the labrets are T-shaped, slender and cylindrical, with straight or more rarely slightly curved legs and a straight bar with well marked arms (the length of the legs varies from 3 cm up to 15 cm, but the length of the bar generally varies only from 1 cm to less than 3 cm; the diameters range from 4 mm to 9 mm).
2. A few T-shaped labrets are thicker, coarsely shaped, and pecked instead of polished.
3. Some cylindrical, straight pieces are also interpreted as the leg of T-shaped, composite labrets, the bars of which were probably made from some perishable material.

In some apparently late sites, T-shaped labrets have been found that are made from some vegetable resin instead of stone. In a few cases, they are composed of two separated pieces, one wedged into the other. Cylindrical, straight pieces of resin or bone are interpreted as representing the third category described above. The resin used is usually described as deriving from the jutai tree (Hymoenea sp. or H. courbaril).

The spatial and temporal distribution of grooved sandstone slab abraders usually coincides with that of the lip-plugs. The abraders are believed to be the tool used to polish those ornaments. Flat potsherds sometimes have polished grooves and possibly were put to the same use, although softer materials such as arrow shafts seems more likely.

Small, usually highly polished, perforated pendants assume many diffferent shapes, mainly flat squares, traingles, trapezoids, or cylinders grooved at one end. Cylindrical or spheroidal stone beads

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with a perforation, and flat, sandstone slab abraders complete the roster of typically Guarani ground lithics.

In some Guarani sites around the southern section of the uplands there have also been found long, straight, bars of such volcanic rocks as basalt or diabase, usually naturally broken into columnar shapes, and ground or polished only along the edges and at the extremities. They measure from 14 cm to 30 cm long and are from 1 cm to 8 cm thick. Because they are often found inside Guarani burial urns, with items such as celts, labrets, pendants, and beads, their Guarani association is unquestionable. As a cultural type, they were probably borrowed from the Caingang. I have already mentioned that such objects were characteristically found in sites of the Taquara and Taquaruçu Styles of the Pedra do Caboclo Tradition.

Chipped stone artifacts include: bifacial axes, unifacial chopping-tools, scrapers of different shapes and dimensions, flakes retouched to be used as knives, or scrapers and flakes with natural cutting edges or points. There are also rocks and pebbles, some showing flaked or ground areas that could have had a multiplicity of uses. Smooth, waterworn pebbles are believed to have been used to rub the surface of pottery vessels in the process of smoothing them. Lumps of minerals are believed to have been used as pigments to be applied to pottery or used for body painting.

In the extreme southerly range of the Guarani in Rio Grande do Sul, there are also sometimes such lithic artifacts as: ground or polished palm-nut breakers, pitted on one or opposite sides (piedras con hoyuelos or quebra-coquinhos); short, cylindrical, or truncated-conoidal manos

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(mao-de-pilao), pounders, hammerstones, or grinders; grooved or smooth bola stones, well polished or only pecked; trapezoidal axes with a groove around the butt.

Because these kinds of artifacts characterize the Palo Blanco Tradition sites found in the swampy areas throughout the grasslands that begin just south of these Guarani sites, they in all likelihood represent loans from the Charrua culture.

Aside from lithic artifacts, Guarani sites produce: conical bone points, small perforated discs made from shells and perforated seeds, and the above mentioned resin or bone labrets or their parts.

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CHAPTER 10

TUPINAMBÁ CERAMICS

10.1 Tupinambá Sites

By this time it should be clear that I am using the term `Tupinambá´ to refer to all the ancient coastal Tupians, in the sense that the term has been used by Métraux (1948b), Fernandes (1963), and Rodrigues (1958, 1964). My study of the Tupinambá ceramics is based on the published research listed in Appendix 2. All the Tupinambá sites or groups of sites have been indicated in Appendix 2 and in Figure 13 by the same letters and numbers.

The area where sites belonging to the Tupinambá Subtradition have been surveyed forms a strip about 4000 km long, bordering the Atlantic coast from Maranhão in the north to the Tropic Capricorn. Occasionally, and if one includes the lower valleys of certain rivers such as the São Francisco, the strip reaches a width of 200 km to 700 km, but typically, and as one progresses farther south, the actual coastal plain is very narrow. Another block of sites is found far inland on the headwaters of the Araguaia. The total area can be estimated at around 1,300,000 km^2. In contrast to the Guarani area, only around 150 Tupinambá sites have been surveyed so far, no doubt because much less field work has been done there. Around 20 more sites in Tupinambá territory probably could be attributed to the Tupinambá, but there is not enough data to do so (Figure 13: TP, TC, TG, and C).

This vast area includes most of what is usually described as Northeastern and Eastern Brazil, but most of the sites are concentrated

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in the immediate vicinity of the coast in the States of Maranhão: Rio Grande do Norte, Pernambuco, Bahia, Espírito Santo, Rio de Janeiro, and São Paulo. A lesser number of sites are inland, particularly in the São Francisco Valley, in the States of Bahia and Piauí, in the areas drained by the smaller rivers of Northeastern Brazil, and in Southern Goiaás State, which is in West-Central Brazil.

All these sites are to the north and northeast of the boundary line with the Guarani (compare Figure 13 to Figures 15 and 17) drawn approximately parallel to the course of the Tietê River.

10.1.1 Fieldwork Done in the Area

In Eastern, Northeastern, and West-Central Brazil, all surveying for sites has been conducted by land, even along the coast or along major rivers. In comparison to the Guarani area, a much smaller proportion of the total area has been sampled. The northernmost Tupinambá site has been recorded in Maranhão, near the boundary between Northern and Northeastern Brazil (Figure 13: TP6). In the State of Rio Grande do Norte a few more sites have been surveyed, not only on the coastal plain but also in the adjoining hilly region inland (TP4). Between Rio Grande do Norte and Bahia another enormous area is virtually unknown, except for a few sites recorded on the coast as well as in the interior of the States of Pernambuco (TP7) and Ceara.

In Northern Bahia most of the Tupinambá sites are concentrated on the coastal plain around Bahia de Todos os Santos, and on the Lower Itapicuru (TP8a and TP8b). In the interior of Bahia, some sites have been surveyed on the uplands in what is called Chapada Diamantina

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(TP8c-8f) and on the Upper São Francisco (TP2 and T1). All the rest of Northeastern Brazil is completely unknown archaeologically, except for one small area north of the Middle São Francisco, where one site has been excavated (TG7).

In the State of Espírito Santo, Tupinambá sites have been surveyed only on the coastal plain, near the shore, or along the Lower Río Doce (TP3a, TP3b, TP14 and C7). On the adjoining uplands--the mountainous region of the State of Minas Gerais where intensive fieldwork is being conducted on the tributaries of the Upper Paraná and Upper São Francisco--only only a few Tupinambá sites have been found (TP1, TP18, TG2, and TG8) but there are many other sites yielding either Una Style ceramics, and therefore attributed to the Purí, or ceramics of the Aratú Subtradition, and therefore attributed to the Southern Cayapó. Enormous areas between Southern Bahia and Northern Espírito Santo are still archaeologically terra incognita.

In the State of Rio de Janeiro, which has been more intensely surveyed, all the Tupinambá sites are on the narrow coastal plain, between the ocean and the escarpments of the uplands known as the Serra do Mar. The sites are generally found along the shores of bays and lagoons (TP5, TP6, TP9, TP12, T2, C4, TG3, TG4, and TG9) or along the lower stretches of some coastal rivers such as the Paraiba (C2, C3, and C4). No Tupinambá site has ever been recorded in the mountainous region inland, where there are many Goitacá or Purí sites, that is, those with Una Style pottery.

The State of São Paulo has never been sampled adequately; this is particularly unfortunate because the boundary between the Guarani and

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the Tupinambá has been traced somewhere between the Paranapanema and the Tietê. On the São Paulo coast, and between the Upper Tietê and the Mogi-Guaçu, all the sites apparently can be attributed to the Tupinambá (Figure 13: TP11, TP13, TP15, and T4) but south of these sites, on the Paranapanema, most of the sites are Guarani (GP1, GP3, GP7, GP17-GP19, GC12, GE3, and TG11); only a few are Tupinambá.

In Southern Goiás, where the headwaters of the Upper Paraná join those of the Araguaia in the uplands of Central Brazil, only a few Tupinambá sites have been recorded (TP16 and TP17). There are other sites with pottery of the Jataí Style, which I attribute to the Macro-Gê, as well as many more sites with pottery of the Aratú Subtradition, attributed to the Southern Cayapó and/or of the Urú Tradition, attributed to the Carajá.

The ceramics from nine sites on the Lower Araguaia near the boundary with Northern Brazil have been attributed to the "Tupiguarani Tradition" (Figueiredo 1965; Simões et al. 1973). Actually these ceramics have only a few of the characteristics of either the Tupinambá or the Guarani subtraditions and are still difficult to place (Brochado and Lathrap 1980).

10.1.2 Excavation of the Sites

With few exceptions, the thickness of the archaeological deposits does not exceed 30 cm to 50 cm. Because the coastal area of Northeastern and Eastern Brazil has been cultivated longer than Southern Brazil, most sites probably have been destroyed, and in those that remain, mixing of materials likely ocurred. Despite the thinness of the

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deposits, small stratigraphic cuts, generally 2 m by 2 m in area, have been excavated in different places to test them. A few sites, such as Tres Vendas in Rio de Janeiro Beltrás and Kneip 1969b; Kneip 1978), and Queimada Nova in Piauí (Maranca 1976, 1977; Moraes 1976), have been completely excavated. Such features as house sites, large hearths, burial places, and culinary pits filled with shells have been uncovered.

10.1.3 Classification of the Sites

The known Tupinambá sites, estimated to total 160, have been classified in two groups:

1. The Tupinambá Painted group includes 140 sites. Most of the sherds they produced are plain, as always happens in the Tupinambá Subtradition. Among the few decorated sherds, a proportionately larger number bear some kind of painting, be it polychrome, bichrome, or only slipping (Figure 13: TP1-TP17, TG2-TG4, and TG6-TG9).
2. The Tupinambá Plastic group includes around 20 sites. These sites produced even fewer decorated sherds than the Tupinambá painted group. Almost all of them bear some kind of plastic surface finishing, such as nail incisions, rim-nicking, or grooving. In some cases no painted sherds have been found (Figure 13: T1-T2, C3, and C4).

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10.1.4 Geographic Distribution of the Tupinambá Sites

More Tupinambá sites have been found in the interior (74 or 52% of the total) than on the coast (67 or 47% of the total). Nevertheless, the ethnohistoric distribution of the Tupinambá seems to indicate that coastal areas were much more densely settled than the interior.

Most of the sites classified in the Tupinambá painted group are on the coast of Eastern Brazil (49 or 35% of the total; Figure 13: TP3a, TP5, 6, TP9, TP11, TP12, C4, C7, TG3, TG4, and TG9) including the lower reaches of the Paraiba (C2, C3, and C4). All the rest of the sites of this group (73 or 53%) are dispersed over a far larger area in Northeastern Brazil that includes not only the coast, but also the Chapada Diamantina and the Upper and Middle São Francisco Valley far inland.

Sites that produced no or only a few painted sherds have been found only on the coast of Rio de Janeiro (T2) and on the Upper São Francisco (T1).

I have been unable to determine whether an additional 18 known sites produced the characteristic Tupinambá vessel forms. Some of them in São Paulo are possibly Guarani rather than Tupinambá, and others might be Neobrazilian (C2, TP15b, T4, TG1, TG5, TG10, and TG11).

10.1.5 Settlement Pattern, Site Hierarchy, and Functional Typology of the Sites

The total area covered by the surface scatter of potsherds may vary from less than 200 m^2 to as much as 20,000 m^2 or even more. A hierarchy of sites has been established for the area of Rio de Janeiro by Beltrao and Kneip (1967, 1970-1971), Beltrao and Laraia (1969, 1970), Beltrao

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and Faria (1970-1971) and Beltrao (1978), which can be applied to other areas. Villages are usually large, measuring from 200 m to 600 m in diameter when they are circular, or 100 m by 200 m to 200 m by 500 m when they are oval, as in the neighboring state of Espírito Santo. Village sites were usually not far from the sea and near a river, on a slight rise or hillside, and always within formerly forested areas. As many as 7 to 11 house sites have been counted, but it is not known if all of them were occupied at the same time.

Near the shores, many sambaquís were actually Tupinambá fishing and shellfish gathering camps. They were usually locateed near or within mangrove stands, there called apicum, and shallow middens about 40 m in diameter and 50 cm deep. Preceramic occupations with lithic materials described as the Itaipú Tradition (Dias 1976-1977) underlie many of them.

Tupinambá pottery also has been found in the upper levels of many of the huge coastal sambaquís. The occupation of the sambaquís by the Tupinambá was still observed in colonial times (Madre de Deus [1797] 1920). On the Upper São Francisco, the Tupinambá also apparently occupied caves and rockshelters in later times. On the uplands, for instance in Bahia, sites are usually smaller, although there are also a few large sites. On the Upper Araguaia it is common to find sites in which areas covered with Tupinambá potsherds are adjacent to areas covered with potsherds of the Aratú Subtradition and/or the Urú Tradition. There are no Tupinambá sites that are exclusively mortuary; burial basins and jars are always found near houses.

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10.2 Vessel Forms

Much less is known about Tupinambá ceramics, of which less than one hundred complete and reconstructed vessels have been published, than about the Guarani ceramics. Nevertheless, it is clear that in contrast to the latter, the set of Tupinambá vessels comprises only a few basic forms, which show little variation. The range of variation is displayed in Figure 16.

There is much more information about Tupinambá everyday life at the time of the Conquest. Pottery vessels were illustrated by the early chroniclers, who also described their uses. Therefore, it has been possible to establish direct relationships between the archaeological vessels and the Tupinambá culture, and to discuss the ways specific vessels may express culinary practices and food rituals.

I have compared the vessels illustrated by the European chroniclers in the sixteenth and seventeenth centuries with vessels found in archaeological contexts; the similarities are striking (Brochado 1979).

The illustrations I refer to were published by Staden ([1557] 1963), Thevet ([1557, 1575] 1944), and Lery ([1578] 1938). Staden's and Lery's works were edited by De Bry (1593) and appeared in one volume; Lussagnet (1953) edited Thevet. With detailed accounts in Gandavo ([ca. 1570] 1924, 1964), Anchieta ([1584] 1964), Soares de Souza ([1587] 1851, 1938), D'Abeville (1614, 1945) and D'Evreux (1615, 1864), these illustrations permit the complete reconstruction of the functional categorization of the set of Tupinambá vessel forms.

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10.2.1 Techniques of Construction

10.2.1.1 Firing

Historic accounts record that in the absence of any permanent kiln, pottery was fired in a pit with fuel stacked around or upon it, as was the case for the Tupinambá of Bahia (Soares de Souza ([1587] 1938:26). When fired above ground, the vessel was set upon rocks and covered first with fuel and then with large slabs of bark, as was the case for the Tupinikin of São Vicente (Staden [1557] 1963:125).

10.2.1.2 Temper

Tupinambá paste texture is coarser than anything in the Guarani Subtradition. The largest size attained by sand grains is in the grade range described as "pebbles", that is, above 4 mm, included by Shepard (1976:118) in Wentworth's scale in order to cover the exceptional inclusions that exceed the grade limits of granules, that is, 2 mm-4 mm. Despite this, we cannot describe Tupinambá wares as "crude", because surfaces are well smoothed when necessary, as for instance, on the inside of open vessels.

10.2.2 Vocabulary of Forms

The Tupinambá set of vessels can be categorized from a functional rather than a stylistic point of view, as I have demonstrated before in detail (Brochado 1979). From a functional point of view there are eight characteristic Tupinambá vessel shapes that make up the set of dishes necessary for a household unit. Figure 16 illustrates these shapes.

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Shape 1 comprises slightly restricted vessels with convex, inward-slanting rims that form a sharp projecting angle or carination on the outside near the mouth. Some are large and deep, complexly contoured, with a truncated conoidal body showing a slight inflection below the carination, and a flat base, and look like cauldrons (Figure 16:1). Others are shallow, with a composite contour and a rounded or flat base, and look more basins (Figure 16: 2 and 3). In a few cases, the rim is wide, divided by a groove, and the vessel is restricted.

Shape 2 comprises large or medium sized, unrestricted bowls with reinforced rims. Some have rounded bottoms (4), but flattened bases are more common; therefore, these vessels also look like basins. The rims may be everted and convex (4), thickened on the inside (6), thickened on the outside (5), or both on the inside and the outside (7 and 8). In the last case, which appears to be the most common, the interior thickening of the rim is not at the same level as the exterior one, which gives the rim profile its characteristic interiorly stepped outline (8). The exteriorly thickened rims usually have a beveled edge around the mouth that looks like a carination (5, 7 and 8). Most of these basins are oval or squarish with rounded, rather than circular corners, and the convex and/or concave upper surface of the rim shows polychrome painting that also may have been repeated on the inside of the vessel.

Shape 3 comprises huge, strongly restricted, ovoid jars with a conoidal base, and are usually plain but sometimes have at least a few rows of corrugations (9).

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Shape 4 comprises large, slightly constricted, flat-based cauldrons. Some have a characteristic cambered rim that forms a strong carination near the mouth (10). Some are deep and have superimposed carinated rims (11). Others are shallow and have a reinforced, exteriorly thickened rim. In either case, most are oval or squarish rather than circular. Some are plain, others have polychrome painting on the convex surface of the cambered rim.

Shape 5 comprises simple, restricted, ovoid or conoidal vessels that are usually plain, but a few have corrugations or nail incisions near the rim (12).

Shape 6 comprises simple, unrestricted, rounded, conoidal or flat based, deep or shallow bowls that frequently have polychrome painting on the inside and/or around the rim.

Shape 7 comprises flat griddles or platters with short rims that were used for processing bitter manioc.

Shape 8 comprises large, independent restricted, spheroidal pots with a short neck and a cambered rim (13). Smaller ones have the same or simpler everted rims.

Aside from the basic shape set, a few regional variants may be noted. There are a few independent restricted jars of complex contour with flat base, a conoidal lower part, and concave upper part separated by a sharp carination, as well as an everted--or more commonly--cambered rim that forms another carination near the orifice (15). The large ones are usually plain. Medium-sized ones have polychrome painting or, less commonly, corrugation or nail incisions around the neck and rim. Because these carinated jars, like the deep, doubly carinated cauldrons

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(11) appear only on the coast of Rio de Janeiro and São Paulo near the boundary with the Guarani, they almost certainly represent some sort of borrowing from the Guarani (Figure 14: 14-19). Large bucket-like vessels, truncated conoidal and flat based have also been found in the same boundary area. Truncated conoidal pot-rests sometimes appear in Tupinambá sites.

10.3 Surface-Finishing Techniques

The exterior surface of Tupinambá vessels showed four contrasting modes of surface fininsh: (1) simply smoothed; (2) slipped; (3) painted; or (4) modified by some kind of plastic decoration or pseudo-decoration.

The interior surfaces were: (1) simply smoothed; (2) slipped; or (3) painted.

10.3.1 Smoothing

The most frequent technique of surface finishing is simple scraping or smoothing, that is, most of the vessel surface was left plain. Some of the decorative techniques are the same as have already been described for the Guarani, but emphasis is on polychrome painting rather than on any plastic decoration.

10.3.2 Slipping and Painting

Red slip is frequent on the inside but not on the outside; however, sometimes it is applied overall.

The polychrome painted decoration is composed of fine lines and wide stripes, painted in different tones of red and/or dark brown, and/or black, upon white, yellowish or grayish slipped background.

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10.3.3 Plastic Surface-Finishing Techniques

The only known techniques of plastic patterning of the surface are: (1) fingernail punctations or nail incisions (Portuguese: ungulado); (2) rim-nicking (Portuguese: entalhado na borda); (3) grooving or body fluting (Portuguese: acanalado), which was used only occasionally; or (4) corrugation (Portuguese: corrugado), which usually is very flattened and unlike the characteristic Guarani corrugation.

10.3.4 Decorative Fields and Motifs

10.3.4.1 Polychrome Painting

Described only in its most general aspects, the polychrome painted decoration of the Tupinambá and Guarani potteries appears to be related. The structuring of the fields of decoration follows the same general rules: continuous encircling bands parallel to the opening developed between the structural lines composed of wide painted stripes. This basic pattern is shared by all members of the Amazonian Polychrome Tradition, and indeed helps to define it. However, because the shape set of Tupinambá vessels is totally different from that of the Guarani, the decorative fields must be defined in a very different way. For instance, the painted stripes outline not only all the corner and end points, but also sharp protruding angles that actually do not represent changes of direction of the vessel wall, but only expansions in its thickness (Figure 16: 5-8).

Polychrome painting is usually concentrated in two fields on the unrestricted and restricted bowls, basins, and cauldrons (Figure 16: 1-8). The convex or, more rarely, concave surfaces of the

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reinforced or cambered rims have a bordering band, while the insides usually have regular, all-over patterns. The lower limit for polychrome painted decoration is at the maximum diameter of these vessels which, on inward slanting rims (1-3, 10, and 11) is marked by the sharp edges of the carination, and on reinforced rims (5-8) is marked by the beveled edge of the lip.

The simple bowls, described as Shape 6 above, are painted on the inside and/or around the usually direct rim. Only on the Guarani influenced jars (9), localized near the boundary between Tupinambá and Guarani territory, is the upper part of the body, neck, and rim painted (15).

The formal aspects of the graphic geometric designs can be compared to Guarani, but the Tupinambá designs have been more elaborately organized, a judgement that is not just impressionistic, but that can be verified by rigorous symmetry analysis (Shepard 1976). At least five new motifs were added to the nine already mentioned for the Guarani: (1) T-shaped patterns; (2) double scrolls unscrolling in different directions, or double anchor shapes; (3) three-lobed or four-lobed figures; (4) S-shapes; and, (5) freely meandering curved lines.

Encircling bands remain important, but larger areas on the inside of vessels are covered by the repetition in two directions of the same motifs on the bands, creating regular, all-over patterns.

Double lines, ticking, and underlining or reinforcing by dots are more common as well as multiple outlinings of the motifs in concentric renderings completely filling the field. There is also hatching, cross-hatching, or stippling as modes to fill spaces between lines

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(positive areas of the design). Small triangular or irregular spaces are filled with solid paint.

A lacquer-like coating apparent on some painted vessels or sherds has been interpreted as a post-firing varnish with vegetable resin, such as jutai-cica obtained from the jutai tree. That identification is plausible, because Hymenoea courbaril (jutai-acu or jatoba roxo) is very common in the rain forests of Eastern Brazil, as well as in the caatingas of Northeastern Brazil. Such post-firing resin glazing is typical of the Late Central and Upper Amazon Polychromes, and related modern complexes, such as Shipibo-Conibo.

10.3.4.2 Plastic Decoration or Pseudo-Decoration

In the case of plastic decoration, nail incisions and corrugations are concentrated on the upper part, around the opening of the few vessels that carry them. In the case of restricted ovoidal vessels (Figure 16: 9 and 11), the decorative field is near the mouth. On spheroidal pots (13) and carinated jars (15), it is around the neck and rim, and on the rather rare burial urns (11), on the superposed carinated rims. Grooving or body fluting was rarely executed on the lower part of the body of vessels.

In Tupinambá sites, from 60% to 90% of the sherds are plain and only 10% to 40% show decorative techniques such as polychrome painting, red-slipping or, less frequently, nail-incising, rim-nicking, or body-fluting; corrugations are even more rare. Fine grained analysis of regional or temporal differences in Polychrome style has not progressed to the point where statements on such trends would be justified.

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10.4 Lithic Artifacts

Lithic artifacts are not found frequently in Tupinambá sites. The only reported elaborate artifacts are ground and polished stone.

Wood-working tools include a few small polished celts, some rather like the Guarani ones, othes trapezoidal but broader. T-shaped polished axes also have been found throughout Tupinambá territory but their association with the Tupinambá complexes is not yet fully demonstrated.

Beautifully polished objects for personal adornment are typical and include both labrets, in the strict sense, and check plugs. Labrets or lip-plugs (tembetá) are generally made of well-polished green stones such as amazonite, jadeite, or green quartz and rarely of such white stones as alabaster or white quartz. They assume at least four distinguishable forms: (1) cuneiform, straight and conical; (2) nail-shaped with a flat round head, some measuring up to 40 mm long and 20 mm in diameter on the head; (3) thick and short, shaped like bottle stoppers, large buttons, or disks up to 26 mm in diameter; (4) T-shaped, but with a thicker, conical or wedge-shaped foot, and shorter arms than the Guarani ones, measuring up to 35 mm long, and 25 mm wide (cf. Scatamacchia 1981: quadro 39). The Tupinambá plugs, worn through the cheek rather than the lower lip, were shaped like buttons or disks. Labrets illustrated by Staden ([1557] 1963) worn by the Tupinikin of São Vicente are different those from described above, found archaeologically, in the interior of the States of São Paulo, Rio de Janeiro, Bahia, Rio Grande do Norte, and Piauí. The Tupinikin labrets, illustrated also in Métraux (1948a:fig. 8) are either trapezoidal, apparently flat, with short arms jutting out from the shorter side, or triangular, long, and notched near the base.

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As is typical of all Amazonian complexes, flaked stone is rare and amorphous. Quartz flakes with cutting edges and/or points appear to represent a borrowing and a continuation from the former preceramic Itaipú Tradition. They lack Amazonian antecedents and are largely limited to those Itaipú sites later reoccupied by the Tupinambá.

10.5 Contrast Between the Guarani and Tupinambá Potteries

The set of Guarani vessel shapes shows a far larger variety than that of the Tupinambá, and few forms occur in both subtraditions. Some of the simpler Guarani vessels do have cognates among the Tupinambá vessels, and vice-versa, but these shared forms are never well represented. The more common and characteristic vessel forms of each subtradition are not shared at all. Those actually shared are so simple and so universally distributed in time and space that they do not warrant any close comparison.

1. Simple, unrestricted, or restricted rounded bowls (Figure 14: 1 and 2; Figure 16: 6).
2. Simple, strongly restricted, ovoidal pots or jars (Figure 14: 13; Figure 16: 9 and 11).
3. Independent, restricted, spheroidal pots or rounded bowls with inflected contour and everted rims (Figure 14: 8 and 9).
4. Restricted bowls with composite contour, characterized by a corner point, that is, a carination (Figure 14: 3; Figure 16: 3).

However, the Tupinambá forms (1-3, 8, and 9) that resemble Guarani pottery have exclusively rounded bottoms, whereas the Guarani forms have either rounded or conical bottoms.

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The more important distinctions between the sets of vessel forms of the Guarani and the Tupinambá are easily specified. Guarani vessels do not have flat bases and strongly thickened and reiforced rims (Figure 16: 5, 7, 8, and 11). Tupinambá vessels rarely have the sharply detached rims or necks, especially those formed by cambered or exteriorly thickened rims, vertically oriented or exteriorly inclined, that characterize the Guarani vessels (Figure 14: 4, 5, 11, and 14-19). Only two exceptions occur (Figure 16: 13 and 15), the second appearing near the boundary between the Tupinambá and Guarani and certainly representing a borrowing from the latter.

The carinated profiles that characterize many of the Guarani vessels (Figure 14: 3-7, 12, 14-19, and 22-23) are rare in Tupinambá pottery (Figure 16: 1, 2, 3, 11, and 15). Some of the so-called "carinations" are actually cambered rims or strongly thickened rims with a beveled edge.

The superposition of composite and/or inflected contours building complex profiles, that is to say, the stacking of discrete horizontal segments, characteristic of the Guarani pottery (Figure 14: 15a, 15b, 16-21, and 23), does not occur in the standard Tupinambá vessel set. It appears only on the two vessel forms already mentioned; they are found exclusively near the boundary and certainly represent borrowings from the Guarani (Figure 16: 11 and 15).

As we turn from considerations of vessel shape to considerations of surface finish, the two subtraditions can be segregated on equally operational bases. Under the term "surface finish" I include characteristics that resulted from the manner in which the vessel was

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evened during the shaping process, the techniques of slipping and painting, and the various forms of plastic surface patterning, such as corrugations and nail incisions. I have pointed out before (Brochado 1973b:8) that six surface finishing techniques are shared by both subtraditions. (1) polychrome black-and/or-red painting on a white slip; (2) red or white slip; (3) corrugated construction of finish of some surfaces; (4) decoration by nail-incisions; (5) rim-nicking; and, (6) punctations. But these six must be considered more as generalized descriptive categories than as precisely shared cultural modes. Further, the position of the decorative fields and their relationship to the whole area of the vessels have, as we will see, a totally different distribution in the Guarani pottery than in the Tupinambá pottery.

Of the six techniques noted above, 5 and 6 have a spotty or discontinuous distribution in time and space. Techniques 1, 2, and 4 persisted for such a long time, lasting as long as the subtraditions themselves, that they must be considered basic to the ancient form of the Amazonian Polychrome Tradition from which both subtraditions have divereged.

The proliferation of the techniques of plastic decoration or pseudo-decoration, in particular the exuberance and proliferation of corrugation in the Guarani pottery, totally sets it apart. On the basis of even cursory examination, at least eighteen variants of plastic surface treatment can be described for the Guarani, while in the Tupinambá pottery only six have been noted, and even these are rarely used.

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In the Guarani pottery there are many elaborately painted jars, and relatively fewer painted bowls or pots, which suggests that ceremonialism was more related to drinking than to eating. The huge painted jars are certainly the functional equivalent of the Chomo aní in modern Shipibo-Conibo ceramics (De Boer and Lathrap 1979) and can best be compared to the punch bowl as it serves in modern American festivals. The few richly painted bowls appear to have been drinking cups, similar in size and in many other respects to those used by the contemporaneous Panoans (Figure 14: 4 and 5).

Exactly the reverse occurs in the Tupinambá pottery. Polychrome painting is concentrated almost exclusively on the large basins used to serve food. There are few decorated jars, except among the Tupinikin. Ethnohistoric accounts state that most drinking cups were beautifully painted gourds, not pottery bowls, and there are a few examples of these exquisitely decorated gourds in very early ethnographic collections made along the Central Amazon.

Most Tupinambá jars are plain or corrugated, except among the Tupinikin, who used polychrome painted ones, similar in some respects to those of the Guarani (Figure 16: 15). On the other hand, given that the large Guarani jars were used mostly to brew and serve alcoholic beverages from "sweet" manioc, while the Tupinambá basins were used to serve farinha from "bitter" manioc, both kinds of vessels were ultimately related to the formal rules of etiquette involved in the presentation and consumption of beverage or solid food made from manioc.

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CHAPTER 11

IT ALL STARTED IN AMAZONIA: TEMPORAL AND GEOGRAPHICAL SPREAD OF THE TUPIANS AND THEIR RELATED TRADITIONS

11.1 Lathrap's Model of the Ethnohistoric Distribution of the Tupians

Both the Guarani and the Tupinambá ceramics clearly conform to what Lathrap and I have called the Amazonian Polychrome Tradition (Brochado and Lathrap 1980), which was first established by Howard (1947:42) as the Polychrome Division of Amazonia. Relationships between the polychrome pottery of Eastern Brazil and that of Amazonia were mentioned often from the late part of the nineteenth century onwards (e.g., Netto 1885) but were first precisely defined as a taxonomic unit by Howard (1947:82). As a reflection of our gradually increasing understanding of these relationships, I will designate the pottery of the Guarani and that of the Tupinambá as two subtraditions of the Amazonian Polychrome Tradition. Because both spread from Amazonia into Eastern Brazil, both must have originated somewhere in Amazonia, and the node of the three major branches of the Amazon--the Solimões, the Negro, and the Madeira, near modern Manaus--must for a number of reasons appear attractive as the putative hearth of their divergence.

Lathrap (1962; 1970a) and Brochado and Lathrap (1980) argue that most of the geographic spread of the Amazonian Polychrome Tradition, except into and beyond the Venezuelan Llanos, must correlate with the expansion of the Tupians--in the broad sense--out of Central Amazonia. In historic times almost every known instance of pottery of this

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tradition was, as we will see, produced by Tupian groups, and the exceptions (Shipibo-Conibo in Peru and Canelos Quichua in Ecuador) can be accounted for by recent, probably historic, acculturation to the Tupian Cocama-Omagua.

With all the data we now have it is possible to reconstruct the spread of the ceramics of the Amazonian Polychrome Tradition over much of Amazonia and Eastern South America (Figures 19-22). Not only shall I put forth evidence bearing on the Tupian expansion, but I will try to build a model that can explain why they were expanding. In doing so I will borrow heavily from Lathrap's (1962, 1970a) model, which puts together all the geographical, geomorphological, botanical, faunal, demographic, ecological, archaeological, ethnographic, and linguistic evidence available to explain the ethnohistoric distribution of the Tupians.

Lathrap begins by pointing out that at the time of initial European contact the most divergent--and presumably more anciently dispersed--branches of the Tupian-stock and of Macro-Arawakan tended to range near the headwaters of the rivers entering the Central Amazon, respectively, from south and west. The speakers of the most closely related languages within the Tupí-Guarani family dominated the broader floodplains on the lower reaches of the major southern tributaries of the Amazon, much of the mainstream of the Lower Amazon, the Atlantic coast of Brazil and Uruguay reaching to the Río de La Plata, and much of the floodplains of the Paraná, Paraguay, and Uruguay river systems. In much the same way, the speakers of Maipuran languages within the Arawakan langauge family dominated the mainstreams of the tributaries of

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the western segment of the Amazon, including the Río Negro and the Orinoco.

Lathrap proceeds to say that the most parsimonious explanation of this pattern of historically observed ethnic distribution is that, between 3000-2000 B.C., the Arawakan and then the Tupians began to spread upstream from Central Amazonia, between the mouth of the Río Negro and the mouth of the Madeira, colonizing all available waterways. The early Tupians also spread downstream along the Amazonian _várzea_. Because floodplain areas are circumscribed, fighting for the limited supply of productive farmland and prime fishing waters has been the most important single force in the cultural history of Amazonia; this is clearly visible in the archaeological record. I will add that the Amazonian pattern of population growth and the competition for scarce resources, which resulted in outward colonization and societal adaptation, can be applied _mutatis mutandi_ to Eastern South America cultural history as well.

Lathrap also points to marked congruences between the distribution of particular ceramic styles and the distribution of particular linguistic families and subfamilies, and suggests the possibility of demonstrating archaeological concomitants of the major outward colonizations, which must be accepted to account for contact period linguistic distribution. In each case, however, the reconstruction of migration from archaeological evidence and the reconstruction of migration from linguistic evidence, must be pushed to its limits _independently_ before the two are compared for possible congruence.

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In relation to ceramic occupations of the Central Amazon, Lathrap (in Brochado and Lathrap 1980) argues that we have two options for the chronology of Amazonia. If we reject, as some investigators do, most of the earlier C^{14} dates (i.e., all those before A.D. 1) we generate a model in which everything is very late, and seems to have been introduced from the outside. If, however, we accept the earlier C^{14} dates--which we have done because we could not find any reason not to--the overall picture is totally different.

Given that, Lathrap (1972a; 1977) proposes a very early occupation of Central and Lower Amazonia by groups of sedentary fishermen and gatherers in whose house gardens cultivation slowly evolved as a response to specifiable ecological and cultural pressures. The differentiation of cultural space and wild space, along with the differentiation of cultural plants and wild plants, was the major push in this development. In time, a very simple ceramic industry emerged. Its invention must be dated well before 3500 B.C., which is the earliest date we have for ceramics of the Mina Tradition, as well as for pottery on the Middle Orinoco (Zucchi and Tarble 1982; Zucchi, Tarble, and Vaz n.d.). However, both groups of pottery are more sophisticated in their construction and decoration than we would expect for simple, incipient ceramics. Indeed, both are far more complex than the group of simple hemispherical ceramics that Linné (1925) has noted as surviving until recently in the crescent of lands marginal to the Amazon Basin.

Such simple pottery is not easy to find. There are a restricted number of prime sites for occupation along the main river channel of the Amazon; therefore, a long history of successive or continuous

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occupations has left so much refuse in such sites--the anthropogenic formations called terras pretas--that the earliest occupations, which must be very small and shallow, have been buried by the larger and deeper subsequent ones. It is only in the Central to Lower Amazon that anthropogenic soils (middens) are so extensive and deep as to appear on even the extensive maps prepared by soil scientists. This explains why the earliest ceramics so far known have been found mainly in shellmiddens; these occupations are detected only when made conspicuous by the accumulation of shells.

The earliest dated remains so far in Amazonia are the ceramics described as the Mina Tradition, which I have discussed in Chapters 5 and 8. Ceramics with the same characteristics as Mina, and in the same time range, have been found in other shellmiddens or open sites along the coast (Uruá, Tucumã, and Areão) as far south as Maranhão (Simões 1971; Correa and Simões 1971; Simões 1972, 1978, pers. com., n.d.), as well as in Central Amazonia, at Jauari (Castália Phase) (Hilbert 1959a, 1968), Taperinha and Paricatuba (Hartt 1885). Even on the Middle Ucayali, in the Early Tutishcainyo midden, before 2000 B.C., similar sherds were found. These apparently had been collected by the Early Tutishcainyo potters from what were even then archaeological sites to produce grog for their more sophisticated ceramics (Lathrap 1962). All the above indicates that this tradition was widespread and had a very early distribution in Amazonia (Brochado and Lathrap 1980).

From that time on, we clearly see ceramic styles evolving in Central Amazonia, developing in parallel, and then bifurcating repeatedly to form new traditions. These gradual and progressively evolutionary

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changes do not support the hypothesis of successive waves of migration coming from the outside, in particular from the North Andes, a source that has been suggested with monontonous regularity (Meggers and Evans 1955, 1978a). Only a model of internal development showing the progressive differentiation, branching, and merging of styles and traditions can be fitted parsimoniously to the data base. This process continued for a long time. Technological development and population growth took place most rapidly within Central Amazonia, and most of the innovations found around Amazonia were the result of evolution occurring in its central <u>várzea</u>. In contrast to this, we see--on the Upper Amazon, as well as on the upper courses of the major tributaries of the Amazon--the superposition of discrete waves of different ceramic subtraditions. This record of discontinuity and the sequential arrival of successive migratory waves or episodes of outward colonization from Central Amazonia contrasts sharply with the picture of continous evolution on the Central Amazon, which can be documented from the data presented in Hilbert's mongraph (1968), although he does not choose to interpret the data in those terms. Lathrap (1970b) has presented a corrective reordering of the data yet to be refuted or even noted by Hilbert or Meggers and Evans.

Lathrap's (1970b) model of the spread of the Tupian languages places the first differentiation of Proto-Tupian in Central Amazonia around 2000 B.C. This corresponds to the node at the top of the phylogenetic chart of Macro-Tupian languages, as it has been reconstructed from Lemle (1971) (Figure 3).

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The probable position of the Proto-Tupians ca. 500 B.C. is depicted in Figure 19, as they began to spread in different directions along the axis formed by the mainstream of the Amazon. By that time, the Proto-Tupians were in possession of the Middle and Lower Amazon, from the middle course of the Madeira to Marajó. With regard to the development of the Guarani and Tupinambá languages, this situation corresponds to the second node from the top in the phylogenetic chart (Figure 3). Proto-Tupian was about to split into what we shall call a Proto-Guaranian branch, moving up the Madeira, and a Proto-Tupinamban branch, moving downstream along the Amazon. Two other branches, formed by the speakers of what would later be called the divergent Tupian languages, were moving up the Xingú and the right bank tributaries of the Madeira, out of the Amazonian plains. The archaeological concomitants of these outward colonizations, which are marked by the spread of the Amazonian Polychrome Tradition, shall be discussed at length in the two next sections of this chapter.

Plotted at one thousand year intervals, the situation by ca. A.D. 500 should have been like that modeled in Figure 20. The pertinent archaeological data has been revised by Lathrap and me, in the light of new C^{14} dates now available (Brochado and Lathrap 1980) and has been fully corroborated by the phylogenetic tree of languages established by Lemle (1971). The situation by A.D. 500 corresponds to the lowest nodes on Figure 3. By that time the Guarani language had already split from Proto-Guaranian, and its speakers, moving up the Madeira-Guaporé and out of Amazonia, had already reached the floodplains of the Paraná-Paraguay and Uruguay river systems in Paraguay and Southern Brazil. The

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Tupinambá proper had also split from Proto-Tupinambá, which also includes Cocama-Omagua, and Tupinambá speakers, moving down the Atlantic coast, had probably already reached Northeastern Brazil.

The speakers of the divergent Tupian languages, the forerunners of those now classified in the Yuruna, Arikén, Tupari, Rama-rama, Mondé, and Puruborá language families (B-G) in Rodrigues' classification (1958, 1964), had long before moved up the right bank tributaries of the Central Amazon to the places where they were to be found in historic times, resting in small embayments into the vertical scarpments of the Brazilian Shield (chapadão) (Domingues 1968: map between pp. 16-17) (Figure 2).

In historic times the situation was that shown in Figures 1 and 2. As I mentioned in Chapter 3, Tupian populations were almost continually occupying the right bank of the Middle and Lower Amazon, from the lower course of the Madeira to Marajó. South of the Amazon they had spread all the way to the headwaters of the Madeira, Tapajós and Xingú, until they could go no farther without impinging on the cerrado area of Central Brazil.

The Guarani and Tupinambá who, as shown in Figure 2, had moved out of Amazonia in opposite directions and held enormous areas in historic times. The Guarani territory comprised most of the Paraná-Paraguay and Uruguay watersheds, as well as the coast of Southern Brazil, Uruguay, and Northeastern Argentina. Their relatives, the Chiriguano and possibly the Guarayo, had moved eastward to the Andes and were occupying a large area between the Upper Pilcomayo and the Upper Guaporé. The Tupinambá territories comprised most of the coast of Northeastern and

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Eastern Brazil, sections of some rivers of the interior such as the São Francisco, the Paranaiba and the Tietê, and reached even to the headwaters of the Araguaia.

North of the mouth of the Amazon, other Tupians extended through Amapá to French Guiana. Others had migrated upstream of the mouth of the Madeira and were occupying long stretches along the Amazon and several of its upper tributaries, such as the Marañón, Middle Ucayali, Lower Huallaga, and Upper Napo. Figures 21 and 22 show how this immense spread of the Tupians took place; its development will be commented upon later.

11.2 The Guarani Ceramic Subtradition as Derived from the Guarita Subtradition in Central Amazonia (ca. A.D. 1)

I shall begin the comparison of the pottery of both the Guarani and Tupinambá to the Amazonian Polychrome Tradition by looking to the features shared by all of this polychrome painting, because this is what prompted the idea of the existence of a tradition in the first place (Howard 1947:42).

Amazonian techniques of polychrome painting are many and varied, but in the Tupinambá and Guarani ceramics usually only the germinal motif, constituted by the juxtaposition of fine lines and wide stripes in red and/or black on a white slip, is employed in generating the complete design. Other characteristics of the Amazonian Polychrome Tradition at or prior to the divergence of Tupinambá and Guarani related to the manipulation of linear elements in the decoration are: double lines, the juxtaposition of wide and fine lines, the ticking or stippling of the line, or its underlining by dots, as well as the occasional use of

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multiple outlines around rather simple motifs. The bounding of the decorative fields by the corner points of the vessel contour, as well as subdivision of the vessel surface into continuous, encircling bands parallel to the opening, also are characteristic Amazonian patterns. The large units of design, as well as the all-over patterns, all look like very simplified versions of the Amazonian stylized representations of supernatural creatures, which has its most explicit form in the Marajoara style. Sometimes it looks as if strips had been cut from these representations and then transformed into geometric bands.

A complete study on the nature and structure of this widespread tradition, following the lead of, for instance, Washburn's (1983) theoretical approach, is still to be done; but it is clear that most of the simpler decorative techniques or ways of texturing the surface of the vessels are the same in Amazonia and in Eastern Brazil. Nail incisions, punctations, rim-nicking, body-fluting, and scraping are almost as common in most Amazonian ceramic complexes as in Tupinambá pottery. However, the Guarani pottery, as we shall see, emphasizes corrugation at the expense of all other techniques. White and red slipping is as common in Amazonian complexes of the Polychrome tradition as in the pottery of the Guarani and Tupinambá, while incision before slipping, incision through slip, and combinations of modeling with all of the above, all exuberantly developed in Amazonian styles from Marajoara on the east to Napo and Caimito on the west, are missing in both Tupinambá and Guarani pottery.

In my own former, erroneous explanation (Brochado 1973a), the Tupinambá pottery was viewed as derived from, or as an offshoot of, the

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Guarani. Actually those features shared by both were inherited from their common ancestor in Central Amazonia, the Guarita Subtradition of the Amazonian Polychrome Tradition, which is an earlier and simpler variant of the Amazonian Polychrome Tradition. The complex combination of techniques just discussed as shared by such styles of the later Miracanguera Subtradition as Marajoara, Napo-Caimito, Zebu, and Pirapitinga, may have been lost by the Tupinambá as they diverged from Marajoara culture, for it is now clear that the Miracanguera Subtradition shares more with Tupinambá than with Guarani. It appears that these complex stylistic innovations, which distinguish the Miracanguera Subtradition from the earlier Guarita Subtradition, post-date the departure of the Guarani up the Madeira.

We have already looked into the relationships between the polychrome painting of Eastern Brazil and Amazonia. The same simplification holds true for white and red slipping, but Guarani pottery emphasizes plastic patterning of the surfaces more than does any other pottery in the Amazonian Polychrome Tradition, and I must explain why. Also ultimately to be accounted for are simple fine-line incised motifs still found in a few sherds from sites on the Upper Paranapanema.

Similarities between the set of Guarani vessel forms and the sets of vessel forms of other complexes of the Amazonian Polychrome Tradition exist, but are few. Carinated vessels are common in both, but few are comparable, because in Amazonia their upper segment is commonly concave rather than convex, as it usually is in the Guarani pottery (Figure 14: 3-5, 12, 14-19, 22).

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It is not only unlikely but, I will argue, outrightly unbelievable, that the same complex combinations of painted decoration described above for the Amazonian Polychrome Tradition could have been invented first in Amazonia and then again in Southern Brazil or Paraguay. Therefore, the clear relationships of the polychrome painting indicate a derivation from an early form of the Guarita Subtradition, but with considerable time depth.

The Amazonian Polychrome Tradition, as discussed by Lathrap (1962, 1970a) and by Brochado and Lathrap (1980), has a much longer history of development in Central Amazonia, predating by at least two millennia the beginning of the development of the Upper Amazonian complexes mentioned above. Consequently, it is unreasonable to consider the possibility of diffusion the other way round, that is, from the Guarani of Southern Brazil or Paraguay to Amazonia.

The unfolding of the Amazonian Polychrome Tradition is the most obvious development in the prehistory of Amazonia. Lathrap (1962, 1970a) and Brochado and Lathrap (1980) argue that most of the spread of the Amazonian Polychrome Tradition must be correlated with the expansion of the Tupians from Central Amazonia.

To account for the dated distribution of the ceramic complexes of this tradition, we have to model an enormous five-branched and multi-pronged succession of movements out of Central Amazonia, embracing not only most of the archaeological culture areas of Amazonia, but a large part of Eastern South America as well (Figures 21 and 22). To explain how the development of this tradition took place, Lathrap (1970a) theorizes two parallel and, in their later parts, partially contemporaneous evolutions.

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Even if details are incomplete, the tradition appears to have developed in Central Amazonia. Using the data, but not the interpretation of Hilbert's monograph (1968), Lathrap (1970b) has already demonstrated a continuous development from a style very like Barrancas, as described on the Orincoo (Cruxent and Rouse 1958), into the earliest phase of the Guarita Subtradition. Crucial to this demonstration are the early Guarita sherds illustrated by Hilbert (1968:Abb. 46, 3, 4. 47: Tafel 332-6). The rim sherds are from bowls identical in shape to the labial flanged bowls of Barrancas, by far the most common vessel form in that style. The design motifs are classically Barrancas, but executed in Amazonian Polychrome. Thus, we can document a picture of continuous cultural development from around 500 B.C. to the contact period.

As one turns one's gaze from 500 B.C. to further into the past, the crystal ball becomes very cloudy indeed. What I present below is only the barest outline of what I am attempting to expand in conjunction with Lathrap (Brochado and Lathrap 1980). It is offered only as a discussable alternative to the other two models that have been published. In the more elaborate model, Meggers and Evans beautifully illustrate a coherent dynamic model in a series of chronologically ordered maps that can be compared directly to my own (Meggers and Evans 1978: figs. 12.7, 12.8, 12.11, 12.14, 12.18). More recently, Roossevelt (1980) proposes, but does not illustrate, a model of <u>total</u> demographic stagnation--not just for the Middle Orinoco but for the whole Amazon Basin--that spans most of the time range under discussion.

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Because I find that neither model adequately accounts for any of the data at hand, I hazard a third, expressed below as a series of points in an evolving continuum.

Prior to 500 B.C., data from within the Central to Lower Amazon Basin is scant and from widely separated locations: Jauarí (Hilbert 1968), Pocó and Boa Vista, dated 1400-900 B.C. (Hilbert and Hilbert 1978, 1980; P P. Hilbert, 1980, pers. com.), collections made by Hartt (1874), still completely unpublished. By combining what is at hand with what is known from the better studied periphery of the Amazon, I hypothesize the following stages in a continuous cultural development in the Central Amazon:

Stage 1. By 5000 B.C. simple hemispherical bowls of the crudest technology, protypes of Linné's simple hemispherical pottery, had appeared or been invented in the Central Amazon.

Stage 2. By 4500 B.C. thinner, better made globular ceramics, sometimes red slipped, the prototype of Mina and Palo Blanco, had been achieved.

Stage 3. By 4000 B.C. a complex with fiber temper, a more complex shape set and well-executed incised decoration had been achieved. This shape set suggests the beginnings of the Nazaratequi Tradition on the Upper Amazon (Lathrap 1970a), the early fiber tempered pottery on the Middle Orinoco (Zucchi pers. com. 1982), and Saladero proper (Cruxent and Rouse 1959), but none of the other Saladoid complexes of Venezuela (Cruxent and Rouse 1958).

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Stage 4. By 3000 B.C. further elaboration resulted in the forms of the Saladoid Series appearing earliest at La Gruta (Roosevelt 1980) on the Middle Orinoco, but from there spreading through much of Coastal Venezuela and out into the Antilles.

Stage 5. By 2500 the shape set characterized by Early Tutishcainyo on the Upper Amazon, but occurring on the Lower Amazon combined with typical Amazonian Polychrome painting had been achieved.

Stage 6. With the Central Amazon the labial flanges typical of the Tutishcainyo Tradition evolved into those typifying the Barrancas-like styles that gave rise to Guarita.

It should be stressed that only Stages 2, 5, and 6 of this outline are crucial to the discussion of Eastern Brazil that forms the core of this thesis (see endnote, p. 347). Otherwise, only the idea of continuous population pressure out of the Amazon is essential to my argument. Besides, the scheme is offered as a working model for criticism, and as a stimulus to further research; it should not, at this stage of our thinking, give rise to further taxonomic proliferation. The one point about which I am certain is, that as the "truth" about the Central Amazon emerges, all three schemes will fail by reason of being overly simplistic.

Because Hilbert (1968) has so thoroughly disarticulated the prehistory of the Central Amazon, I have overcompensated by stressing the idea of a single continuously evolving and continually branching Macro Tradition. This concept, which at this stage of our knowledge

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must, of necessity, have fuzzy boundaries, is intended to include: the two early ceramic traditions of East South America, Pedra do Caboclo and Palo Blanco; the Nazaratequi Tradition; the Tutishcainyo Tradition; Saladero; the Saladoid Tradition of Venzuela and the Antilles; Barrancoid ceramics in the broad sense of the term (Lathrap 1970a); and all complexes of the Amazonia Polychrome Traditions.

All of us archaeologists who have looked at the Central Amazon agree that there are futher, clearly intrusive, ceramic complexes that cannot be fitted into the scheme presented above. Lathrap (1970b:501), in agreement with Hilbert, stresses the intrusive character of Paredão, but suggests no source. Other late intrusive complexes into the Amazon are striking in the amount of territory they encompassed at the time of contact. The careful reader will have noted that I exempted the final map of Meggers and Evans (1978:fig. 12:23) from my general criticism of their dynamic model of Amazonian Prehistory. With the exception of their treatment of the Tupinambá problem, this stage of their model is remarkably similar to my own. Their upstream movement of the Amazonian Polychrome Tradition, up the Napo to become the historic Omagua, and up the Ucayali to become the historic Cocama, accords precisely to my own. The invasion of peoples with Arauquinoid cermaics from the Venezuelan Llanos into the Lower Trombetas area indicated on their map precisely parallels Lathrap's thinking on the origin of the Itacoatiara Style (Hilbert 1955) and the appearance of Cariban speakers on the shores of the Amazon (Lathrap 1970a). The exuberant modeling of the style of the Tapajós nation (Palmatary 1960) has no real parallels with any other Amazonian style. For once, an origin in Colombia, but not at a high

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elevation, seems indicated. A discussion of such a linkage lies far beyond the scope and interest of this thesis.

As I turn back from the general and highly theoretical model of Central Amazonian prehistory and paleodemography to the specific problems of the origins of black and red on white slip painting as a decorative technique, and the origin of the ethnic group that was to diverge into Tupinambá and Guarani, there are futher specific points to be emphsized.

There are many high and deep middens (terras pretas) concentrated in the area between the Jamundá and Trombetas (Palmatary 1960; Faria 1946:map, p. 11; Hilbert and Hilbert 1980; Smith 1980; Isaacson 1981; McEwan 1983), suggesting that the early, massive buildup of population leading to the dispersal of populations out along the three great tributaries of the Amazon extended from Manaus eastward along the Amazon floodplain to the mouth of the Río Tapajós.

The C^{14} dates for the Boa Vista and Pocó sites in this more eastern section of the várzea, mentioned above (Hilbert and Hilbert 1978, 1980; P. P. Hilbert 1980, pers. com.) are the earliest so far determined for black and red on white polychrome within the Amazon Basin.

Last but not least, there are extensive beds of particularly good kaolin in that area (Sioli, pers. com. to Lathrap), essential for the preparation of the white slip used as a background in most polychrome painting.

During the development of the Amazonian Polycrome Tradition, modeling and broad-line incising were gradually replaced by polychrome painting. Early in the development, this painting was still applied on

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to the same decorative fields--the flat surface of the broad labial flanges. Later, the painting appeared on progessively more differentiated decorative fields, but retained the characteristic scroll motifs, which were painted instead of incised. On the other hand, the relatively simple Central Amazonian range of vessel shapes did not change much and, characteristically, there are no anthropomorphic burial urns.

Given the relationship between this tradition and the Tupian-speakers, the beginning of the regional differentiation of this early Guarita Style is correlated with the first differentiation of Proto-Tupian, represented by the uppermost node on the phylogenetic chart of the languages of the Tupí stock (Figure 3).

Because there are strong structural similarities between Guarita, Tefé, and São Joaquim materials this development, which Lathrap calls the Guarita Subtradition, should have been well advanced by 400-500 B.C., during the earlier occupation of the Paredão site. Before A.D. 1, it had already spread farther down river and is found at the Itacoatiara site, where sherds having red-and-black-on-white polychrome painting as well as sherds having the two tones of red on a white slip have been found (Figure 19: vertically hachured arrow = Proto-Tupians; Figure 22: black arrow = 1400-400 B.C.). Guarita subtradition materials dated before A.D. 400-500 were found at the site of Manacapuru, above the mouth of the Río Negro; the polychrome painting is still concentrated on the outslanting rims of some bowls (Figure 20: cross-hachured arrow = Tupian; Figure 22: finely cross-hachured arrow = 400 B.C.-A.D. 1). Related materials, dated A.D. 700, appear well upriver at the sites of

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Caiambé and Tefé, above the mouth of the Japurá-Caqueta, and at São Joaquim and Santa Luzia, near the mouth of the Içá-Putumayo (Figures 21 and 22: vertically hachured arrows).

The above evidence indicates that the Guarani pottery is a very early derivative of the Guarita Subtradition. Because the Guarani pottery had to spread up the Madeira and Guaporé and down the Paraguay to reach the drainages of the Paraná and Uruguay, and because it was already widespread there between A.D. 100-500, it must have started moving out of Amazonia by at least 200 B.C. to have achieved the linguistic model I have projected for A.D. 500 in Figure 20, where Guarani is indicated by the diagonally hachured arrow. Given the distances involved, 200 B.C. is an extremely conservative estimate (see endnote to Chapter 12, p. 389). Figure 15 is a schematic of the expansion of Guarani in the territory where their archaeology is fairly well known. This data set is discussed in Chapter 12. Figure 22 summarizes the expansion of all pottery of the Amazonian Polychrome Tradition. Linguistically, the cross-hachured arrow in Southern Brazil = A.D. 400-600.

As the Guarani moved up the Madeira-Guaporé, their simple version of early Guarita Polychrome style was augmented by close cultural contact with non-Tupian groups in eastern Bolivia and the northern Chaco. The set of vessel forms also changed. Bowls with everted and thickened rims, labial or medial flanges, and fields of concentrated incised decoration were replaced by a large array of new pot and jar forms. All of them are conoidal, independent and restricted, but while some have inflected profiles, others are carinated and show characteristic

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"stacked-up" profiles. However, the common spherical pots show the same range of variation as the Amazonian ones. Guarani vessel forms can be traced to the Pacacocha Tradition of the Middle Ucayali, the Pacachocha complex, the Cashibocaño complex, and the Nueva Esperanza complex. Myers (1970) was the first to discuss this pattern of relationships, a number of as yet undefined complexes from the Ucayali upland (Lathrap 1970a), and all of the modern ceramic complexes of the non-riverine Panoans of the Ucauyali that are branches of the 1500 year evolution of the Pacacocha Tradition in eastern Peru. Myers (1970) was the first to demonstrate that the arrival of the Pacacocha Tradition in eastern Peru marked the arrival of Panoan speakers in that area. Unfortunately, in terms of terminological simplicity, the best published and most fully illustrated vessels of the Pacacocha Tradition were found at the Cumancaya site (Raymond, DeBoer, and Roe 1975; Roe 1973:142-145), where they are directly associated with a totally different ceramic style. This complex situation is not the result of mechanical mixture, but of a stratified society in which there was a Lowland Quecha speaking elite and a Panoan (Conibo and Cashinahua) lower class. Raymond has isolated the lowland Quecha style, without Pacacocha Tradition (Panoan) contamination, at the Sivia site (Raymond 1972; Raymond, DeBoer, and Roe 1975; Lathrap 1984).

The utility vessels of the Pacacocha Tradition, from the Sonochenea site (De Boer 1981), offer the best basis for discussing the divergences of Guarani ceramics from their Amazonian antecedents because there is less influence there from the Lowland Quecha style. The huge Sonochenea independent restricted jars have almost identical tiered or "stacked-up"

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profiles, showing superimposed convex sections, or "shoulders", topped by an elborated neck (Figure 14: 12, 14-19). This insistence on marked, horizontal segmentation remains the distinguishing characteristic of modern, riverine Panoans (cf. DeBoer and Lathrap 1979). The large Sonochenea independent and restricted, conoidal pots and jars of inflected contour are identical to the Guarani ones (Figure 14:12 and 14) and show the same encircling bands of superposed simple or complicated, spatulated and finger-marked, or nail-incised corrugations. Corrugation in Sonochenea is sometimes applied only around the rims, but is often applied to all the upper segment of the body or even the entire body. Nail-incisions, unobliterated coils, brushing or combing, as well as all-over red slip, are also common. These large conoidal pots, of such styles as Cumancaya, Shauaya, and Sonochenea, were secondarily used as burial urns in a formalized pattern of urn burial typical of all Guarani and surviving into modern times among the Chiriguano.

The composite nature of the ceramics from Cumancaya has only recently became clear, mainly through the excellent ethnographical study of Angelica Gebhart, conducted among the Conibo at Caimito on Imiriacocha of the Middle Ucayali to the east. Cumancaya is a singularly inappropriate style to be designated the nominate member of a tradition, because it is, in fact, two superimposed and completely separate ceramic traditions.

Conibo myths, collected by J. Loriot (pers. com. to Lathrap 1964) mention a large village at Cumancaya, near Caimito, and the fact that it was ruled by an Inca. However, the copious materials collected by Gebhart (pers. com. to Lathrap 1982) repeatedly emphasize the stratified

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character of Cumancaya society, clearly indicating a Lowland Quichua aristocracy and a Panoan--more specifically Conibo-Cashinahua--lower class, a situation exactly analogous to the well documented relationship between the Mbaya-Caduveo and the Guaná (e.g., Boggiani 1900). The fact that this series of myths also discusses taxation in the form of peanuts indicates that the hierarchical structure may have been even more developed and rigid.

Because of this data, Lathrap strongly believes that the zoned-red style is specific to the Lowland Quichua aristocracts who came out of the Macás region and settled among the Panoans. This style is cognate with the Chiguaza Complex (Rampon 1959; Porras 1980:123-127) and the Macás Complex (Bushnell 1946; Lathrap 1970a), both from the Santiago-Pastaza region on the Upper Marañón. Ultimately, it derives from the red-zoned style of Cerro Narrío, on the Southern Ecuadorian Andes, closely dated to around 1100 B.C. there (Collier and Murra 1943; Braun 1982).

Other features of the serving ware of the Cumancaya complex, such as high pedestal bowls and interior resist decoration, which is preserved without change by the modern Cashinahuá (Kensinger et al. 1975), are also clearly part of this Ecuadorian tradition.

The horizontally segmented and largely corrugated vessels of inflected or complex contour found in Cumancaya are part of a different tradition. Because these vessel forms are still used by the Shïpibo-Conibo and Cashinahua, this tradition can be associated with the Panoan-speakers, as Myers (1970) first pointed out.

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There is no reason to argue that the Cumancaya red-zoned style of Ecuadorian derivation influenced the Guarani; Guarani pottery does not have red-zoned decoration. What Cumancaya and Guarani have in common, as we have already seen, are the often corrugated conoidal pots and jars of inflected contour, which characterize the Pacacocha tradition in the Cumancaya, Sonochenea, and Shauaya Styles--as well as the "stacked-up" jars of complex profile--which at present are best published for the Cumancaya and Sonochenea styles. Sonochenea has been C^{14} dated A.D. 700-950, and Cumancaya A.D. 750-900. Hence, even if I accept the earliest C^{14} date for Shauaya (A.D. 350-550), which De Boer explicity rejects, the ceramic complexes of the Peruvian Panoans cannot be accepted as the direct source of the Guarani segmented and corrugated jars. By A.D. 100-500 the Guarani set of vessel shapes, including the above, was already fully integrated and had spread far into Southern Brazil. Nor are there any indications that the Guarani ever penetrated the Peruvian montaña, because, as I have stressed repeatedly, their route out of the Amazon was up the Madeira and Guaporé and across the anually flooded flat lands into the upper Paraguay drainage.

From whom then, did the Guarani acquire this particular set of vessel forms? Given the dates above, the cognate vessel forms in Cumancaya and Guarani must have had an earlier common ancestor. The mutual influences of the Guarani and these Upper Amazonian styles are all confined to a group of styles spreading into Eastern Peru from the southeast, which are related to the arrival of the Panoans. As noted above, `Cumancaya´ had best be expunged as the designation of a tradition. The utility ware at Cumancaya is best subsumed in the

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Pacacocha Tradition first defined by Myers as including only three phases: Pacacocha, Cashibocano, and Nueva Esperanza, the last dated from A.D. 500 to 900 (Myers 1967, 1970). As I have noted above, the tradition can be fruitfully expanded to include the total ceramics, the non-riverine Panoans, and even the utility ware of the Shipibo-Conibo. The antecedents of the Pacacocha tradition, and its earliest known member, Pacacocha itself, thus assume great interest. Pacacocha is found in four sites on the Ucayali; the temper is sherd, the bowls are simple, open, and hemispherical, the forms are predominately constricted olla. Large, deep, trucated-conical pots with straight inclined walls, which were secondarily used for burials, are characteristic of this style. Carinated bowls and griddles also have been recovered. Necked vessels are rare. The only decorations are red slip and stylized, inward facing zoomorphic adornos attached to the rim of some vessels. Corrugations appear in the later phases of the tradition.

Both Cumancaya and Pacacocha have inflected contour bowls whose sides flare outward concavely from a small flat base; this form survives in modern Panoan pottery. As I noted earlier, the peculiar style of adornos shared by Pacacocha, Nueva Esperanza, and Cumancaya relate not to the Barrancoid Tradition, but to the style of the Ribereños plásticos found along the Lower Paraná and Río de La Plata. Because the adornos of the Ribereños plásticos represent the southern edge of the distribution of this modeled style, and Pacacocha the northern, it is reasonable to suggest that they originated between these two places, that is, in Eastern Bolivia.

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Linguistic evidence, that is, the distribution of Panoan in Bolivia, and the fact that Panoan and Tacanan are so closely related that the status of Tacanan as a separate family is more a terminological courtesy than a reflection of the facts of historical linguistics, makes a movement of the Panoans from Bolivia to Peru almost incontrovertible. Stated more precisely, at the time the Guarani were moving along the Guaporé, the ancestors of all Panaons were confined to that part of Northern Bolivia including the shores of the Guaporé and the lower courses of its major tributaries. It is in this zone that the mutual aculturation of Panoan and Guarani ceramics took place. This aculturation forever differentiated Guarani from all other branches of the Amzonian Polychrome Tradition.

The distribution sketched above shows that all the Upper Amazonian complexes that are similar to Guarani pottery are found along a wide strip parallel to the eastern face of the Andes, stretching from as far south as the Upper Pilcomayo and as far north as the territory of the Caqueta, slightly downstream from the confluence of the Ucayali and the Marañón.

The non-Amazonian characteristics of Guarani ceramics resulted from intimate contact between the Guarani and Proto-Panoan peoples along the Guaporé in Eastern Bolivia. We have every reason to believe that highly segmented shapes and extensive use of corrugation were typical of the proto-Panoan ceramics before they arrived on the Upper Ucayali during their expansion from the forests of northeastern Bolivia. The Guarani would have adopted both the set of vessel shapes and the associated culinary practices as they passed through this section of Bolivia moving

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up the Guaporé in route to the Upper Paraguay. This pattern of mutual interaction probably also involved the changes in culinary practices and agricultural patterns placing ecological constraints on the expansion of the Guarani which, as I shall discuss at length in the next chapter, began in Southern Brazil between A.D. 100-500.

In order to account for the dated distribution of the complexes and styles of the Amazonian Polychrome Tradition, Lathrap (1970a) theorizes the development of two subtraditions. The first, Guarita, has already been discussed; the second, which he calls the Miracanguera Subtradition, developed on the Middle and Lower Amazon from a tradition something like the one that produced the materials recovered from the early occupation of the Itacoatiara site mentioned above. The same shift from Barrancoid wares resulted, in this last case, in a more complex set of vessel shapes, including vessels that are oval or square in plan view, sometimes with castelated or undulating rims, as well as anthropomorphic jars with a bulging lower part and a tall conoidal or straight neck, which were used secondarily as burial urns. Such sophisticated decorative techniques as complex combinations of broad-line incising, single and double fine-line incising and excising, retouching or pigment crusting into the incised or excised lines, polychrome painting, red and white slipping, incision and excision through slip, as well as high and low relief modeling, flourished. Either cauixi or caraipé were used as tempering materials.

This development took place on Marajó and the Lower Amazon, and we have to accept its appearance there by, at the very latest, A.D. 1, and probably even earlier. It appears first as part of what Magalis (1975)

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calls the Marajoara Tradition I, later on taking the form of what she calls the Pacoval variant of Marajoara Tradition II. This development is correlated with the differentiation of Proto-Tumbinamban, depicted as somewhere between the second and third node in Figure 3.

The Miracanguera Subtradition also spread upstream, crossing territories held by bearers of the earlier Guarita Subtradition, while the Guarita Subtradition peoples, and the bearers of the late Barrancoid and Arauquinoid or Itacoatiara pottery, held others. Strong structural similarities obtain between the materials from all the sites on the Middle and Upper Amazon, beginning from below the mouth of the Madeira, from which anthropomorphic burial urns have been recovered. These sites are at Lago de Silves and Itacoatiara, Miracanguera opposite the mouth of the Madeira, Nova Olinda and Borba on the lower reaches of that same river, Manaus on the lower Río Negro, Beruri and Lago de Macupiri near Tefé, and Pirapitinga above the mouth of the Içá--Putumayo. On the Japurá, they are not found above Macupiri and Mapari. The differentiation of the Miracanguera Subtradition from Marajoara correlates with the split between Cocama--including Omagua, etc.--from Tupinambá, an event that took before A.D. 500, and that is represented by the lowermost node in Figure 3.

The Miracanguera Subtradition passed upstream of the Trapecio of Amazonas only after A.D. 900. This was after the end of the Natá Phase, which is related to the Red-banded Tradition occurring as the serving ware in Cumancaya. Just downstream, the beginning of the Zebu Complex is dated about A.D. 1000. (Figure 22 schematizes this expansion: vertically hachured arrow = A.D. 600-800; horizontally hachured arrow =

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A.D. 800-1000). Miracanguera spread up the tributaries of the Upper Amazon as far as the Upper Napo, Aguarico, Coca, and Tena, near the westernmost boundary of Amazonia (Napo Phase, A.D. 1100), reached the Middle Marañón, where Napo-like materials have been found on the Santiago and Pastaza Rivers, moved well up the Huallaga where the Cocamilla still maintain a large, viable community, and moved all the way to the Middle Ucayali (Caimito Complex, A.D. 1300) where the rich fishing resources of Imiriacocha seem to have consolidated the huge community at the southern limit of Cocama expansion. All these finds clearly mark the upstream spread of the Omagua (Zebu, Yanayacu, and Napo), Cocama (Caimito), and probably the Xibitaona (Anatico).

Anthropomorphic burial urns also have been found as far up the Madeira as the Upper Beni, at Rurrenabaque, and on the Guaporé (Iténez). The polychrome painting in such complexes of the Upper Mamoré as Upper Vellarde and Hernmark, as well as in El Eviato, may be also attributed to influences from Miracanguera, sometime after A.D. 1000 (Figure 22: horizontally hachured arrow).

The node between Tupinambá and Cocama-Omagua in the phylogenetic linguistic chart (Figure 3) should be situated at the time of the differentiation between the Lower Amazonian or Marajoara aspect of Miracanguera, and its Upper Amazonian aspect, which is attributed to the Cocama and Omagua.

From the western section of Central Amazonia to the Paraguay-Paraná watershed, the only route is, as I have already mentioned, up the Madeira and Guaporé (Iténez), because it is the only place where the <u>várzea</u> areas of both river systems are actually interconnected without

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intervening uplands (chapadão). I have already noted how the southward expansion of the early divergent branches of Tupian up the southern tributaries of the Madeira was blocked by the escarpment of the highland. The existence of this continuous waterway was well known to the Europeans from the beginning of the seventeenth century onward, even before they had used that aquatic route themselves; they received this information from the Guarani of Paraguay (e.g., Ferrer [1633] in Cortesão 1952). Unfortunately, almost no archaeological fieldwork has been done along this crucial crossroads of central South America (see endnote, p. 347). Riester gives a graphic description of the annual flooding of the whole zone between the Upper Guaporé and the Upper Paraguay. The one collection he made on the actual bank of the Guaporé does contain three characteristic Hupa-iya sherds (1981:pl. 23 - 21, 24, and 25) the style that Lathrap (1970a) has argued marks the initial spread of Maipuran Arawakan. Unfortunately, his 26 sherd surface collection contains no sherds that are definitely Proto Guarani. Otherwise, the only investigations ever undertaken in that area are those of Becker-Donner (1956) in the Iténez (Guaporé), Petrullo (1932) and M. Schmidt (1940) on the Upper Paraguay, and Pride (1926) on the Chaco. They failed to find evidence of a Guarani occupation. Becker-Donner found a few sites, some with pottery of the Amazonian Polychrome Tradition--decidedly not Guarani but, rather, of the Mirancanguera Subtradition. M. Schmidt, Petrullo, and Pride excavated sites yielding materials that can probably be described as Aratú Subtradition of the Pedra do Caboclo Tradition (see Chapters 6 and 8).

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On the other hand, it is known that in early historic times the Guarani continuously occupied the left bank of the Paraguay from Asunción to the Apa River. Slightly later they are recorded farther inland in the hilly forested country around the Pantanal, as far north as the Middle Taquari (Figure 1). There are also detailed accounts of Guarani populations stretching from the western bank of the Paraguay opposite the Itatin, all the way northwestward to the area occupied by the Chiriguano (Ferrer [1633] in Cortesão 1952). Moreover, the modern Chiriguano and Guarayo-Pauserna extend even farther north along the foothills of the Andes, to the Rio Grande (Guapay). (The recent publication of the Pauserna [Guarasug'we] ceramic style [G. Riester 1981] makes it highly unlikely that the Guarayo split from the Chiriguano in relatively recent times.) This vast distribution of the Guarani somewhat shortens the gap in the distribution of pottery known to archaeologists.

The number of diagnostic similarities between the pottery of the Amazonian Polychrome Tradition and the Guarani are so great as to make any suggestion of independent invention absurd. An arraying of the chronological data relevant to the connection make a south to north movement of these influences--that is to say, the derivation of the Amazonian Polychrome Tradition from Guarani ceramics--equally absurd. I am basing this claim only on extant radiocarbon assays relating to discrete ceramic complexes. The continuous waterway of the Madeira, Guaporé, and Paraguay is the only feasible route along which this connection could have taken place (see endnote, p. 347).

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11.3 The Tupian Ceramic Subtradition: A Late Development of the Marajoara Style of the Miracanguera Subtradition in Lower Amazonia (ca. A.D. 500)

The Tupinambá pottery, as does the Guarani pottery discussed above, clearly conforms to the Amazonian Polychrome Tradition and is here described as another subtradition of the latter, which also spread out of Amazonia into Eastern South America but in a different direction. We have already looked into the general relationships between the polychrome painting of Eastern Brazil and Amazonia. I have just explained the derivation and divergences of Guarani ceramics from the Guarita Subtradition of the Amazonian Polychrome Tradition of the Central Amazon. The derivation of Tupinambá ceramics from the Amazon Polychrome Tradition is a far simpler case requiring a much less involuted explanation. Tupinambá ceramics in their full set of vessel shapes are closer to the Marajoara Style of the Lower Amazon than the Guarani and even closer to the Miracanguera Subtradition as represented on the Upper Amazon by the Napo and Caimito phases.

Marajoara pottery has been recovered from more than 50 sites, around 40 of which are concentrated in a relatively small area to the east of Lake Arari; only around 10 sites are west of the lake. The Marajoara sites are clusters of artifical mounds (tesos). The small mounds, averaging 50 m by 30 m in area, and up to 6 m in height, were used for habitation. Larger mounds, measuring around 200 m by 30 m in area and as much as 10 m in height, were used for secondary inhumations and cremated burials in large jars.

Marajoara pottery is usually sherd tempered, although caraipé is also reported. There are seven basic techniques of surface treatment:

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plain smoothing, scrapping, painting, incision, excision, modeling, and relief. Except for the first three, which may appear alone, the other four techniques are usually combined with one or all the others, and eleven types have been formally defined as the result of these permutations and combinations, which include the filling of incisions and excisions with paint, and excision and incision through one or more layers of red and/or white slip (Meggers and Evans 1957). Bichrome and polychrome painting in red or brown and/or black on a white slip is very characteristic. Modeling is used for vertically attached handles, geometric or zoomorphic lugs or rims, and low relief representations of anthropomorphic or zoomorphic features on vessel walls.

Most of the Tupinambá vessels are simplified versions of some of the most characteristic Marajoara vessels (Palmatary 1950; Meggers and Evans 1957:324-404; Magalis 1975). These are: small and medium sized, shallow, open bowls with a rounded or slightly flattened base; larger flat-base basins; and deep, truncated-conoidal, strongly carinated cauldrons. Most of these vessels have characteristically reinforced rims, thickened on the outside, and often are ovoidal or squarish instead of circular in horizontal plan. The Marajoara bowls, basins and cauldrons are almost identical to those described in Chapter 10 and synotically illustrated in Figure 16 (4-8, 1-3, and 10). Moreover, the polychrome painted decoration occupies the same fields on the surface of Marajoara vessels as on their Tupinambá cognates, that is, the upper surface of the reinforced rims received a bordering band, and the inside received intricate overall patterns representing very stylized animals and human beings. Griddles occur, but as in the Tupinambá style, are not frequent.

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On the other hand, in the Marajoara style there are many kinds of jars, which are generally tall with rounded, biconical or carinated bodies and clearly differentiated necks. Many of these jars have modeled faces on the neck and anthropomorphic designs on the body of the vessel--what Magalis (1975) describes as Tradition I--or are thoroughly anthropomorphic, as in her Tradition II (Pacoval). These jars have no counterparts in the Tupinambá set of vessel forms, in which apparently they were functionally replaced by the simple or corrugated ovoidal jars illustrated in Figure 16 (9 and 12). Large basins and cauldrons were typically used for secondary burials. Less frequently, secondary burials were placed in the large, ovoid jars cognate to the typical Marajoara burial jars. Moreover, both in Marajoara and among the Tupinambá, such jar burials are covered by basins of the form illustrated for the Tupinambá (Figure 16: 4-8). The fact that the Marajoara sets of vessel forms have subsets that are identical to Tupinambá ones strongly suggests that the diets and food rituals of these two peoples had much in common. In another, still unpublished paper (Brochado 1980), I have demonstrated the correlation between functional categories of Tupinambá vessels and their Marajoara cognates.

The predominance of plain pottery is another trait that relates Tupinambá ceramics, even more than the Guarani pottery, to the Amazonian Polychrome Tradition in general and Marajoara in particular. The painted patterns of the Tupinambá Polychrome are far more organized and fully stated than in the simple painted designs of Guarani polychrome. Double scrolls, often S-shaped, the elaboration of the line by ticking

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or dotting, the filling of space between lines with hachuring, cross-hachuring, stippling or solid paint, and multiple outlines of the motifs are all productively and complexly manipulated in Tupinambá Polychrome in ways that are typical of Marajoara. The motifs of bordering bands on the upper surface of the reinforced rims have been compared to those painted on the upper horizontal band of the Marajoara triangular clay female pubic coverings (tangas) (Pereira Junior 1967:120).

The unique environment of western Marajó can be compared to an enormously enlarged várzea, situated not between a river and terra firme, but between two rivers: the Amazon and the Rio Pará. If we take the left part of the schematic transverse section through the Lower Amazon valley illustrated by Sioli (1975: fig. 18.9), all of western Marajó can be interpreted as an enormously wide várzea fanning out around the block of terra firme that comprises the eastern half of the island and is covered by upland forest (mata de terra firme). The strips of terra firme and swampy forest (igapó) that fringe the southeastern coast of the island can be compared to the gallery forest fringing the river bank along the main arm of the river, in this case represented by Marajó Bay. As in the case of the river banks on the Amazon várzea, the southeastern coast of Marajó is the highest point of the island. Its morphology resembles the high, outer, natural levees of the large islands of the Middle Amazon, the geomorphology of which have been examined in great detail, especially with reference to the Island of Careiro. A summary of Sternberg's attention to these problems, which has continued through most of his career, is available (Sternberg 1975).

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Behind the high outer levee, the terrain slopes gently to the large, shallow lakes of the interior. Igapo covers all the low-lying terrain to the west, and the northeastern half of the island is a floodable grassland with swamps and temporary lakes. Lake Ararí, lying near the center of this part of the island, can be compared to a typical várzea lake of the kind that occurs in the center of the relatively stable, football shaped islands characteristic of the main channel of the Amazon. Such lakes should not be confused with other várzea formations such as ox-bow lakes and rias (Sternberg 1975; Sioli 1975; Lathrap 1968, 1970a). The Ararí River is an enormous natural channel (furo) that connects the várzea lakes to the river.

The area occupied by the Marajoara east of Lake Ararí has been described as a fluvio-lacustrine plain, flooded every year by rain water, and covered by formations that contain halomorphic soils of maritime origin (Barbosa et al., 1974; Correa et al., 1974). But most important for my interpretation of the Marajoara culture is that the topography of the area where 80% of the sites are concentrated is characterized by a succession of ridges and swales. The topography of this section of Marajó resembles the terrain described as an alluvial topography of the first order (Sternberg 1975:18, fig. 13), comprising a series of arcuate, subparallel, narrow strips of overbank deposition (restingas) with intervening sloughs occupied by swamps and long, narrow, lakes (Figure 18). In this case, however, the topography was created not by the meandering of the main channel of the Amazon; it was developed in a marine environment, proof of which is the deposition of hallomorphic soils of maritime origin. Lake Ararí, then, probably is an

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old sea-shore lagoon closed by a beach formation, and the alternation of ridges and swales are a succession of old beach ridges of a gradually elevating shore line. Giddings has studied a comparable geological situation in Alaska at Cape Krusenstern and related the succession of beach ridges to his archaeological sequence. His long-term research has been summarized (Giddings 1967). Richardson (1973) has noted a similar sequence of beach ridges near Paita on the extreme north of the Peruvian coast, and is continuing to investigate the relationship of the geological sequence to the late preceramic and earliest ceramic occupations of the area. Because mangroves (mangue) are still found along the north and eastern coasts, their land stabalizing and colonizing tendencies also contributed to claiming the enormous block of land between Lake Ararí and the east coast of Marajó, but coastal uplift was the dominant process. This block of ridge-swale topography reached it present size, 60 miles north to south and 50 miles east to west, before it was colonized by peoples of the Marajoara culture.

The northeastern quadrant of Marajó simulates the alluvial ridges with intervening swales of the várzea, offering a prime niche for colonization by an agricultural system already fully adapted to the land forms of the várzea. This environment is far more complex than is indicated in the published literature or by present day land use. See, for instance, Meggers and Evan's (1957:169-170) poor description of the environment that focuses only on the contrasts between the forested western half and the grassland covered eastern half of the island. The area east of Lake Ararí is not covered by large expanses of forest, savanna, or grassland, but the environment is divided into parallel

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stripes of grass or savanna on the tops of the ridges, lines of trees along the banks of the streams or channels, and aquatic vegetation suspended or rooted in the bottom or on the banks of the channels or long, narrow lakes.

The possibilities for intense cultivation of this particular kind of environment, which forms naturally ridged fields in the seasonally flooded savannas, have been discussed elsewhere at length (Brochado 1980). The ridge and swale topography and the annual floods are precisely the key to the problem of how the Marajoara not merely survived, but blossomed in this much maligned environment. All the area was exploited as natural raised fields and somehow must be fitted as a special case in Denevan's (1970) comprehensive categorization of aboriginal land reclamation and soil management of wet lands. We still do not know how the Marajoara peoples managed this kind of environment, but the fact that their sites are concentrated there indicates that this was their ecological niche. Mulching, draining of the swales, or cultivation of the flooded swales with some crop adopted to wet conditions could have been some of the Marajoara responses to the environment. During the height of the rainy season, travel to almost any point throughout the inundated grasslands is possible by canoe. In the area east of Lake Arari, where the restingas are aligned, the transverse ditches cutting through the elevated ridges must have allowed easy travel by canoe between the lakes and streams parallel to the ridge and swale topography.

These short, straight channels do not appear to be natural and, as well as facilitating navigation, could have served to stabalize the

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level of water throughout the year, especially during the dry season. The periodic cleaning of the organic muck from the swales and ditches and placing the muck on the top of the ridges would not only stabalize the relationship between the water level and the land surface, but would maintain the soils on top of the ridges at maximum fertility for agricultural purposes. Ongoing research by graduate students at the University of Wisconsin and the University of Illinois is demonstrating that such systems were widely used in aboriginal South America and, indeed, are immensely effective even by the standards of modern agronomy. Deneven (1980) offers a recent summary, but serious research in South America and tropical Mesoamerica has expanded exponentially in the last four years.

There is a close coincidence between a large number of the coastal Tupinambá sites in Northeastern and Eastern Brazil and an environment similarly characterized by parallel ridge and swale topography, which no doubt was formed by depositions left by old strand lines. This kind of topography, also called restinga, is found along several stretches of the Brazilian coast, and was formerly covered by a kind of tropical forest called mata de restinga. This kind of forest is a southern variant of the so-called hileia bahiana (Hueck 1972a) found in Northeastern Brazil, and occupies less rainy stretches of the coast in Eastern Brazil. For instance, rainfall lower than 1,000 mm, and as low as 650 mm, occurs on the Lower Río Doce and around Saquarema Lagoon. The mata de restinga was rather open, with trees up to 10-15 m tall. Because it has been almost completely destroyed, the sites found in the restinga environment are nowadays in barren sandy areas, supporting only

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scattered grasses, bushes, and palmtrees, the only remnants of the former lush forest.

About 25% of all the known Tupinambá sites are in this kind of environment, although it covers much less than 1% of the total area of the spread of the Tupinambá in Northeastern and Eastern Brazil. In certain stretches of the coast, the proportion is even higher. For instance, comparing the distribution of sites in the State of Rio de Janeiro, with Lamego's (1946:2) map of the distribution of the restingas, I have estimated that about 80% of them are concentrated in this kind of environment.

The restinga topography and its vegetation cover has many similarities to the ridged topography of Marajó. The density of Marajoara occupation in the northeast quadrant of the island and the high level of cultural complexity indicated by all of the indices of complexity that archaeologists apply show that the Marajoara farmers had fully exploited the agricultural potential of the local ridge and swale topography. At present we do not fully understand all of the strategies they implemented, but such an understanding could be achieved by well planned archaeological-ecological investigation. What is clear beyond doubt is that, as the excess population of farmers colonized out from the mouth of the Amazon, intially they by choice settled only those restricted niches, 1% of all territory available, to which their sophisticated agronomic system was preadapted. The few radiocarbon dates we have indicate temporal continuity and even a partial overlap in the time ranges of Marajoara pottery and that of the Tupinambá. Again, the assertions I am making rest on establishing temporal and spacial continuity between the ceramic traditions.

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Five C^{14} dates with enormous 1-sigma ranges of error place the occupation of one of the Marajoara sites beginning somewhere between 300 B.C. and A.D. 300, and ending between A.D. 900-1650. Another site seems to have been occupied between A.D. 300-800 (Simões 1967b, 1971, 1972; Smithsonian Institution list of C^{14} dates, n.d.). The short-lived and rapidly deteriorating occupation of Marajó by the people of the Marajoara culture, hypothesized by Meggers (Meggers and Evans 1957) is a myth largely generated by her faulty analytical procedures. These dates suggest that the occupation of Marajó was of long duration and maintained stable or even increasing agronomic effectiveness. The Marajoara polity actually florished there for more than one thousand years, and it is possible that their culture was still flourishing during the middle of the sixteenth century, as can be glimpsed in Carvajal's account (Oviedo [1543-1575] 1945:152; Heaton 1934:442; Brochado 1980; Brochado and Lathrap 1980). One jar showing unmistakably Marajoara painted motifs has been found on the Cassiporé River 500 km to the north up the coast of Amapá (Meggers and Evans 1957:pl. 25). Because this vessel contained European glass beads, a Marajoara-like pottery must have extended to historic times.

The range of C^{14} dates for Tupinambá pottery extends from ca. A.D. 800 to historic times, as is shown in Figure 17. This will be discussed later in more detail. Becuase the dated Marajoara complexes antedate by at least five centuries the earliest known Tupinambá site, which is situated in Northeastern Brazil (Figure 13: TP 4; Figure 17: 21), it is easy to accept the Marajoara pottery as ancestral to that of the

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Tupinambá. The late estimates for the beginning of the Amazonian Polychrome Tradition, such as those that place it ca. A.D. 600 (Meggers and Evans 1961, 1963, 1973; Silva and Meggers 1963) or ca. A.D. 300 (Simões 1971, 1972; Meggers and Evans 1978a, 1978b; Meggers 1979) appear to be erroneous for three important reasons. First, they do not allow sufficient time for the development of such complex art forms. Second, they do not allow time for the development of the Guarani and Tupinambá ceramics from the Guarita and Miracanguera subtraditions, respectively, prior to their spread out of Amazonia. Third, they do not allow enough time for the immense outward colonization of the Guarani and the Tupinambá, which were well under way at least by A.D. 500.

The criterion of spatial continuity is totally fulfilled with regard to the expansion of the Tupinambá. There is no embarassing gap, such as the one that complicates my discussing of Guarani expansion (see endnote, p. 347). Tupinambá pottery can be continuously traced from at least the area of its earliest dated site in Northeastern Brazil, all the way down the coast to the southernmost limit of the spread of Tupinambá culture, near the Tropic of Capricorn (Figure 13: TP 4, 7, 20, 8a-8f, 3a-3b, 14, 6, 5, 9, 12, 13, and 11).

Very little archaeological investigation has been done in the area between Marajó and Northeastern Brazil. Nevertheless, two bowls showing unmistakably Marajoara painted motifs have been found on the Gurupi River, 300 km down the coast at Maranhão (Nordenskiöld 1930:pl. 17), and polychrome pottery attributed to the "Tupiguarani" Tradition has been found on the upper levels of preceramic sambaquís around São Luiz Bay farther south (Figure 13: TG 6) (Lopes da Cunha 1956; M. F. Simões,

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pers. com. in Lathrap 1973:238). These finds link the developments we suppose to have taken place between Marajó and Northeastern Brazil. Moreover, in historic times, a dense Tupinambá population occupied all the coastal strip from the southern coast of Marajó itself down to the Tropic line (Figure 2). Because there is no indication whatsoever that the pottery made by the Tupinambá of Pará and Maranhão was different from that described and illustrated for the Tupinambá of Northeastern and Eastern Brazil, I will assume that the continuity of their occupation indicates the continuity of the spread of the same pottery.

In 1630, when the first Portuguese explorers were able to reach the area in the northeastern section of Marajó where the Marajoara sites are located, they found the area uninhabited. Many devastating epidemics had already wiped out most of the indigenous populations along the mainstream of the Amazon to its mouth. Therefore, we are not sure who produced this most complex and beautiful pottery. The people called the "Marajoara" from the nineteenth century on actually might have been some Tupí-speaking group akin to the Tupinambá themselves. If so, this pottery, as is the case with all the other ceramic complexes in the Amazonian Polychrome Tradition, is representative of the Tupian culture.

Probably the Tupinambá pottery developed from the Marajoara pottery on the southern coast of the island, where a dense Tupinambá population is known to have existed in historic times; their fierceness prevented the Europeans from reaching the interior for almost a century. However, no archaeological investigation has been done in that area or along the opposite shore of the Rio Pará, around the capital city of Belém. This area was also occupied by the Tupinambá.

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Because we must accept that other ceramics of the Amazonian Polychrome Tradition spread along the major Amazonian rivers for distances as great as those separating Marajó from the Upper Napo or the Middle Ucayali, where Napo-Caimito ceramics are found, it is not difficult to accept also that the Tupinambá pottery could have traveled only slightly farther down the coast of Brazil.

As I concluded concerning the origins of Guarani ceramics, an independent invention of Tupinambá ceramics outside Amazonia must be ruled out as absurd. All of the objections raised against and independent origin of the Guarani in eastern Paraguay apply with far greater force against the idea of an independent genesis of the Tupinambá outside of Amazonia. There is no break in the pattern of dated expansion of the Tupinambá out from the mouthe of the Amazon. They have many points of agreement with other, earlier, ceramics of Amazonia. Their similarities are so peculiar--as, for instance, the quite distinctive profiles of most of the vessels--as to make most unlikely any explanation resting on independent invention by the Tupinambá somewhere in Eastern Brazil or the Guarani in Southern Brazil or Paraguay. The number of characteristic similarities and their peculiarities satisfy the criteria of quality or form, as well as that of quantity, used as criteria of likelihood in diffusion studies. The language, economy, social organization, religion, mythology, and art of both cultures remained characteristically Amazonian, even though the Guarani and the Tupinambá evolved independently for 1500-2000 years.

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Having established the stylistic origins of the ceramics produced by the Guarani and the Tupinambá, I now face the problem of how--after their origination in Amazonia--these ceramics were carried or diffused over the enormous area in which they were ultimately found.

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Endnote to Chapter 11

It was only after all of the above was written that the 1983 version of the Meggers and Evans chapter Lowland South America came to my attention. It is lucky that I did the above reconstruction of Amazonian prehistory in ignorance of their most recent thinking, because, as was the case with Lemle's (1971) reconstruction of the Tupí-Guaranian language family, the changes in the Meggers-Evans reconstruction act as an independent check, a meter reading in C.P. Snow's (1934) sense, on my own model. It is gratifying that the Meggers-Evans model is dynamic in two senses. It reconstructs the cultural conditions of Amazonia at various points in time and connects these stages in an evolutionary manner; it has also evolved in the span of time from 1978 to 1983. It is most gratifying of all that every one of the evolutionary changes in their model has brought it in closer conformity to my own. When one compares Fig. 7.2 of the new edition to Fig. 12.3 of the 1978 edition, one notes little change other than the addition of a number of aceramic sites and complexes that are irrelevant to my discussion. One is depressed to note that the arrow that implies the derivation of Puerto Hormiga and other very early Colombian ceramic complexes from Valdivia and, in turn, the derivation of Mina at the mouth of the Amazon from the early Colombian ceramics is still unchanged. Because we know that Coastal Valdivia dates no earlier than 2600 B.C. uncorrected (Norton 1982) and that the early ceramics of the lower Magdalena and its tributaries date earlier than 3400 B.C. (Reichel-Dolmatoff, pers. com. to Lathrap) one must question the direction of the arrow, if indeed

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direct contact is involved. Because there are no known coastal ceramic complexes of comparable antiquity between the lower Magdalena and the mouth of the Amazon, I still belive that the routes of expansion of the early, simple ceramics of South America were more frequently riverine than coastal.

When one compares Fig. 7.5 of the 1983 edition to Fig. 12.7 of the 1978 edition, one notes only the addition of several recent aceramic sites or complexes that do not relate to the present discussion.

When one compares Fig. 7.6 of the 1983 edition to Fig. 12.8 of the 1978 edition, one notes that a northwest Colombian origin is now suggested for the earliest component at the La Gruta site on the Middle Orinoco, whereas I have suggested a central Amazonian origin; otherwise, the changes involve the addition of further aceramic sites that add no data to this discussion. With regard to the Meggers-Evans mapping of the "Zoned Hachure" materials, I should emphasize that I recognize the same close stylistic affinities between Early Tutishcainyo, Pastaza, and Jauarí that they emphasize; but to my eye, Ananatuba does not share in this style, nor do any known styles in northwest Colombia.

As one compares Fig. 7.11 of the 1983 edition with Fig. 12.11 of the 1978 edition, one is most gratified to note that an Extra-Amazonian source for the Incised Rim Style or tradition is no longer indicated. One wonders if this represents agreement with Lathrap's (1970b) suggestion that "Incised Rim" is simply a euphamism for the earlier more "Barrancas"-like members of the "Barrancoid Tradition".

It is in comparing Fig. 7.14 of the 1983 edition to Fig. 12.14 of the 1978 edition that the most sensational changes are noted. Although

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an unspecified source in the Colombian Andes is still suggested for the very early polychrome style in the Central Amazon--Guarita--the Guarita style is now dated at around the time of Christ, precisely the dating first suggested by Lathrap in his review of Hilbert (Lathrap 1970b). Guarita is clearly indicated by Meggers and Evans as the source of an early polychrome style on the Madeira, precisely the data required by my model of the derivation of Guarani from Guarita, by a very early movement up the Madeira and Guaporé and down the Paraguay and Paraná. The gap in the data on early Polychrome on that system of waterways that I have so frequently mentioned no longer exists!

I will not extend this discussion by comparing Fig. 7.17 of the 1983 edition to Fig. 12.18 of the 1978 edition.

I will again note that there is a large degree of agreement between my model and the model presented by Meggers and Evans in 1978 and Fig. 12.23 and republished in 1983 as Fig. 7.22. There is now unanimity about the late two-pronged upstream movement of Polychrome, archaeologically designated as Napo and Caimito and ethnographically identified as Omagua and Cocama (a point first demonstrated by Lathrap [1970a; 1972]). We are still in agreement that Kondurí represents a late Aranquinoid expansion from the Venezuelan Llanos into the Amazon, but I still feel that the Tapajós (Santarém) style represents a different intrusion, this time, indeed, from northwest Colombia. The major differences between their Fig. 7.22 (1983) and my model all relate to the expansion of the several ceramic traditions into Eastern Brazil. Because my thesis is the first attempt to treat this subject systematically, I can only hope to see further convergence between my model and that of my colleagues in the future.

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CHAPTER 12

THE CANNIBALS ARE COMING!

12.1 Reconstruction of the Routes and Progress of the Guarani and and Tupinambá Invasions of Eastern South America

The reconstruction of the colonization of Eastern South America by the Guarani and Tupinambá is based in three different kinds of evidence: (1) Their historic geographical distribution; (2) The archaeological distribution of their pottery; (3) The geographical distribution of the radiocarbon dates for the pottery.

12.1.1 Ethnohistoric-Geographical Distribution of the Guarani and Tupinambá

At the time of contact those aboriginal groups who were speaking Guarani or Tupinambá formed two distinct and massive blocks of peoples. The Tupinambá, as I have mentioned before, lived mainly along the coast, from the Rio Pará, just south of the mouth of the Amazon, all the way to the Tropic of Capricorn, but their territory extended some distance inland as well (Figure 2). Most Guarani lived farther inland on the watersheds of the Paraná, Paraguay, and Uruguay, but their territory extended to the adjoining stretch of the coast to the south, adjacent to that occupied by the Tupinambá (Figure 1).

That the Guarani and Tupinambá territories are both located south of Amazonia strongly suggests that their movements were in that direction; the southernmost limits reached by these languages, therefore, represents the leading edge of their migration from the north. The most parsimonious explanation for the formation of these two massive opposed blocks is that the ancestors of the Guarani moved southward up the

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Guaporé and down the Paraguay to the Paraná and Uruguay drainages and ultimately to the coast, and that the ancestors of the Tupinambá moved first down the Amazon, and thence out of the mouth of the Rio Pará and down the coast of Northeastern and Eastern Brazil to the Tropic line, with branchings to the interior (Figure 21). Other routes for the spread of the Tupinambá out of Amazonia, such as going up the Tocantins-Araguaia, might also be hypothesized. However, no evidence exists from the Río Araguaia where, as I have already demonstrated, in Chapters 6 and 7, it was the Carajá who colonized up river from the north (Figures 4 and 7), dominating the main stream, while the Tupinambá apparently reached the Upper Araguaia from southeast, almost at the same time when the Gê-proper were arriving from the northwest (Figures 21 and 22).

The thesis of this dissertation can be stated in a single sentence: The hyphen must be expunged from the term Tupí-Guarani. The deep-seated, almost subliminal connotation of the hyphen has confused all thinking on the ethnohistory and archeaology of Eastern Brazil for many decades. I would not be so bold as to make suggestions to the historical linguists as the appropriate terminology for their taxonomic units. It is ironic that the most rigorous study of the languages crucial to my dissertation has the title The Tupí-Guarani Family in Tupí Studies, Part 1 (Lemle 1971). This difference in the title of the paper and the title of the series underscores the hierarchical relationship between Tupí and Tupí-Guarani in linguistic usage. It is the most powerful verification of my model that I was totally unaware of the Lemle work until my dissertation was all but complete. It was for me

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the independent verification demanded by my model; an independent meter reading, in C.P. Snow's (1934) usage, that did not go into the construction of my model. It is the fact that, in terms of shared innovation, the Tupinambá and Cocama-Omagua form one natural unit, while Guarani and Sirionó form a contrasting natural unit, that establishes an Amazonian hearth for the differentiation of Proto-Tupinambá from Proto-Guarani. For reasons that have been presented at tedious length in Chapter 11, an Amazonian origin for the linguistic family designated Tupí-Guarani must now be accepted as fact and not hypothesis. But this differentiation could not have occurred later than 500 B.C. From Lemle's title and from my discussion with other linguists, it appears that the terms Tupí, Tupian, and Macro-Tupian will be used to designate larger, fully demonstrated, linguistic taxa that embrace the Tupí-Guaranian family as a branch. Nonetheless, I suggest that the term Tupí-Guarani be banned from discussions of East Brazilian ethnohistory and archaeology.

I have not established who first put the hyphen in Tupí-Guarani. It is clear that much of the associated confusion proliferated and was codified in the massive scholarly output of Alfred Métraux. In his thinking and writing, the connotations of the hyphen appear to have served as a pretext for his tendency to gloss over all of the crucial cultural differences between the two groups. But as is the case with most intellectual developments, it is his followers who, in accepting his thinking as dogma rather than as hypotheses for further testing, must carry most of the blame. This confusion reached its peak when the hyphen was removed, not in recognition of what were two very different

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ethnohistorical entities, but to produce the archaeological concept "Tupíguarani ceramics", an even more thorough scrambling of what are two very different groups of archaeological materials.

Métraux's influence also appears central in the long-standing tendency to focus on the Paraná-Paraguay Basin as the hearth of Tupí expansion. The Tupinambá were still on the move when the Europeans arrived and the accounts of these movements, along with his extensive use of mythology, enticed Métraux (1927) to attempt reconstructions of their proto-historic migrations. His reconstructions led him to suggest that these movements began no earlier than 100 to 200 years before the onset of European conquest. Again, his suggestion became a cast iron conclusion in the minds of most subsequent scholars.

On the other hand, there were neither historical accounts nor mythological materials indicating that the main block of Guarani were also on the move at the time when the Europeans first entered the Paraná-Paraguay drainage. Métraux exempted the expansion of the Chiriguano and Guarayo, although the Chiriguano expansion was observed by the <u>first</u> European to enter South America. Indeed, the early observer participated in it (Alexio Garcia 1524-1525; Nordenskiöld 1917:103-121, 1924:80; Métraux 1927:19-20; Hemming 1978:239-242, 280, 386). Contrary to Métraux's assumptions, the onset of the Chiriguano expansion could not have been triggered by European colonization, but was more likely a response to the rapidly expanding Inca Empire. (It might be added that Métraux's lumping of the Chiriguano and the Guarayo, which has also become fossilized in the thinking of South American ethnohistorians, appears suspect in light of recent archaeological

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evidence [Reister 1981]). This idea of the stable block of Guarani in what is now eastern Paraguay, in contrast to the peripetetic Tupinambá, made the Paraná-Paraguay Basin an attractive hearth for the reconstruction of Tupí-Guarani expansion. The idea may not have been original with Métraux, but certainly became a deeply embedded paradigm in all of his copious writing.

Rodrigues' (1964) placement of the origin of the Tupían linguistic stock in the Guaporé drainage at least moved our thinking into the Amazon Basin. The interpretation that I now offer was further anticipated as it appeared in new forms, such as Lathrap's (1970a) model to explain how the ethnohistoric distribution of the Tupians was achieved, as well as in Susnik's (1975) reconstruction of the migrations of the "Tupí-Guarani".

12.1.2 Mapping the Progressive Expansion of the Guarani and Tupinambá in Eastern South America

In Chapter 11 I demonstrated that two widespread styles of polychrome pottery found in Eastern South America are actually subtraditions of the Amazonian Polychrome Tradition. I demonstrated that these two ceramic subtraditions were produced by the the ancestors of the Guarani and the ancestors of the Tupinambá, each group evolving independently during the last 1500 to 2000 years. This demonstration is based on the ethnohistoric information synthesized in Chapters 3 and 11, coupled with the interpretation of the ceramic data synthesized in Chapters 9 and 10, and the archaeological data from Amazonia and adjacent groups in South America. My task will now be to reconstruct the spread of Guarani and Tupinambá pottery over all of the area where

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it is now found in Eastern South America. My view in Chapter 11 was wide ranging, embracing over half of South America, and of necessity coarse grained. In this chapter, I attempt a fine grained view of two phenomena: the relationship between the expanding populations of Tupinambá and Guarani and the ecology of Eastern Brazil; and each group's boundaries with the earlier inhabitants of the area.

In all of the previous sections of this dissertation, I have sought to maintain terminological clarity and to reduce the number of taxonomic units in the literature. I have demonstrated that the early simple ceramics of Eastern South America can be segregated operationally into the Pedra do Caboclo tradition of the North and the Palo Blanco Tradition of the South. But I have also made the suggestion that both might be considered subtraditions deriving from my very hypothetical "Stage 2" on the Central Amazon (Chapter 11). Taken together, they do form a kind of epoch or stage in the development of South American culture, but a stage that in many areas of Brazil lasted until contact.

The crux of the dissertation has been to demonstrate that the two subtraditions of the Amazonian Polychrome Tradition, Tupinambá and Guarani, have totally different distributions and histories in Eastern South America. Until this fact is accepted, the prehistory of Eastern South America will remain a hodge-podge. Nonetheless, taken together the two Polychrome Subtraditions do form a second, much later epoch, stage, or wave in the prehistory of that area.

In the following summary statement, terms to designate these two high level taxa are neceassary if an immense amount of circumlocution and redundancy is to be avoided.

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As I noted above, Tupí or Tupian have a precise significance in the linguistic literature, and following this usage it would be precise and appropriate to apply "Tupian" to all of the polychrome styles of Eastern South America. I refuse to suggest this terminology. Having worked up to now to exorcise "Tupí-Guarani" and especially "Tupíguarani" from the archaeological literature, I am reluctant to let even a fragment of that term back into the literature. The denotations of the terms "Guaranian" and "Tupian" can be expressed precisely to all of us working in Eastern South America, but there are complex connotations, which most of us hold at a visceral level, that cannot be avoided. For this level of taxonomic designation, I must agree with Meggers and Evans that linguistic and ethnic implication should be avoided. "Stage" has been so over-worked and redefined by archaeologists that I hesitate to use it. From this point on, I will refer to the early wave of simple pottery as Stratum 1 and the second wave of polychrome pottery as Stratum 2. As is the case with geological strata, the possibility of finding reverse stratigraphy exists.

The spread of any particular ceramic style over a given area can be attributed to one of the following cultural phenomena: (1) Distribution from one or more centers where pottery was mass-produced for "export" to groups not producing their own pottery; (2) Reproduction or adoptation by other ethnic groups who did not have any pottery, or who had a different kind of pottery, that is, trait unit intrusion (Lathrap 1956); (3) Transportation through the migration or expansion of an ethnic group that maintained its ceramic tradition, carrying it with them and reproducing it wherever they settled, that is, site unit intrusion (Lathrap 1956).

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In the case of both the Guarani and the Tupinambá, we observe that, in relation to the first possibility, there is no archaeological or ethnographic evidence of any kind of exchange that was sufficiently developed to have distributed either of these ceramics over such an enormous areas, nor has any center of mass-production been found.

The modern example of this first possibility is the very well-known case of the distribution of pottery mass-produced by the Arawakan-speaking Waura and Mehinaku over all the Upper Xinguan area; it is traded to and used by all the other indigenous groups, who are Tupian and Cariban speakers and who make no pottery of their own. This intertribal trade continues today (Lévi-Strauss 1948:332, 338-339).

However, historic accounts unanimously state that all the Guarani and Tupinambá groups produced their own pottery. Exchange between the Guarani or the Tupinambá groups and adjoining alien groups definitely existed, and is indicated by the many findings of Guarani or Tupinambá potsherds in archaeological sites of Stratum 1 cultures such as the Pedra do Caboclo, Palo Blanco, and Urú traditions, as well as of the Aratú subtraditions. As I have demonstrated in Chapters 5 through 8, Stratum 1 cultures relate to such ethnic groups as the Ancient East Brazilians, the Caingang, the Charrua, the Carajá, and the Gê-proper. The reverse situation, that is, findings of sherds of Stratum 1 cultures in Stratum 2 sites is also common. This reciprocal exchange shall be dealt with extensively in 12.2.

In order to account for the diffusion of Stratum 2 pottery over Eastern South America solely by means of successive copies made by

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different groups, it is necessary to hypothesize the existence of a large number of aceramic ethnic groups scattered throughout the immense areas later occupied by the Tupinambá and Guarani, and eager to accept and faithfully copy the ceramic models handed to them. As the experiment of Hodges shows (1965, fig. 3), such copying will never remain faithful over large areas. The condition of these hypothetical groups being aceramic is important because, if the Guarani or the Tupinambá pottery had been copied by the known ethnic groups that produced any of the ceramics of the other traditions previously discussed, the characteristics of the resident pottery of these groups should have influenced the copy; as we have seen, this is not the case. Furthermore, these regional, Stratum 1 ceramic traditions would not have survived into historic times as, in fact, they did. The sets of vessel shapes of Stratum 1 ceramic traditions are completely different from the Guarani or Tupinambá sets (compare Figures 5 and 11 to Figures 14 and 16) and, moreover, the vessels never show any polychrome or bichrome painting. Most are plain, but some show decoration, which is predominantly plastic. The only techniques employed are non-obliterated coils, nail incisions, punctations, basketry impressions, corrugation, and red-slipping which, except in the Taquara Style of the Pedra do Caboclo Tradition, cover only very small areas on the surface of a few vessels.

In order that the copy be faithful, those who copied it must have had the same necessities, that is, must have used the vessels for the same functions, because a mere reproduction of the form without an appreciation of its function is easily detectable. Because we know from

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ethnohistoric accounts that the Stratum 1 inhabitants of Eastern South America subsisted on staples quite different from those consumed by Stratum 2 intruders, it is totally improbable that the Guarani and/or Tupinambá pottery was spread by means of successive copies by alien groups who lacked the cuisine requiring the specific vessel forms.

It is true that instances of acculturation did occur, but these are restricted to rather clumsy copies of decorative or pseudo decorative Stratum 2 techniques other than polychrome painting, that is, exclusively the plastic ones. In Eastern Brazil, at least, the acculturation is always from Stratum 2 to Stratum 1 groups. The fact that Guarani pottery and Tupinambá pottery each maintain remarkable stylistic homogeneity over their respective territories is further counter evidence to the hypothesis that Stratum 2 pottery could have passed from one group of Stratum 1 people to another by means of successive copies. Even if regional variations are known to exist, vessels of identical shapes are found in sites separated by enormous distances. The complex painted patterns that characterize the Tupinambá ceramics are remarkably uniform over the whole territory of the Tupinambá, and equal uniformity can be observed for the simpler Guarani designs within Guarani territory.

In the absence of evidence of either sufficiently intense long distance trade or of the diffusion of the Guarani or Tupinambá pottery from group to group over all their respective territories, we must accept population expansion as the only explanation accounting not only for the spread of pottery, but also for the rest of their cultures as well. All of the preceding attempts to model the spread of Tupinambá

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ceramics or of Guarani ceramics through the process presented as alternative 2 (trait unit intrusion) have a strained and redundant sound. Stated positively and repeating much of what has been said before, all archaeological evidence indicates that the spread of Guarani ceramics into Southern Brazil and the spread of Tupinambá ceramics along the rest of the east coast of Brazil can be accomodated sensibly only as site unit intrusion.

12.1.3 Geographic Distribution of Radiocarbon Dates for Guarani Pottery as a Key to the Reconstruction of Guarani Expansion into Eastern South America

The expansion of the Guarani in Eastern South America can be readily observed through the available archaeological data. At least from the first century A.D. onwards, that is, from 1500 years before the arrival of the Europeans, their movements can be plotted from the radiocarbon dates of materials found along the routes of invasion, the major river valleys and the coast.

The chronology of the Guarani is formed from 54 radiocarbon determinations, which are listed in Appendix 1 (see endnote, pp. 389). Not all the assays have been accepted by the investigators who have collected and submitted the samples. One suspects that most of the rejections result from the failure of the data to conform to the rigid preconceptions of the investigators. The pretext for rejection varies from investigator to investigator, and in most instances these pretexts appear capricious. Therefore, I shall list all dates, with evaluative comments used sparingly.

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All radiometric determinations for the Guarani pottery have been plotted in Figure 15. The sites have been arranged in the order I sensed to be significant for the purpose of plotting the pottery spread. I have placed at the center of the chart those sites that have the earliest dates--all of them situated between the Upper Jacuí and the Paranapanema--and arranged all the others in decreasing order of age to the right and left. All those at the right are situated between the Iguaçu and the Upper Paraná, and those at left are situated between the Upper Uruguay and the Río de La Plata. Therefore, the sites are displayed from right to left on the chart approximately in the same order occupied by each of them from north to south through Eastern South America.

There is a C^{14} date of 1985 $\pm$ 60 B.C. (SI-707) for one site of Irapuã Phase (2), not represented in the chart, that understandably has not been accepted, not only because it is too early but because there is no continuity between it and the next earliest dates. The two earliest C^{14} dates shown in the chart, SI-418 from one Cambará Phase site (12), and SI-1011 from one Tamboara Phase site (17), have not been accepted by some investigators, the first because of the gap between it and the next C^{14} date for the same site, and the second because the pottery it dates allegedly shows characteristics that would place it later than that of other early sites in the same area on the Upper Paranapanema. However if the next oldest C^{14} date, SI-2205 (1), is to be accepted--which is the case--the dates from Cambará Phase sites should be accepted also; being on the Upper Paranapanema, they are nearer the more probable route of the spread of the Guarani up the Paraná than the site from which the

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SI-2205 date was obtained, which is part of the Guaratã Phase of the Upper Jacuá (1).

Everyone seems to accept the next oldest dates: SI-2203 from the same Guaratã Phase (1), and Gsy-81 from the site of José Vieira on the Middle Ivaí, now placed in the Umuarama Phase (13). Both these dates place the beginning of the Guarani spread in Eastern Brazil between A.D. 400-700.

There is no reason to believe that the C^{14} dates (A.D. 1-200) of the earliest known manifestations of Guarani pottery are not correct (Figure 15; SI-418 [12] and SI-2205 [1]), especially in light of the fact that the date of the next oldest site--also of the Guaratã Phase--is only slightly later (Figure 15; SI-2203 [1]). The date of the latter site, as have the others of the Upper Jacuí, come from my own research in colaboration with P.I. Schmitz (Schmitz 1980), and have been accepted by everyone.

There is a continuity of C^{14} dates from the first century A.D. to the beginning of the nineteenth century. All these data indicate that the Guarani presence in Eastern South America has a a time depth of no less than 1800 years.

In the case of those dates for which the recent extremity of the statistical range of error penetrates the beginning of the nineteenth century, the actual occupation of the site must fall in the lower half of the total span, because in most places the traditional Guarani pottery was not produced after the end of the eighteenth century, being replaced by Colonial or Neobrazilian pottery.

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The dated sites are shown in Figure 15 grouped by phases or clumps of sites (numbers at the upper part of the chart) corresponding to the way dates have been published. The widely spaced dates for some sites seem to indicate that they were reoccupied through time. Unfortunately, there is no stratigraphic information confirming successive occupations. Therefore, there is almost no way to reconstruct site sequence other than by using quantitative Fordian seriations, which are based on sherds from a few 10 cm levels from one or more 2 m by 2 m stardard test-pits excavated in each site. The limitations of this method have been noted above. On the other hand, most sites have been arranged in long sequences by means of their C^{14} dates and/or the evidence supplied by Fordian seriations.

Most of the sites are single-component, representing only one, probably rather short occupation, but there are exceptions. First, as we have mentioned above, the C^{14} dates of some sites suggest reoccupation through time. Second, a few sites show evidence of being occupied successively by people of two or more archaeological cultures; in some cases, there is evidence of a preceramic occupation below the level of Guarani pottery, and in others the lowest level or levels of some sites yielded pottery from one of the Stratum 1 traditions. In some cases this actually represents a previous occupation of the site by the makers of Stratum 1 ceramics, but in other cases this may represent only the exchange of pottery vessels between Stratum 1 peoples and the Guarani occupants of the site. All these cases will be briefly reviewed in 12.2.1 and 12.2.2.

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The 54 radiocarbon dates are not sufficient evidence to reconstruct in detail all the multiple movements that together formed the massive invasion of Eastern South America by the Amazon-adapted Guarani. These movements were very complex, constituting not simply one-way migrations over set routes, as they earlier were thought to have been, but developed into a process of colonization with uncountable branchings. We have also to have to account for the many reversals of the preceding movements, as well as for the successive waves of migrants traveling the same routes, a situation recorded in historic times (e.g., Métraux 1927).

These movements were developed over an enormous ares, and C^{14} dates are still very thinly scattered. In addition, crucial places have not been dated. There are still no C^{14} dates for any sites along the Paraná, the Paraguay, and even the Middle-Lower Uruguay, which should have been the main migration routes (see endnote p. 389). By connecting the earliest C^{14} dates from sites found along each of the segments in which a river valley or a stretch of the coast can be divided, a general idea about the time range and the direction of the movements is obtained. It is clear that only the forward pioneering movements can be indicated on the map in Figure 15, because what I am mapping is the advance of the first Guarani colonizing waves. However, reverse movements, as well as the reoccupation of areas already occupied by late-comers, also probably took place.

I have outlined before a reconstruction of the Guarani expansion into the drainages of the Paraná and Uruguay, using very much the same evidence (Brochado 1973a, 1973b). This expansion is shown in the map in Figure 15, as well as in Figures 21 and 22.

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The earliest radiocarbon dates obtained from sites along some other rivers such as the Paranapanema, Ivaí, Iguaçu, Upper Uruguay, and Jacuí, clearly indicate movements up these rivers from the mainstreams of the Paraná and Uruguay (Figure 15:1-3, 7-9, 12-18). Because the Guarani generally moved up the rivers that flow from near the coast to the interior, with their headwaters just west of the crest of the escarpments of the uplands, they spread from the interior to the coast and, upon reaching it, moved southward and northward to the Río de La Plata and to the Tropic of Capricorn. Most of the earlier sites are found along waterways; major rivers and the coastal lagoons were consistently used as their main routes of expansion, indicating that, as was the case with the historical migrations of the Tupians, these prehistoric movements were usually accomplished by boat.

The earliest C^{14} dates indicate that by A.D. 100-200 the Guarani were already widely spread in the area between the Ivaí (12) and the Jacuí (1) (Figures 15 and 22).

If, as I demonstrated in Chapter 11, the Guarani arrived from Amazonia, the only pratical route must have been up the Madeira and Guaporé, and down the Paraguay to the Paraná. However, because there is almost no archaeological data for this area, I cannot plot their spread along these rivers, where their passage must remain hypothetical, though logically neccessary, until further investigations take place. Given the earliest C^{14} dates from the tributaries of the Paraná and Uruguay, the proto-Guarani must have started moving up the Madeira, out of Central Amazonia, by at least 200 B.C., or perhaps even earlier.

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Probably not many people made the first trip, but their numbers must have grown rapidly after they reached the rich _várzea_ lands of the Lower Paraguay, Upper Paraná, and Uruguay.

12.1.4 Geographic Distribution of Radiocarbon Dates for Tupinambá Pottery as the Key to the Reconstruction of Tupinambá Expansion into Eastern Brazil

The framework of the chronology of the Tupinambá sites is formed by 16 radiocarbon determinations, which are listed in Appendix 2. The same considerations made when introducing the radiocarbon dates for Guarani sites apply here. Figure 17, showing the geographic distribution of C^{14} dates for Tupinambá pottery, is divided in two sections. In the right section all dated sites along the coast are arranged from right to left in the order in which they range from north to south through Northeastern and Eastern Brazil. In the left section of the chart, the few dated sites found farther inland have been arranged the same way. Numbers in the upper part of the chart correspond to the sites shown in the map from which the C^{14} dates have been obtained. The patterns shown above the numbers relate the earliest date in each group to the same patterns on the arrows. Some sites have been grouped by phases because that is the way they have been published.

Except in the cases of numbers 21, 23, and 29, all the other sites have only one C^{14} date each. There is a C^{14} date of A.D. 260 $\pm$ 110 (Gsy-[lot number not published]) from the site of Queimada Nova, north of the Middle São Francisco in Northeastern Brazil (Figure 17:20 Figure 13:TG7) that is not represented in the chart because it is believed that it dates a preceramic occupation found beneath the ceramic levels, not the Tupinambá occupation. The presence of clay pipes, coupled with the

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location of the site in the middle of the caatinga, right at the center of one of the driest areas of Northeastern Brazil, strongly suggests that the Tupinambá occupation was rather late there.

After that, the oldest date we have is A.D. 800 ± 65 (SI-2364) from one site near the coast on the shoulder of Northeastern Brazil (Figure 17:21; Figure 13:TP4). attributed to the Curimataú Phase. The succeeding dates, placing the Cricaré Phase from Espírito Santo (Figure 13:TP22) and the Guaratiba Phase from Rio de Janeiro (TP23) suggest a movement down the coast from Northeastern Brazil to near the Tropic of Capricorn branching inland in Pernambuco (TP30) and Bahia (TP24) and even extending as far inland as the Upper Araguaia (TP28). About this last date it is necessary to note that some of the sites classified as Iporá Phase yielded pottery that is clearly Tupinambá, but the only one so far dated (TP28) apparently represents one Guarani urn burial that might have some smathering of Tupinambá sherds around. Therefore, there is the possibility that N-235 (Figure 17) actually dates a Guarani, not a Tupinambá, occupation of the area.

The continuity of radiocarbon dates, running from the eighth century A.D. to the beginning of the nineteenth century, suggests that the Tupinambá lived continuously in Northeastern and Eastern Brazil for at least one thousand years. However, because the European occupation of the Brazilian coast began earlier than their occupation of the Paraná-Paraguay watershed, there are fewer dates later than the sixteenth century because here the replacement of the traditional indigenous pottery by Colonial or Neobrazilian ceramics started earlier than in Southern Brazil. The late date of the Itabapoana Phase (27) represents one example of acculturation to European norms.

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As in the case of the Guarani sites, most Tupinambá sites were occupied only for a short time. This assumption does not derive from continuities of C^{14} dates from the same site, but from the thinness of the occupation levels and the lack of large masses of smashed pottery. Most of the sites are also single-component, but there are some exceptions. First, C^{14} dates indicate that one site (21) was reoccupied after having been abondoned for approximately 600 years. Second, there is evidence that some sites were successively occupied by two or more different archaeological cultures. The Tupinambá reoccupied some of the coastal preceramic shellmiddens or sambaquís, as well as other preceramic sites also characterized by the presence of shells, but not exactly sambaquís, and apparently did this more often than did the Guarani. The lowest levels of some sites yielded pottery of Stratum 1 subtraditions. In some cases this may actually represent a previous occupation of the site by the makers of Stratum 1 pottery, but in other cases it may only represent the exchange of pottery vessels between those alien groups and the Tupinambá. All these cases will be briefly reviewed in the next section of this chapter. Because the oldest C^{14} dated site, which is in Northeastern Brazil (21) is less than 200 years older than the oldest site near Rio de Janeiro (23), it is important to explain what makes me so sure that the Tupinambá have spread from north to south and not from south to north.

First, even if, as I have demonstrated in the Chapter 11, the Tupinambá pottery has part of the complex of attributes that characterizes the Amazonian Polychrome Tradition as a whole, the Tupinambá set of vessel shapes, as well as their decoration and the

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organization of the decoration, relate most closely to the Marajoara style. In that regard, Tupinambá pottery is something like less decorated Marajoara, just as the Aruã Phase of Marajó and neighboring islands (Meggers and Evans 1957:457-539), is something like a plain Marajoara (Brochado and Lathrap 1982). In both cases, different sets of forms--all characteristic of Marajoara--were used, while decoration declined.

Second, as I have already mentioned, the earliest C^{14} dates for Marajoara pottery, even if taken most conservatively, are at least 500 years earlier than those for the Tupinambá. Moreover, they date a full blown Marajoara Style, indicating that its beginnings must have been even earlier.

Therefore, given: (a) the relationships of Tupinambá pottery to the Amazonian Polychrome Tradition and its closer relationship to the Marajoara Style; (b) the fact that the earliest dates for Marajoara are older than the earliest ones for Tupinambá; and, (c) that Tupinambá pottery is found south of Marajó, it must have spread from north to south.

Moreover, if the Tupinambá had moved from south to north, there would be no clue whatsoever as to the origin of the characteristics shown by their pottery, which clearly could not have been derived from that of the Guarani with whom the Tupinambá had a common boundary in Southeastern Brazil. There are two reasons why the Tupinambá pottery could not have been derived from the Guarani: (1) A complete transformation of the basic characteristics of the set of vessel forms cannot be accounted for without an appreciable span of time or spatial

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gap. (2) Between the Tupinambá and the Guarani there was a sharp boundary in historic times, and although it probably did change slightly in prehistoric times, it remained more or less in the same general area for around 500 years. If that boundary zone actually was the center from which the Guarani migrated southward and the Tupinambá northward, there should not be a sharp boundary between two distinct ceramic traditions and two distinct ethnic groups but, rather, an area where the characteristics of both were mixed, or better said, still undifferentiated.

As in the case of the Guarani, C^{14} dates alone cannot be used to reconstruct all the movements that together formed the massive invasion of Eastern Brazil by the Tupinambá. Therefore, other kinds of evidence must be used. For instance, if by A.D. 900 they were already in Espírito Santo, and had reached Rio de Janeiro by A.D. 1000, they must have crossed coastal Bahia, where the only C^{14} date is very late (Figure 17:29; Figure 13:TP19) sometime before A.D. 700.

Movements to or from the interior described by the chroniclers at the beginning of the Conquest (e.g., Métraux 1928b) should be explained as later branchings of the more general southward spread along the coast. Contrary movements--that is, displacements up and down the coast--cannot be dismissed either, but can be easily accounted for; although the general direction of the Tupinambá spread was from north to south, it could very well accomodate later reverse movements. In any case, their spread was far from the massive, all-out migration from the interior to the coast, hypothesized by Métraux (1928a:311). If that had been the case they would have had to cross all the mighty rivers that

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flow generally parallel to the coast in that part of Brazil, unlikely for people known to prefer canoe travel. It is clear, instead, that they followed the coast and, when inland, used the major rivers, such as the São Francisco, the Paranapanema, and perhaps the Tietê. It is also clear that their outward colonizations at least in part motivated by population pressures that developed in areas of the fertile <u>várzea</u> soils on the lower reaches of the rivers along the coast, as well as in the valleys of most of the major inland rivers; this reason for migration is identical to that hypothesized by Lathrap (1970a) in his Amazon model. The Tupinambá appear to have progressed farther and faster than did the Guarani in the same amount of time. This can be explained by the assumption that the former, advancing as they did along the very narrow strip of the coastal plain, colonized all the available land in less time and therefore had to proceed forward faster than the latter, who moved along the wide flood plains of the interior rivers encountering plenty of land to colonize before proceeding onwards. Also, in the south the interfluvial soils were developing on a volcanic substrate rather than on the Pre-Cambrian quartzites typical of the East Brazil Highlands, so were much more fertile.

The combined thrusts of the Guarani and Tupinambá described an immense two-pronged movement encircling the eastern section of the Brazilian Uplands. The final result of that encircling movement was that the Guarani and the Tupinambá eventually clashed in Southern Brazil, along a front running generally parallel to the course of the Tietê River (Figures 21 and 22).

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If we concentrate our attention only on the Guarani, we again see, between A.D. 100-1000, a smaller but still immense two-pronged movement following the Paranapanema-Itararé in the north and the Jacuí in the south, which brought the Guarani from the interior to the coast or very near it (Figures 15 and 22:1, 4, 12, 14-16). The next two hundred years or so, from A.D. 1000-1200, were a pause during which, as we shall see, the resistence of the Caingang and probably also of the Charrua, was broken. Therefore most of the arrows with interrupted horizontal hachures are very short or barely can be seen between the horizontally hachured and stippled ones (2-3, 6, 13-16, 14-15). This done, from A.D. 1200 on the Guarani assaulted the uplands, moving up the rivers and along the coast and, as the stippled and white arrows indicate, formed pincer movements surrounding progressively smaller portions of the uplands until the Caingang were almost completely isolated within them. The same happened, to a lesser degree, to the Charrua in the grasslands south of the uplands.

The Guarani invasions wrought havoc in the territories reached by the earlier Caingang and Charruan inhabitants. If we compare maps of the historic ethnic distribution of all these groups such as those by Nimuendajú (Lowie, 1946), Mason (1948), Loukotaka (1969) and Rowe (1973), with maps of the distribution of Guarani archaeological sites (Figure 13), Pedra do Caboclo Tradition sites (Figure 4), and Palo Blanco Tradition sites (Figure 10), and with the map of the spread of the Guarani (Figures 1, 15, 21, and 22), we will find that the Guarani forced their way into Eastern South America, driving many wedges through the boundaries between distinct groups of the earlier settlers, probably exploiting the weakness of their control over the border zones.

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Only the movements along the major rivers can be indicated on the maps (Figures 15, 21, and 22) because of their small scale, but movements up the lesser rivers had the same characteristics. Thus, the Guarani colonization formed a huge centrifugal and centripetral movement that embraced the whole of Southeastern South America.

12.2 Eviction and Encircling of the Earlier Inhabitants of Eastern South America

I have already indicated that the ceramics of the Pedra do Caboclo and Palo Blanco Traditions were spread mainly by adoption from group to group, that is, by trait unit intrusions (Lathrap, et al. 1956). Whenever the pottery of either of these traditions was adopted by groups with different cultures, it was adapted to their own culinary needs, which accounts for its variation through time and space.

With the spread of Stratum 2 ceramics, a new pattern appears, because pottery was brought by mass movements of peoples and spread by site unit intrusions (Lathrap, et al. 1956), connected to the outward colonization developed by these effective tropical forest farmers. The warlike, cannibalistic Guarani and Tupinambá not only brought with them a more complex style of pottery, but had a more complex culture than the already settled Ancient East Brazilians, Macro-Gê (Caingang), and Guaycuruans. The more tightly organized and larger ethnic units of Guarani and Tupinambá then expanded and divided, and could easily displace or eliminate the smaller, less disciplined communities of the earlier settlers.

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Nevertheless, the Guarani and the Tupinambá never completely wiped out the previous inhabitants, who were evicted from the major river valleys and from most of the coast, but held fast until late historic times in mountainous areas of the interior or in swampy coastal areas.

12.2.1 The Case of the Guarani

12.2.1.1 The Caingang

In the previous section, I mentioned that from very early times the Guarani, moving up the rivers that flow down from the uplands, began to impinge on territories held for thousands of years by such Caingang speakers as the ancestors of the historic Guayaná, Ingain, Pinaré, and Aweikoma (Brochado 1973b:20) (Figure 4; Figures 15 and 22: 6, 2, 3, 18, 9 and 14).

The complex distribution of the Guarani and the Caingang in late prehistoric and protohistoric times in Southern Brazil and Northeastern Argentina can be reconstructed by combining archaeological evidence and ethnohistoric records. The Caingang were occupying the top of the uplands from about 400 m elevation to the highest elevations reached by the coastal escarpments (ca. 1000 m). The Guarani were occupying the bottomlands of the river valleys that drain from the uplands, such as the Jacuí, Uruguay, Iguaçu and Upper Paraná, as well as the bottomlands of many of their tributaries. The occupation of these river valleys by the Guarani is shown only in Nimuendajú's map (Lowie 1946) but not in any other linguistic distribution, yet it is quite clear from ethnohistoric data (Figure 1), as well as from the large number of Guarani sites found on the bottomlands of these rivers. The Guarani

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occupation of the river valleys has been indicated by thick black lines along the river banks (Brochado 1973a:fig. 2) (Figure 13).

The highest elevations generally attained by the Guarani (400-500 m) were in the same range of the lowest elevations usually occupied by the Caingang and, therefore, constituted a sort of boundary line. This boundary was very complex, because the Guarani occupation of the bottomlands encroached, like so many fingers thrusting from west to east, into Caingang territory (Figures 15, 21, and 22). The ethnohistoric information is completed by archaeological data on the distribution of the ceramic styles related to the Caingang: Itararé, Taquara, and Taquaruçu. However, to make things more complicated, the historic Caingang were known to have occupied seasonally some of the same stretches of the rivers valleys and of the coast that were dominated by the Guarani. Consistent with this information, pottery of the Itararé, Taquara, and Taquaruçu Styles is usually found in or nearby Guarani sites that are within those areas on the periphery of the historic Caingang territories. Even if we still do not fully understand what actually happened, these findings indicate that the Caingang previously held sway over a larger area, part of which was later occupied by the Guarani. Some interpretations suggest that some sort of accomodation had been reached between the Guarani and the Caingang about how to use the disputed areas.

As has been suggested by Lathrap (1977b) for interfluvial groups in Amazonia, we should reconstruct the culture of these simpler and less sedentary groups in terms of the period when they had a hold on the coast and the mainstreams of the major rivers. The "hunting and

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gathering" Caingang most probably had a full blown form of the Gê ecotone culture before they were displaced by the Guarani. The protohistoric boundary between the Guarani and the Caingang was not merely a territorial one, but precisely mapped two different ecological niches. The bottomlands of the river valleys below 500 m elevation are occupied by tropical forest, while the top of the upland above 500 m in the south and 700 m in the north is occupied by a mixed broadleaf-coniferous subtropical forest. The occurrence of frost prevents the full growth of tropical crops such as manioc or even some strains of maize in the uplands. Therefore the area was not fit for Guarani occupation, and the ecological segregation of the Caingang and Guarani stemmed from their differential use of the environment.

The abandonment, around A.D. 1250-1400, of the pithouses formerly occupied by the Caingang could have been related--we still do not know exactly how--to their ultimate defeat at the hands of the encroaching Guarani which, as we shall see, happened shortly after ca. A.D. 1200. On the other hand, it seems that the need to fight against the Caingang slowed the rate of expansion of the Guarani in the key boundary areas along the periphery of the protohistoric Caingang territories between A.D. 800-1200, and only after that last date were they able to break the Caingang resistence and to colonize up those rivers into Caingang territory (Figures 15 and 22; see how in the interior the arrowheads have to be depicted close together between A.D. 800-1200; 2-4, 13, 16 and 17: horizontaly hachured and interrupted horizontaly hachured arrows). This seems to indicate a period when the Guarani invaders had to mark time before moving on.

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Pottery of the Itararé Style, attributed to the ancestors of the Guyaná of the Upper Paraná, appears in Guarani sites from as early as A.D. 400-700, and began to show apparent Guarani influences by at least A.D. 800. Pottery of the Taquara and Taquaruçu Styles, attributed to the Aweikoma of the Upper Uruguay, does not show any Guarani influence (Figure 4), and is not found in Guarani sites until late, almost historic times. These temporal and spatial differences in Guarani influence indicate that contacts between the Guarani and the Caingang started earlier in the northern half of Caingang territory and only gradually spread southward. The intensity of Guarani presence was also different in these two areas, a difference fully noted, as I have already mentioned, in the ethnohistorical data about the Guayana and the Aweikoma (Cortesão [1549-1640] 1951:192, 1969, 1970; Métraux 1946; Nimuendajú 1954:17; Baldus 1957; Hicks 1966).

Finds in late Guarani sites of a few sherds of the pottery attributed to the Caingang or of a handfull of the same kind of sherds in separate but nearby locations may be interpreted in many ways. It is possible that even after the Guarani had settled the coast and floodplains of the major rivers, the Caingang still came to the sea shores and river banks. Yet, we do not know if this was done with the consent of the Guarani or in their temporary absence.

The Guarani never reached the top of the uplands before historic times, when some groups did so under pressure, retreating from contact with the Europeans (F. La Salvia, pers. com. 1983).

Instances of acculturation between Caingang and Guarani pottery are known to exist, particularly in late, proto-historic and historic times,

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that is, from A.D. 1400 onwards. These instances will not be discussed here because they have been described and studied in a published paper (Brochado 1973b). Here, suffice it to say that the direction of the stylistic loans was predominantly from the Guarani pottery to the Caingang, which became more and more complex in regards to vessel shapes and decoration because of these loans.

Inputs from the Caingang pottery into that of the Guarani, although they could have occurred, never actually have assumed the importance given to them by earlier appraisals of the PRONAPA archaeologists (Brochado, et al. 1969; PRONAPA 1970; Brochado 1973b). Now we know that from the earliest times the Guarani pottery already possessed, fully developed, all those decorative techniques such as nail incisions and punctations that were suggested to have been derived from the ceramics of the regional traditions, especially from that of the Taquara and Taquaruçu Styles. Besides, these techniques are quite different stylistically in those earlier traditions than in the Guarani ceramics, and some of the comparisons then made are misleading. For instance, most of what have been described as nail incisions in the Taquara Style are actually basket impressions (Ribeiro and Silveira 1979).

12.2.1.2 The Charrua

Another sort of territorial accomodation seems to have been reached between the Guarani and the Charrua south of the Jacuí River. The Vieira ceramic, a subtradition of Palo Blanco marking the historic Charrua, was widespread in the area between the Río de La Plata estuary and the Jacuí River, the Lower Paraná and the Atlantic coast (Figure 10:

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V, bR, Cr, Cb, Tm, Pt, Yg, Vz, Rn, Sg, Ib, Ip). When the Guarani began to colonize this area, probably after A.D. 1000 (Figures 15 and 22: 4, 5, and 11; horizontally hachured, interrupted horizontally hachured, stippled and white arrows) they lived near the Vieira, most frequently on the coast and near the coastal lagoons, but also on the floodplains of the Lower Uruguay and Lower Río Negro. This movement represents a clear case of site unit intrusion, as defined by Lathrap and his colleagues (1956).

Guarani sherds dated to A.D. 1200 appear in the upper levels of the Vieira sites, and in some cases even cap them completely. Because these sites are low artificial mounds, fairly undisturbed, it is possible to assert that the Guarani sherds represent in the first case some sort of exchange or trade, but in other cases, where there is a continuous layer of Guarani refuse, the occupation of sites abandoned by the Charrua is the probably explanation. Nevertheless, the Charrua were never completely destroyed, displaced, or absorbed by the Guarani because in historic times both were occupying contiguous stretches of the coast and the banks of some rivers such as the Negro, Lower Uruguay, and Lower Paraná. As in the case of the Caingang, this kind of mosaic distribution is not clearly shown in maps of linguistic distributions, but is clear from the ethnohistoric data and from the number of sites with either Charrua or Guarani pottery, but not both, that have been found in that area.

The boundary between the Charrua and the Guarani is even more complicated and difficult to draw on a small scale map than that between the Guarani and the Caingang on the uplands. As in the confrontation

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with the Caingang, the final accomodation between the rival groups seems to have had an environmental character. The ecological niche favored by the Charrua was the interfluvial grassland and the coastal swamps, as well as the swamps found around the headwaters of tributaries of the Uruguay, the Jacuí, and the Lower Paraná. Because of the absence of forest cover, these areas could not be permanently occupied by the Guarani, who depended on slash-and-burn agriculture.

Although the Caingang-Guarani boundary approximately coincided with the 400 m-500 m elevation line, the distribution of swamps and grasslands on one hand, and of gallery forest on the other, is much more complex. These three formations are generally interspersed in parallel strips along the coast, and form a mosaic in the interior. Therefore, on a small-scale map, the Guarani and Charrua sites would seem to to be distributed in the same areas. Only when the distributions are plotted on a large-scale map with ecological zones sharply delimited is it clear that the distribution of the two classes of sites is complementary rather than overlapping.

12.2.2 The Case of the Tupinambá

12.2.2.1 The Ancient East Brazilians

The relations between the Tupinambá and the indigenous groups speaking languages related to Ancient East Brazilian (Camacan, Botocudo, Purí-Coroado, etc.) in Northeastern and Eastern Brazil are still not completely understood, because much less fieldwork has been undertaken in those regions than in Southern Brazil, and much less data has been published. Nevertheless, it is known that sites with pottery classified

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in the Pedra do Caboclo, Una, and Jataí Styles of the Pedra do Caboclo Tradition (Figure 4), have been found interspersed among the Tupinambá sites along the coast and in the interior. Tupinambá sherds also have been found upon or intrusive in the upper levels of some purportedly late sites of these same styles.

The Pedra do Caboclo Tradition has C^{14} dates in Northeastern Brazil, ranging from 1000 B.C. to historic times, long before the Tupinambá began moving down the coast in their southwestward push from Northern Brazil (Figures 6 and 7). It is also clear that the dates of the Pedra do Caboclo sites do not indicate the first spread of the groups speaking Ancient East Brazilian languages, which I believe were already in place at least from 9000 B.C. What these dates indicate is their acquisition of pottery.

In historic times, the Ancient East Brazilians had been almost completely replaced by the Tupinambá along the coast and on the lower courses of the coastal rivers, although they were not destroyed outrightly, but rather expelled to the interior where they were found still living in mountainous areas not farway from the sea and still striving to come back to the coast. Apparently, the Tupinambá hold on the coastal strip was not complete because at different times some of these groups--the Goitacá (Purí), the Messien (Camacan), and others that are not linguistically classified such as the Caxago or the Teremembé--were still able to reoccupy some stretches of the coast (Figure 2; note gaps in the coastal distribution of the Tupinambá). The wide defensive spacing typical of Tupian polities (DeBoer 1981) probably facilitated this infiltration. There are nown instances of

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acculturation between the pottery attributed to the Tarariú, Shurucu, and Purí and the Tupinambá pottery, at least in late proto-historic and historic times (Brochado 1973b), but less is known about them except that the direction taken by the stylistic loans was mainly from the Tupinambá pottery to the Pedra do Caboclo, Una, and Jataí Styles.

12.2.2.2 The Gê-Proper and the Cariri

The spread of the Aratú Subtradition seems to represent the late colonization of Northeastern and Eastern Brazil by the Gê-proper and Cariri. The Tupinambá, Gê, and Cariri colonizations were developed concurrently in Northeastern Brazil, moving generally in a southern direction (Figures 7, 17, and 22). The first proceeded mainly along the coast, and the other two by the interior. Nevertheless, the Cariri were apparently the first to reach the Northeastern coast, only to be expelled back to the interior by the incoming Tupinambá. In later times, after A.D. 1200, the Tupinambá also branched to the interior, disputing the possession of territories with the Gê on the headwaters of the Rio Grande (Upper Paraná) and of the Araguaia. The southward movements of the Gê were halted by the Guarani moving northward and occupying the Upper Paraná at least to the Tietê, before the Southern Cayapó, representing the outer edge of Gê southward expansions arrived around A.D. 1000. Along the coast, the southward colonization of the Cariri was halted approximately at the same latitude by the Tupinambá who, moving in the same direction, overtook them there.

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12.3 A Clash of Giants: The Boundary Between the Guarani and The Tupinambá in Eastern Brazil

The confrontation between the Guarani and the Tupinambá, at least on the southeastern section of the front (Figure 21 and 22: dotted line between the Guarani and the Tupinambá) on the Upper Paranapanema, occurred as early as A.D. 1000, as suggested by the earliest dates for Guarani sites in that area. The northwestern section of the same front might have been reached by the Guarani some centuries before that time. It is possible that the Guarani had progressed even farther up the Paraná, because presumably Guarani vessels have been found on the headwaters of the Araguaia (28). In historic times, however, they were not found beyond the confluence of the Tietê and the Paraná (Loukotka 1969: map) and, according to some investigators, did not reach there (Mason 1948: map; Rowe 1973: map) (Figures 15 and 22: checkered arrow; 19).

The result of the clash between the Guarani and the Tupinambá was the establishment of a permanent boundary somewhere to the southwest of the Tietê. This boundary might have undergone minor shifts, but stood in the same general area until late historic times.

There is at least one archaeologically documented instance of shifting. In historic times, the Tupinambá were occupying the banks of the Upper Paranapanema and Itararé, which were formerly occupied by the Guarani. This is archaeologically attested by several Guarani sites radiocarbon dated from A.D. 100-700 to 1300 (Figure 15:12). However, in historic times no Guarani were known to live east of the Tibagi River (Métraux 1928:15). This suggests that they retreated westward between

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A.D. 1300-1500, while the Tupinambá advanced in the same direction (Figures 21 and 22).

Because of the permanent blocking effect of the boundary, no further long range movements were possible in the directions previously followed by the expansions of the Guarani and Tupinambá. The movements of the latter were therefore redirected to the interior, where the Tupinambá attained the headwaters of the Araguaia, crossing from the Paranaiba, on the headwaters of the Paraná, by A.D. 1300-1400 (Figure 17:28).

The Guarani still had plenty of room to maneuver (Figure 22: stippled and white arrows = A.D. 1200-1600). Some Guarani groups, after breaking the opposition of the Guayana and Caingang, advanced up the rivers that flow from the southern section of the uplands (Figure 22:6, 9, 16-18). Others advanced northward (10), and southward (5), along the coast. Still others navigated down the Uruguay and the Paraná, reaching the Río de La Plata estuary (11), probably not long before the arrival of the first Europeans.

The migrations of the Chiriguano, who crossed the Chaco northwestward from the Paraguay River settling between the headwaters of the Pilcomayo and those of the Madeira (Rio Grande) (Figure 21: stippled arrows; Figure 22; white arrows), probably started in prehistoric times (Diaz de Guzman [1612] 1900:21-23; Nordenskiöld 1917; Métraux 1927:18). As Susnik (1975:18) points out, the Chiriguano corrugated or brushed culinary pottery has been maintained intact, while the polychrome painted fiesta vessels have been replaced by Andean forms and decoration (Outes 1909).

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The Guarani had more time to colonize at ease before clashing with the Tupinambá. Not counting the time they must have spent moving up the Madeira and down the Paraguay, they had from 500 to 800 years (A.D. 400-500 to 1000-1200) to colonize Southern Brazil before clashing with the Tupinambá. The Tupinambá had only 100 to 500 years (A.D. 700-900 to 1000-1200) to spread without hindrance. The boundary between the Guarani and the Tupinambá, therefore, ought to have been around 400 years old when the first Europeans arrived.

When we look at the initial distribution of Stratum 1 ceramics, a corresponding boundary, interestingly enough, can be traced in the interior between the areas occupied by the two largest blocks of speakers of Macro-Gê languages, the earlier settled Guayaná (Caingang) to the south, and the lately arrived Southern Cayapó (Gê-proper) to the north. Near the coast, however, the line runs along the boundary that divides such Macro-Gê speakers as the Guayaná, to the south, from groups speaking Ancient East Brazilian languages, such as the Goitacá (Purí), to the northeast. This situation and the Una Style pottery found there suggest that before the arrival of the Southern Cayapó, Purí-speakers were occupying all that area.

Another characteristic of the boundary was that, on the coast, between the areas more densely occupied by the Tupinikin (Tupinambá) and the Cário (Guarani), there was a stretch occupied by the Guayaná (Caingang). Moreover, in some maps of linguistic distribution (e.g., Loukotka 1969), a large area northeast of the Upper Tietê is left blank, which seems to indicate that there were, at least in historic times, no-man's lands between the Tupinambá and the Guarani. More to the

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north, in Tupinambá territory, there are other stretches along the coast that were occupied by the Goitacá (Purí), the Messien (Camacan), the Caxago, and the Teremembé.

In a recent article, DeBoer (1981) describes the buffer zones maintained between the Tupian polities of the Upper Amazon in historic times, and discusses how these could also be detected in prehistoric times. It is therefore possible that the same kind of buffer zones were maintained, not only between the Guarani and the Tupinambá, but also between large Tupinambá polities farther north (Nobrega [1549] in Leite 1956:136; Corrêia [1551] in Leite 1956:227). In these zones, their hold probably was not strong enough to prevent the earlier inhabitants, pushed by them to the interior, from returning, at least seasonally, to the coast.

The Guarani and Tupinambá were constantly at war along their common boundary and, in historic times, the latter continually raided the former. For instance, the Cário or Carijó (Guarani) villages along the coast of Santa Catarina, which were placed far south of the actual boundary (Figure 13:10), were enclosed by palisades as protection against the attacks of the Tupinambá (Oviedo [1543-1575] 1949; Métraux 1928a:57-58). Southwest of the Tietê there was also a well-known war zone between the Guarani and the Tupinambá, documented by those who crossed from the coast to the lower course of the Paraguay in the sixteenth century, such as Cabeza de Vaca ([1541-1542] 1946).

Even if the itinereries followed by these adventurers are far from well known, probably most or all of them, even possibly Aleixo Garcia (1524-1525; Nordenskiöld 1917:103-121, 1924:80; Métraux 1927:19-20;

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Hemming 1978:239-242, 280, 386) had followed one or other of the many branches of the system of indigenous trails called the Peabiru that crossed the Guarani territory from the coast of Southern Brazil to the upper course of the Paraná. Montoya ([1640] 1892:181) describes it as Sumé's road, relating this Tupian cultural hero to Saint Thomas; this is repeated by Lozano ([1750] 1873:67). Several stretches of this trail have been rediscovered in Paraná State by Maack (1959), and again by Chmyz (1976:66; Chmyz and Sauner 1971:29). It is said that the trunk road, after crossing to the Upper Paraguay, went all the way to the Andes (Zapata Gollan 1940:36). The northeasternmost branch of the Peabiru, as it has been plotted by Maack (1959), actually ran through the no-man's zone between the Guarani and the Tupinambá.

As should be expected, the pottery from a few sites near the Tupinambá-Guarani boundary shows parts of both sets of forms. However, from the published data (Chmyz 1977) it is not possible to assert that: (1) all the forms represented were actually part of one and the same set, and that what happened was the borrowing of forms of one subtradition by the other; or (2) that two different sets were represented in the context, their mixing being caused by the reoccupation of the sites.

Nevertheless, some sort of partial borrowing of vessel shapes actually occurred near the boundary, at least in late proto-historic times. Illustrations sketched at the time show tall, carinated, Guarani-like, but not thoroughly Guarani, jars being used with the typical Tupinambá vessel set by the Tupinikin (Staden [1557] 1963; Léry [1578] 1938; Brochado 1980). These jars have been found in archaeological contexts of this area, as I discussed in Chapter 10.

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The homogeneity of the Guarani and Tupinambá pottery over their respective territories was probably maintained by means of frequent travel between settlements far away from each other. Fewer or only hostile contacts between the bulk of the Tupinambá and the bulk of the Guarani accounted for the maintainance of their differences.

The qualitative and quantitative distribution of lithic materials also shows a clear geographic pattern, related to the areal dispersion of the subtraditions. Generally, more lithic artifacts are found in Guarani sites, at least in some areas and time ranges, than in Tupinambá sites. Moreover, there are more elaborate artifacts and their typology is more varied in the former than in the latter sites.

A clear pattern of distribution is shown by the typology of stone labrets or lip-plugs (tembetá). Scatamacchia (1981: quadro 39) lists and illustrates many published instances. It is easy to see that those from Tupinambá territory--that is, from Rio Grande do Norte, Piauí, Bahia and Rio de Janeiro--are different from those from Guarani territory, that is, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul.

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Endnote to Chapter 12

Since this thesis was defended, Chmyz (1983:102-103) published 25 radiometric determinations from Guarani sites along the stretch of the Upper Paraná that forms the Brazilian-Paraguayan border, that is, between the Guarirá Falls (Sete Quedas) and the mouth of the Iguaçu. The earliest C^{14} dates reinforce those I already had from the Middle Jacuí (Figure 15:1) and some tributaries of the Upper Paraná (12, 13, and 17). Therefore, the absence of earlier dates along the Paraná, commented upon in the test, does not exist anymore and I was right in estimating the beginning of the Guarani colonization of Southern Brazil ca. A.D. 1 or somewhat earlier. Nevertheless, Chmyz does not accept any of the 5 dates prior to A.D. 800; because the Ibirajé Phase to which they belong has been classified in the Corrugated Subtradition, he maintains for it his former estimate of A.D. 1000-1500, that is, after the Cambaré Phase of the Painted Subtradition (12). However, the dates clearly indicate that the slight predominance of painting is some sites has no direct chronological value, because the material from the earlier sites on the Middle Jacuí and Ivaí (1, 13, and 17) also could be classified in what was called the Corrugated Subtradition.

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CHAPTER 13

SOME CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

In this chapter, I will draw attention to certain key conclusions and point out some issues that should be addressed again and developed further. The most important of these are the occurrence of population movements from Central Amazonia into Eastern South America, and the ensuing adjustments and accomodations within the latter.

13.1 Population Movements

As we have seen in the chapters concerning the ethnic distributions, we have to envisage a time when the Guarani and the Tupinambá had not yet arrived, and the bulk of Eastern South America was occupied mainly by Ancient East Brazilians, Macro-Gê, and Guaycuruan peoples, who together comprise what we are now calling Stratum 1. The major consequence of the arrival of the Guarani and the Tupinambá, sometime around A.D. 100-500, was the general expulsion of the earlier inhabitants to rugged or swampy interfluvial areas. Nevertheless, contacts between all these groups were also widespread, and acculturation resulted. Because either the Guarani or the Tupinambá generally prevailed, cases of almost complete guaranization or tupianization of Macro-Gê or Ancient East Brazilian groups appear to have occurred.

The arrival of the Gê-proper sometime before A.D. 700 further modified the ethnic distributions in a series of still not well understood rearrangements. Apparently, when one or the other--the

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Tupinambá or the Gê--was the stronger and able to swamp the other in numbers because of a more continuous distribution, that one prevailed. The arrival of the Carajá, beginning ca. A.D. 1200, was influential only in the area between the headwaters of the Araguaia, Tocantins and Paraná, but from contacts with the Gê processes of carajáization also resulted.

The outward colonization of such Neo-Amazonian (what I now call Stratum 2) peoples as the Guarani, Tupinambá, and Carajá was still in full swing at the time of the arrival of the Europeans; this latter invasion brought even more turmoil and signalled the end of the aboriginal period in most of South America.

An important outcome of the model just outlined is the circumstance that the several waves of influence entered Eastern South America at about the same time, from its southwestern and northeastern extremities, meeting somewhere midway. The geography of Eastern South America, with two large river systems, the Amazon and the Paraná draining the interior through widely separate outlets, seems to have been instrumental in shaping this repeated two-pronged patterning of ceramic and/or population expansion out of Amazonia. This was true in the cases when pottery diffused from group to group, as in the spread of the Pedra do Caboclo and Palo Blanco Traditions. The same two-pronged pattern developed when more complex pottery was brought from the Central Amazon, carried by invading groups of Guarani and Tupinambá through a process of outward colonization. The dominant fact of geography, which cannot be repeated too often, is that the Madeira and its tributary, the Guaporé, and the Paraná and its tributary, the Paraguay, form a continuous

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waterway. The Upper Guaporé and Upper Paraguay are not separated by a divide, but are for part of each year merged in a huge lake a meter or more deep.

In the Amazonia paper, Lathrap and I (1980) came to the conclusion that Amazonia was not marginal to centers of development and diffusion elsewhere, but itself constituted that center. I have offered the baldest sketch of our conclusions in Chapter 11. On the other hand, Eastern South America is marginal to Amazonia and this accounts for the fact that Amazonian inventions and discoveries came to it only relatively late. The East Brazil highlands did form something of a barrier to movement from west to east, so that all these influences and migrations followed the pincer movement along the two great river systems and then along the coast.

As a result of the data presented and discussed in this thesis, I am now able to assert further that there is no cultural continental divide separating Amazonia from East Brazil (PRONAPA 1970; Meggers 1979). First, there is nothing to support the view that the earlier ceramic cultures of Eastern South America were independently invented; instead, everything indicates that they diffused from Amazonia. Forming a second stratum of acculturation to Amazonia, the Guarani and Tupinambá invaded Eastern South America, carrying two different aspects of the Amazonian Polychrome Tradition that were so widespread there and also had two long and important developments in East Brazil.

There is a belt of savannas, dry forests, and what is called the pantanal that crosses South America obliquely from Northeastern Brazil to the Southern Andes, thus dividing the Amazonian rainforests from the

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coastal rainforests and the subtropical forests of Eastern and Southern Brazil (Hueck 1972a, 1972b:292). That zone has been demonstrably highly permeable to influences from Amazonia. The Ancient East Brazilians and Macro-Gê groups, later including the Gê-proper--all of whom appear to have been well adapted to the semi-humid vegetal formations--crossed the caatinga and the cerrado by way of the gallery forests along the major rivers, using the humid and semi-humid forest "islands" of the interior as stepping stones. But even those groups who colonized the highlands generally moved from north to south along or between the rivers, and seldom west to east cross-grained to the topography. On the other hand, the Tupinambá could only follow the narrow strip of coastal rainforests to go around the caatingas of Northeastern Brazil, while the Guarani must have used the gallery forests along the Paraguay River to cut accross the wet and dry savannas of the pantanal.

The same model also serves to correct the popular misconception that Eastern South America was culturally homogenous. The tensions between the six distinct cultures--(1) the Ancient East Brazilians and Macro-Gê, (2) the Charrua, (3) the Guarani, (4) the Tupinamba, (5) the Gê proper and the Cariri, and (6) the Carajá--affected the patterns of ethnic distribution perceptible in the prehistory of Eastern South America as much as did the assumed tension between the terra firme and the várzea dwellers in Amazonian prehistory (Lathrap 1962; 1970a). Even more violent was the confrontation between groups possessing similar economic systems, and thus competing for the same niche, a situation exemplified by collisions between effective tropical forest farmers: the Guarani, the Tupinambá, and the Carajá.

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Now that the differences between the Guarani and the Tupinambá archaeological cultures have been established, something I have accomplished in this dissertation, future research can be directed toward systematically exploring these cultural differences. I have done most of this research, but the data are not included here, being reserved for another monograph in preparation. For instance, I have shown that the differences between the sets of vessel shapes of the Guarani and the Tupinambá can easily be explained by their different diets and food rituals. Obviously, a given set of vessel shapes is a function of diet; that is, the set of vessel shapes of any culture is a function of what kind of food is prepared, stored, and served in them, and what rituals are tied to the occasions when food is presented.

Diet, then, is related to the particular way the environment is perceived and exploited and, therefore, to a certain degree, to the environment itself. The fact that the Guarani and the Tupinambá had somewhat different diets by the time they reached the Brazilian coast explains why they settled in somewhat different environments during their initial colonization.

If one synthesizes all the geographical, climatic, and phytogeographical data on their location, it is easy to see that the Guarani and the Tupinambá were occupying separate areas with dissimilar environments--representing different ecological niches obviously related to their emphasis on different crops (Figure 13). Moreover, both the Guarani and the Tupinambá were concentrated in environments that occupy only relatively small and rather localized areas in relation to the whole of South America. In the case of the Guarani, climates of types

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Cfa and Gwa (Koppen) of the bioclimates 7.a and 6.b (Gaussen) are restricted to the southeastern part of the continent and correspond to the southern section of the Brazilian uplands. However, in this very restricted area the sites are even more concentrated, occupying only the subtropical forests and, to a lesser degree, the nearby mata de restinga, which together cover an even smaller area (Figures 15 and 17). The colder climate and characteristic vegetation--mixed broadleaf-coniferous forests, the mesophylous forest, and the open grasslands of the highland--were totally unsuited to Guarani agriculture. The niches favorable to Tupinambá agriculture were even more restricted.

Type Aw climates (Koppen), or 4.d Th´ bioclimates (Gaussen), cover enormous areas of the continent, especially in the northern section of the Brazilian Uplands. Tupinambá sites are concentrated within the tropical rainforests that grow on the coastal lowlands (hileia bahiana and mata de restinga) and, to a lesser degree, on the lower sections of the coastal escarpments (mata atlântica), which together represent rather minor segments (ca. 14% of the total vegetation). We have already noted that even within those restricted vegetation zones, the Tupinambá initially colonized only areas with a ridge-swale topography resembling that of northwestern Marajó.

The sequence of colonization, first into the extremely limited and most favorable niches, followed by an expansion into less favorable, more extensive zones, necessitating a gradual modification of the agricultural system, can be noted for both Tupinambá and Guarani. The choice to settle in these very specific environments, and only in them,

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is obviously related to the kind of tropical forest agriculture practiced by both the Guarani and the Tupinambá. The differences between the ecosystems settled by the former and the latter are at least in part a function of the different diets and the cultivars of corn and manioc on which they depended. The divergence of their agricultural systems, in turn, resulted from the different histories of the two groups as they entered Eastern South America from Amazonia along different routes and from different directions.

The relationships between diet and environment then helped to explain such natural and cultural processess as: (1) population growth, and (2) patterns of spread and colonization into different ecosystems, In the latter case, some light has also been thrown on certain patterns of social and political organization such as warfare and the incorporation of aliens, the role of the paradise myth in their migrations, etc.

13.2 Population Growth

The demographic build-up that fostered the outward expansion of the Guarani and Tupinambá had a triple aspect:

1. population growth while they were still in Amazonia;
2. population growth outside of Amazonia; and
3. the incorporation of aliens.

13.2.1 Population Growth While Still in Amazonia

The partial model built to explain the archaeological and ethnohistorical patterns shown by the distribution of the aboriginal

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populations in Eastern South American requires a general model for all of the South American lowlands. For the working of my model, it is necessary to posit a slow but constant increase of population in Central Amazonia to feed the continuous expansion of the Guarani and Tupinambá out of it and into Eastern South America. This means that the occurrence of demographic imbalances between different cultures that fostered outmigrations and conquests are crucial to the working of the model, as Lathrap (1962; 1970; 1977c) has already pointed out.

As first noted by Bateson in Naven (1958) and discussed at length by Chagnon (1973), ethnic units maintain systems of adjudication effective only up to some particular group size, and a ceremonial life sufficient to discharge group tensions effective only up to some particular group size. Once the upper limit is reached, groups will divide and move outward. It is the dividing and spacing of communities that controls population distribution in the early stages of Neolithic expansion, so that early Neolithic or Formative communities typically stayed well under the theoretical carrying capacity of the catchment area.

It is accepted that any advance of economic efficiency--this being an imprecise term as it is--has to have an effect on population that, however slight, given the amount of time involved, should show up at least as a miniscule amount of growth. This is to say that even very small advantages in the natural and/or cultural selection, in the long run, would lead to population expansion (Hassan 1981:125-142).

Because the river floodplains of Amazonia are rich and were intensively exploited, populations were relatively dense along them and tended to grow even more. So much population pressure was generated

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that, because of the ever increasing competition for limited resources, some groups had to leave and settle outside Amazonia proper. They were actually "extruded" from the richer Amazonian _várzeas_ into contiguous, even if not so rich, stretches of _várzea_ up the tributaries of the Amazon. Eventually, the Guarani spread reached the tributaries of the Río de La Plata (the Paraguay, the Paraná, and the Uraguay) and the Tupinambá spread reached the coastal lowlands of Northeastern and Eastern Brazil.

The requirements for the continuing outward colonization of both the Guarani and the Tupinambá outside of Amazonia also can be synthesized in Lathrap's words, when dealing with the Amazonian groups: " . . . relatively continuous population pressure, relatively constant rates of migration, and the search for a single kind of ecological niche, good alluvial soil" (Lathrap 1970a:75).

It is therefore difficult to explain why such authors as B.J. Meggers and, lately, Roosevelt (1980) argue that relatively high population densities were achieved in Amazonia only in late prehistoric times. As I have shown, since at least 500 B.C., population pressure was strong enough to force the Guarani to move out. (In her most recent mapping of Polychrome tradition expansion, Meggers [1983:fig. 7.14] concedes this point.) Moreover, Lathrap (1962; 1970a) argues for the beginning of population pressure long before that time, in order to account for the expansion, first of the proto-Arawakan, and later of the Maipuran Arawaks, out of Central Amazonia. Given the above discussion, Roosevelt's contention that until very late population growth on the Middle Orinoco approached zero is strange indeed, because her La Gruta

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community is most likely the seed population that gave rise to the millions of Taino inhabiting the Antillies when Columbus arrived (Lathrap and Stewart 1982).

I leave out the contention that it is highly questionable to apply an estimate of population density on the Middle Orinoco to the whole of Amazonia, because ecologically the former area is on the boundary of the latter and outside of it. For reasons clearly discussed by Roosevelt, the flood plain of the Orinoco is a simpler environment than the Amazonian _várzea_.

That population pressures existed in Amazonia is therefore demonstrated by the outmigrations of the Guarani, and later the Tupinambá, and their southward movements into Eastern South America. However, I will not elaborate on how these pressures developed, because most of the data for adequately studying such processes has still to be established _in loco_. Nevertheless, the explanation set forth by Lathrap (1962; 1970a) and Lathrap and Stewart (1982) is still the most acceptable.

13.2.2 Population Growth Outside of Amazonia

Upon leaving Amazonia, the Guarani and the Tupinambá moved on, in an outward colonization, each of them, as I have already indicated, always first colonizing the ecological niches optimal for their respective agricultural systems until they had saturated all these most favored niches and began to impinge into less congenial ones. Because the Guarani moved farther south than the Tupinambá, their agronomy underwent greater changes from Central Amazonian norms than did that of the

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Tupinambá. In the course of this expansion, they fueled their own population pressure by expanding into the fertile *várzeas* of the major rivers and coastal plains of Eastern South America, a process very similar to that modeled for the build-up of population pressures in Amazonia (Lathrap 1962; 1970a). Population pressure was continually generated at the same rate as they progressed along the river valleys and down the coast, maintaining this outward colonization until all the ecosystems suitable to them had been occupied.

Therefore, the diacronic and spatial distribution of ceramics, and the spatial distribution of languages at Contact times in Eastern South America can be explained only by the operation of these same diachronic processes of population growth, competition for scarce resources, migration, and displacement.

Plotting Stratum 2 colonization through time and space against a vegetation map of South American, such as that by Hueck (1972a; 1972b), and more detailed ones cited at the beginning of this chapter, we clearly can see how this happened. The Guarani, after colonizing the subtropical forests of the interior, and the *mata de restinga* of Southern Brazil, began to settle near the northern boundary of their range within the mixed broadleaf-coniferous forests of the Upper Paraná (Guairá Province), situated at higher elevations. To the south, following the gallery forests of the Paraná and Uraguay to their utmost reaches, they began to settle in the levee forests around the islands of the Paraná Delta and even moved all the way to the last stands of trees, the *talares* of the southern coast of the Río de La Plata estuary.

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The Tupinambá, after colonizing all the tropical coastal rainforests (the lowland forests, the nearby mata de restinga, and the fringes of the mata atlântica) extended their settlements farther into the interior, occupying that last "islands" of forests, well within the cerrados and caatingas of East-Central and Northeastern Brazil.

Little is known about the relative densities of either the Guarani or Tupinambá popultions. Nevertheless, the existence of some population pressure must be invoked to explain the fact that they occupied larger and larger areas, which expanded through time. There are also ethnohistoric indications (Cortesão 1951, 1959, 1970) that Guarani pressure on food resources was approaching--maybe even beginning to exceed--the carrying capacity of their ecosystem within some limited areas such as the southward facing escarpments of the uplands (Tape), and the Upper Tibagi (Guariá). Both areas are at the boundary between their purportedly optimal environments and different ones, viz., the open grasslands in the first case, and the mixed broadleaf-coniferous forests in the second. In both cases, the Guarani populations in question were situated relatively far from the floodplains of the major rivers, which were occupied by other Guarani groups for whom there is no hint of any scarcity of resources.

Calculations undertaken by Fernandes (1963) seem to indicate that there were relatively high densities in some stretches of the Guarani and Tupinambá territories, for example, around São Luiz Bay, in Maranhão, around Guanabara Bay, in Rio de Janeiro, and around Asunción in Paraguay. However, because the ecological requirements of the Guarani and the Tupinambá were so strict, the calculations cannot simply

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be extrapolated to the whole of the territories in which they were known to hold sway.

13.2.3 Incorporation of Aliens

The importance of the acculturation and incorporation of alien groups by the Guarani and Tupinambá, discussed at length, for instance, by Susnik (1975:57, 121-144) cannot be overstressed. These processes constitute one of the most important mechanisms of popultion increase through colonization. By means of such mechanisms, portions of Stratum 1 populations were absorbed and made to swell the ranks of the invaders.

These complicated processes should be studied further. It seems that the first contacts between the invaders and the earlier populations were usually through warfare. These wars continued late into historic times, sometimes waged against inland groups, sometimes against "Tapuya islands" that formed enclaves at some locations on the coast. After Conquest, the Guarani and Tupinambá were enlisted by the Europeans in wars against these same groups, for example, against the Aimoré in Bahia, or against the Charrua-Minuano in Southern Brazil.

Again referring to the pre-contact expansion of the Tupinambá and the Guarani, after the will of the alien groups to fight had been broken, different boundary defining processes ensued. One was some kind of accomodation by which winners and losers occupied different ecological niches that were represented by different, even if contiguous ecosystems, or were located within the same general ecosytem (e.g., the Guarani and the Charrua). Trade was sometimes the result of this sort of accomodation; for prehistoric cases, archaeological evidence of trade

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is sometimes the only indication that some sort of accomodation was achieved. As I have pointed out, potsherds of the Stratum 1 traditions are commonly found in the Guarani and Tupinambá sites, but evidence of acculturation and trade into the remaining Stratum 1 populations is much less common.

Supremacy in warfare invariably resulted in some sort of displacement. Almost everywhere, the earlier inhabitants were pushed out from the better soils of the river floodplains or the coast, and into the narrower valleys up river or rugged regions away from the major rivers; there were, however, some exceptions, for example, the coastal Goitacá. In other cases, the result was the outright extermination or annihilation of the vanquished, which sometimes involved the slaughter and consumption only of the men; the women were taken as second class wives. As a consequence of the prevalent gerontocratic practices of avuncular preference in marriage, the young warriors had to look for women elsewhere.

Submission without extermination resulted in assymetric aliances or clientism, including the right to take not only women, but boys as well, the latter being incorporated into the group as chief followers (Guarani = mboya). Cases of enslavement apparently also existed, but were less common, the above being more the rule.

In many cases, acculturation and complete physical and cultural absorption of the vanquished was the end result in the long run. These processes of guaranization or tupianization included the adoption of either the Guarani or the Tupinambá pottery, which makes them identifiable archaeologically. One of the best known cases is the

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guaranized Tape of the southward facing escarpments of the uplands, missionized by the Jesuits in the seventeenth century (Cortesão 1969; 1970).

Warfare and the incorporation of aliens, briefly discussed above, also had a role in the patterns of spread and the colonization of different ecosystems, which should be studied further. Another issue is the role of the paradise myth in the Guarani and Tupinambá migrations. Messianic movements such as those witnessed by Nimuendajú (1978) at the beginning of the twentieth century concerning the quest for the Yvy mara´ey, the Land-without-evil had less importance in prehistoric times than people were lead to believe by such fanciful interpretations as those of Métraux (1928b), Steward (1949a), and Steward and Faron (1959), who originated what we could call the paradise illusion. Presently, it is necessary to reevaluate the earthly paradise myth, which is a post-European distortion of the Tupian ecolocial approach to environmental selection, viz., the preference given to the rich várzea environment, with all its bounty and scheduling challenges (Bergman 1980). Repeated references to an earthly paradise in Guarani and Tupinambá cosmologies precisely define the ecological niches suited to them and lack the supernatural and messianic overtones insisted on by Métraux and Steward (Métraux 1928b; Steward 1949a; Steward and Faron 1959).

13.3 Toward a More Specific Model of Guarani and Tupinambá Expansion

Given all the above, there should be no doubt that the occupation of pre-Columbian Eastern South America by the Guarani and the Tupinambá was

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not a result of random or capricious movements, but can be explained only in terms of specific models of demography, cultural ecology, and cultural evolution.

The above also clearly indicates that population movements must be restudied by more sophisticated means than those hitherto employed. Concerning demography, whenever population movements result from population growth, it is known that such growth can be expected to occur where and when the combination of a particularly productive economic pattern and an environment favorable to that pattern coincide. Therefore, population movements ought to be explicable in terms of ecology, economy, and cultural evolution. Hence, further research should attempt to reconstruct demographic changes in the cultures involved, following, for instance, Hassan's lines, chiefly in archaeological demography (Hassan 1981:63-94). However, these problems cannot be treated individually, but must be treated simultaneously, as a continuous development in time. I suggest, moreover, that the approach to the agriculture-triggered demographic expansion, first exemplified by the two-pronged Guarani and Tupinambá expansions, and then by the expansion of the Gê-proper, Cariri, and Carajá, can only be given a precise quantitative evaluation through computer simulation, using a detailed ecological map of Eastern South America as the background or "gaming board". Lathrap and von Foerster, and a number of their students and associates, addressed the problem of computer simulation in the late 1960s, and the program was largely written at that time; however, the technology of computer graphics was primitive. In the last few years this technique has become almost oppressively sophisticated

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(e.g., computer games). The project, using various estimates of all important parameters, should now be reconstituted. (See Lathrap and Stewart [1982] for a summary of later thinking on the subject.) This is, however, subject matter for one or more further dissertations.

Cavalli-Sforza and his associates have pioneered such simulation studies vis-à-vis the spread of the Neolithic from the Middle East into Europe, but they have used an undeformed map of Europe as a "gaming board" (Ammerman and Cavalli-Sforza 1972, 1973; Menozzi, Piazza, and Cavalli-Sforza 1978).

What I have done here is mainly to clear the way for those who, in the future, will develop adequate simulation models to address these problems properly on the detailed ecological maps now available. Within the last ten years, the revolution in computer graphics makes such detailed boards possible to achieve. The ecological requirements of the Amazonian cultures were very specific, as Lathrap (1962; 1970; Lathrap and Stewart 1982) have demonstrated for Amazonia proper. I have demonstrated in this thesis that the same applies to the Guarani and Tupinambá, who constituted Amazonian extensions into Eastern South America. As I have already indicated, the South American environments that were important for this Neolithic spread occupy no more than 10% of the total area; hence, this kind of study will require the use of the most detailed ecological maps, that is, maps on which those environments positively selected by the Amazonian cultures would carry more weight than those shunned by them. My discussions of the interactions between the Guarani and the Caingang, and between the Guarani and the Charrua, in Southern Brazil, have already indicated the complexities a meaningful

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simulation would have to address in relation to these fine distinctions as they relate to the environmental requirements of each culture. Therefore, any simulation has to be plotted against sophisticated ecological zonations. Not all and any dry land could be used by either the Guarani or the Tupinambá. For instance, such environments as the grasslands, cerrados, and caatinga could not be settled by them and were left to other groups who had previously settled there. Therefore, the useful environments for either the Guarani or the Tupinambá are more constrained than a non-ecologically zoned map would lead us to believe.

In this dissertation, I have therefore provided the background for further studies of demography, in particular about the effect on population growth of different levels of economic efficiency as agriculture became intensified. The fact that, with the same data, other people were unable to visualize the development of the indegenous cultures with the same depth and sweep shows clearly that this cannot be done within small geographically circumscribed areas, but only against the whole geographical and cultural background of all of Eastern South America, or even all of the South American lowlands.

Because I assume the defintion of cultural ecology presented by Chagnon (1968a, 1968b, 1973), it is impossible to study such population growth within a small circumscribed territory, and I have found it necessary to draw the multiple movements of the ubiquitous Tupians in the perspective of the whole of Eastern South America and Amazonia. Such wide-ranging, holistic approaches to the interaction of economy, ecology, demography, and linguistics have not been popular in New World archaeology. Dumond's (1965, 1972) study of the waves of Eskimo expansion is the most fully developed example known to me.

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If I have done nothing else in this dissertation, I hope I have shown the necessity of such wide-ranging studies for the understanding of the ecological, demographic, and economic problems involved, and demonstrated that precisely circumscribed studies can not adequately address the problems of economic evolution and demographic instability. All these problems must always be addressed by taking into account immigration and, more importantly, emigration.

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APPENDIX 1

LIST OF GUARANI SITES, RADIOCARBON DATES, AND PUBLISHED LITERTURE

The letters and numbers (e.g., GP1) in the first column refer to the position of the site or group of sites in Figure 13. The numbers in the second column refer to Figures 15 and 22. Only the dates sites have an entry in the second column. All the radiocarbon dates are graphically shown in Figure 15. Lists of Guarani phases and their C^{14} dates can also be found in Simões (1972). Lists of Guarani sites and groups of sites described under phases can also be found in Brochado (1973a, 1973b). Understandably, neither Simões nor Brochado include include the more recent publications. More detailed lists with some discussion and larger maps can be found in Scatamacchia (1981) who, however, does not include the sites in Uruguay, Argentina, and Paraguay.

Figure 13	Figure 15	
GP1		Angatuba: Jango Luiz and Barreiro dos Italianos (Pallestrini 1968-1969:25-56; Szmuk 1968-1969 91-95, 98-99).
GP2		Uruguay Phase: 3 sites (Rizzo and Schmitz 1972).

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Figure 13	Figure 15	
GP3	12	Cambara Phase: 60 sites, including Fazenda Ibera (Baldus 1951-1952; Chmyz 1967:64-66, 69, 1968a:172-175, 1969a:108; Chmyz et al. 1968:16-17; Maranca 1974:118-120, 125). A.D. 80 ± 100 (SI-418), 775 ± 80 (SI-1009), 820 ± 150 (SI-422), 970 ± 100 (SI-709), 1100 ± 150 (SI-417) and 1190 ± 50 (SI-140).
GP4	3	Comandai Phase: 36 sites (Miller 1969:39-41). See also GC28 Mondai Phase. A.D. 1725 ± 55 (SI-701) and 1735 ± 105 (SI-702).
GP5		Conceicao: (Nigro 1970).
GP6	16	Condor Phase: 13 sites, including Estirao Comprido (b) (Fernandes and Blasi 1953; Silva and Blasi 1955a:128-143, 1955b:289-845; Silva 1958:113-118; Blasi 1967; Chmyz 1968a:177-178, 1969a:101-103, 108-110). A.D. 885 ± 95 (SI-695), 1340 ± 120 (SI-696), 1360 ± 70 (SI-699), 1410 ± 60 (SI-697) and 1815 ± 120 (SI-698).
GP7		Florinea: uebra Canoa (Pallestrini 1975).

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Figure 13	Figure 15	
GP8		Guairá (Pereira Jr. 1957).
GP9		Guajuvira Phase: 12 sites (Chmyz 1968b:34-35, 1968a:182-183, 1969b:112-114).
GP10		Ibirajé Phase: 12 sites including Tres Morrinhos (b) (Blasi 1961:49-78; Chmyz 1968a, 1971a:91-93).
GP11		Ibiti Phase: 2 sites (Maranca 1969:137, 1974:120-125).
GP12		Ilha Solteira: 8 sites (Maranca 1974:121-125, 1978:171-193).
GP13		Imbituva Phase: 15 sites (Chmyz 1968b:34-35, 1968a:181-182, 1969b:110-112).
GP14	13	Umuarama Phase: 3 sites, including José Vieira (b) (Laming 1959; Laming and Emperaire 1959; Laming-Emperaire 1962; Chmyz 1968a:176-177, 1968b:120, 1969a:99-101, 1969b:120; Brochado et al. 1968; Willey 1971:450). A.D. 570 ± 150 (Gsy-81), 1480 ± 100 (SI-694) and 1650 ± 115 (SI-693).

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Figure 13	Figure 15	
GP15		Irapuã Phase: 5 sites (Miller 1969a:38-39, 1969b:13-30).
GP16	2	Itapeva: Fonseca (Pallestrini 1969, 1975; Szmuk 1968-1969:91-95, 98-99). A.D. 730 ± 120 (SI-708) and 1985 B.C. ± 60 (SI-707).
GP17		Piraju: 4 sites, including Alves (Pallestrini 1972-1973:7-32, 1974:47-94, 1975).
GP18		Pirapo Phase: 7 sites (Chmyz 1974:72-73, 81-88).
GP19		Pompeia: Regadas Garcia (Pallestrini 1975).
GP20		Tabay Phase: 8 sites, including Corpus (Mayntzhusen 1912:461, Métraux 1928:238-240; Palavecino 1948; Rizzo 1969:131-133, 1970b, 1972; Rizzo and Schmitz 1972).
GC1		Alto Paraná sites: (Ambrosetti 1894, 1895a, 1895b; Mayntzhusen 1912, 1941; Serrano 1930; Aparicio 1948; Howard and Willey 1948:19; Canals Frau 1954; Menghin 1957, 1960).

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Figure 13	Figure 15	
GC3		Asunción-Ypane: 14 sites (Vera 1930:274-280, 1940:62-67; Schmidt 1932:1-21, 1934:132-188; Vellard 1934).
GC4		Baixo Paraná sites: (Burmeister 1872; Lista 1878; Ameghino 1880; Torres 1903, 1907, 1911, 1919; Outes 1918; Devicenzi 1927:324-325; Serrano 1930, 1936; Lothrop 1932:77-232, 123-146; Howard 1948; Aparicio 1931, 1948; Palavecino 1948 map; Menghin 1962; Lafon 1971:119-152).
GC5		Bojoru Phase: 7 sites, including Presidio de São Padro (Naue et al. 1968:141-152, 1971:91-122; Schmitz and Brochado 1972:6, 7, 21; Brochado 1974b).
GC6		Bopicua Phase: 6 sites (Boretto 1969; Boretto and Bernal 1969:7-14; Boretto et al. 1973:150, 152, 156, 168-171).
GC7		Camaquã Phase: 16 sites (Schmitz et al. 1970b:515-517; Brochado 1974a:25-51).
GC8		Cangucu Phase: 19 sites (Ullrich 1906; Brochado 1974a:40-42, 45-47).
GC10		Guaiuba: (Eble and Schmitz 1972:29-36).

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Figure 13	Figure 15	
GC11		Guaiuba, before Jaguaruna: 20 sites (Rohr 1968:50, 1969:7-9, 19-34; Piazza 1973 pers. com.).
GC12		Guaraci Phase: 4 sites (Chmyz 1974:77-78, 81-88).
GC13	1	Guaratã Phase: 31 sites (Brochado 1971:20-23). A.D. 150 ± 100 (SI-2205), 475 ± 80 (SI-2203), 695 ± 100 (SI-2201), 770 ± 70 (SI-2204), 1060 ± 40 (SI-1190), 1175 ± 65 (SI-2198), 1275 ± 55 (SI-2200), 1420 ± 120 (SI-816), 1605 ± 105 (SI-818), 1685 ± 90 (SI-2199), 1730 ± 85 (SI-2202) and 1750 ± 80 (SI-1191), and 1600 ± 105 (SI-818).
GC14		Ibirama: (Eble and Scatamacchia 1974:67-82).
GC15		Icamaquã Phase: 12 sites (Serrano 1955; Miller 1969b:18).
GC16		Ijuí Phase: more than 22 sites (Brochado 1968:230-231; 1969b:16-19, 1969c:43-44, 1974b; Brochado et al. 1969a).
GC17		Ilha de Santa Catarina: 3 sites (Schmitz 1959:267-324).

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Figure 13	Figure 15	
GC18		Induá Phase: 11 sites (Brochado 1969c:41-42).
GC19	9	Ita Phase: 41 sites (Miller 1971:51-53; Piazza 1971:75-76).
		A.D. 1360 ± 100 (SI-826).
GC20		Itapiranga: 52 sites (Schmitz 1957; Rohr 1966:21-59).
		A.D. 770 (pers. com. 1972, in Scatamacchia 1981:76, 77).
GC21		Itapocu Phase: including Itaocara (Tiburtius, Bigarella, and Bigarella 1950-1951; Piazza 1974:55, 59-60, 62-65; Chmyz 1976:1).
GC22	19	Ivinheima Phase: 4 sites (Chmyz 1974:74-77, 81-88).
		A.D. 1475 ± 45 (SI-1017), 1690 ± 70 (SI-1016), 1770 ± 60 (SI-1018) and 1840 ± 60 (SI-1019).
GC23		La Tuna: (Baeza and Bosch 1973:153-169).
GC24		Los Negros (Baeza and Bosch 1973:153-169).

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Figure 13	Figure 15	
GC25	4	Maquiné Phase: around 50 sites (Schmitz 1958:113-143; Miller 1967:21-22; Brochado et al. 1968; PRONAPA 1970; Willey 1971:450). A.D. 880 ± 100 (SI-413), 1080 ± 100 (SI-412), 1410 ± 100 (SI-411) and 1430 ± 200 (SI-410).
GC26	11	Isla Martin Garcia: 3 sites (Outes 1916b; Cigliano 1968:7-8; Cigliano et al. 1971a:136-137, 152-159, 170, 182, 186-187; Cigliano et al. 1971b:103-104, 106). A.D. 1545 ± 35 (GrN-5146).
GC28	3	Mondaí Phase: 40 sites (Schmitz 1957:122-142; Piazza 1969:61-63). See also GP4 Comandai Phase. A.D. 880 ± 100 (SI-549), 1180 ± 100 (SI-439), 1330 ± 80 (SI-550), 1440 ± 70 (SI-547), 1460 ± 70 (SI-548) and 1700 ± 90 (SI-546).
GC30		Paranhana Phase: 16 sites (Miller 1967:22-23).
GC31		Pocó Grande Phase: 3 sites (Beck et al. 1970:27; Chmyz 1976:1).

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Figure 13	Figure 15	
GC32		Puntal de Gabito: 8 sites (Prieto et al. 1970:18-20, 35, 36, 42-46, figures 6-8).
GC34		Reducciones del Uruguay: Candelaria, Jesus-Maria, and San Jose (Brochado 1971:15-20, 27, 1974:14, 28; Brochado and Schmitz 1972-1973:62, 1976:119-130; Ribeiro et al. 1972, 1976).
GC35	6	Rio Caí Phase: 34 sites (Ribeiro 1968:153-169). A.D. 1205 ± 115 (SI-1198) and 1760 ± 85 (SI-1197).
GC36	5	Rio Grande Phase: 26 sites, including ex-Camaquã Phase (20 sites) (Naue et al. 1968:141-152, 1971:91-122; Schmitz and Brochado 1972; Naue 1973; Schmitz 1973). A.D. 1105 ± 75 (SI-1005).
GC37		Río Negro: (Baeza and Bosch 1973:153-169).
GC38		Río Taquari: more than 60 sites (Fernando La Salvia, pers. com.).

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Figure 13	Figure 15	
GC39		Salto Grande: 3 sites (Serrano 1930a, 1930b, 1932, 1933, 1936; Palavecino 1948; Rodriguez 1969:11, 11, 24, 1970:5; Cigliano et al. 1971a:170; Cigliano et al. 1971b:103-104; Dias 1977:156).
GC40	17	Tamboara Phase: 10 sites, including Jose Lopes (c), Villa Real del Sprictu Santo (d) and Ciudad Real del Guayra (b) (Watson 1947; Blasi 1963; Blasi and Chmyz 1963:63-102; Chmyz 1963, 1964, 1968a:178, 179, 1969a:103-105, 108, 110, 1969b:120, 1974:81-90; Brochado 1974:14-20). A.D. 460 ± 45 (SI-1011) and 1390 ± 60 (SI-700).
GC41	10	Tapera: (Rohr 1966:21-35; Chmyz 1971b:11-14). A.D. 1400 ± 70 (SI-244).
GC42		Taquarembo: (Baeza and Bosch 1973:153-169).
GC44	7	Toropi Phase: 22 sites (Brochado 1969c:39-41). A.D. 1820 ± 105 (SI-815) and 1840 ± 150 (SI-817). Figure 15:7

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Figure 13	Figure 15	
GC45		Trombudo Phase: 41 sites (Schmitz et al. 1967:24-58, 1970:1-54).
GC46	18	União da Vitoria: (Chmyz 1969b:106, 1971a:87-114). A.D. 1450 ± 45 (SI-1015).
GC47		Uruguaiana: 3 sites (P.I. Schmitz pers. com.).
GC48	8	Vacai Phase: 22 sites (Brochado 1969c:36-39, 1971:15-20, 1974b; Brochado and Schmitz 1972-1973, 1976). A.D. 1045 ± 95 (SI-1196), 1150 ± 40 (SI-1003) and 1343 ± 40 (SI-1002).
GC49		Yaguarete: (Boretto 1969; Boretto and Bernal 1969:7-14; Boretto et al. 1973:150, 169, 170).
GC50		Yaguari Phase: 4 sites (Palavecino 1948 map; Nunez Regueiro and de Lorenzi 1970, 1973:23-68; Nunez Regueiro and Tarrago 1972:36-48).
GC51		Irai: 9 sites (J.P. Brochado, field notes).

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Figure 13	Figure 15	
GE1		Calore Phase: 2 sites (Chmyz 1968a:179-180, 1968b:31-52, 1969a:105-107; Brochado 1974:16).
GE2		Ipira Phase: 15 sites (Piazza 1971:77-78; Miller 1971:53-54).
GE3		Loreto Phase: 27 sites, including the Reduccion of Loreto (Chmyz 1974).
GE4		Sarandi Phase: 4 sites (Chmyz 1971a:93, 94, 103, 1974:81-88).
GE5		Tibagi Phase: 6 sites (Chmyz 1967:66-67, 1968b:31-52, 1968a:174-175).
GE6		Irai II: 8 sites (J.P. Brochado, field notes).

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APPENDIX 2

LIST OF TUPINAMBA SITES, RADIOCARBON DATES, AND PUBLISHED LITERATURE

The letter(s) and numbers (e.g., TP1) in the first column refer to the position of the site or group of sites in Figures 13 and 22. The numbers in the second column refer to Figure 17. Only the dated sites have an entry in the second column. Radiocarbon dates are graphically shown in Figure 17. A list of Tupinambá phases and their C^{14} dates can also be found in Simões (1972). Lists of Tupinambá sites and groups of sites described as phases can also be found in Brochado (1973a, 1973b). Understandably, neither Simões nor Brochado include the more recent publications. A more detailed list with discussions and larger maps can be found in Scatamacchia (1981).

Figure 13	Figure 17	
TP1		Belvedere Phase: 3 sites (Dias Jr. 1971a:133-148, 1974:111-114, 1975:13-15; Dias Jr. et al. 1975:5-17).
TP2	26	Cocha Phase: 9 sites, including Catuni Sub-phase (Silva-Bezerra 1971:14; Pepe and Dias 1973:383; Lathrap 1973:239; Carvalho and Cheuiche 1975:21-52; Carvalho et al. in press).

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Figure 13	Figure 17	
TP3	22	Cricare Phase: 23 sites (Perota 1971:153-154, 1972, 1974:132, 135). A.D. 895 ± 80 (SI-828).
TP4	21	Curimataú Phase: 19 sites (Nasser 1967:123-125, 1971:181-185, 1974:160-163; Brochado et al. 1968; PRONAPA 1970; Willey 1971:450). A.D. 800 ± 65 (SI-2364) and 1545 ± 60 (SI-2365).
TP5		Governador: (Beltrão and Kneip 1969a:93-100, 1969a:108-110; Beltrão and Faria 1970-1971:97-135; Dias 1972:79, 80).
TP6	23	Guaratiba Phase: 15 sites (Dias Jr. 1967:94-96, 1968:21-33, 1972:79-80; Beltrão and Kneip 1969a:93-100, 1969b:107-108; Beltrão and Faria 1970-1971:98-135; Brochado et al. 1968; PRONAPA 1970; Willey 1971:450). A.D. 980 ± 100 (SI-433) and 1150 ± 100 (SI-434).
TP7		Itapacura: (Albuquerque 1969).

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Figure 13	Figure 17	
TP8	24	Itapicuru: 27 sites, including S. do Chapeu, M. do Chapeu, Tapuia (e), and Jequiê (f) (Ott 1958:107-121; Calderon 1967:113-115, 1969:143, 144). A.D. 1270 ± 130 (SI-471), 1400 ± 95 (SI-821) and 1645 ± 65 (SI-820).
TP9	23	Jequiê Phase: 5 sites (Beltrão and Kneip 1969a:97-100, 1969b:107-108; Beltrão and Faria 1970-1971:98-135). A.D. 1735 ± 120 (SI-1203).
TP10		Juiz de Fora: (Pereira Jr. 1967:122).
TP11		Peruibe: (Pereira Jr. 1965).
TP12		Praia Grande: (Beltrão and Kneip 1969b:110; Beltrão and Faria 1970-1971:97-135; Dias 1972:79-80).
TP13		São Paulo: (Ott 1958:118-119).
TP14	25	Tucumã Phase: 2 sites (Perota 1974:131, 132, 135). A.D. 1390 ± 70 (SI-832).

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Figure 13	Figure 17	
TP15		Tietê and Mogi-Guaçu: 11 sites (Godoi 1946; Silva 1966:79-87, 1970; Pereira Jr. 1967:117, 124).
TP16		Cacu Phase: 5 sites (Schmitz 1975).
TP17	28	Ipora Phase: 5 sites (Fensterseifer and Schmitz 1975, 1976:53; Wust 1976:105; Schmitz 1976-1977:10). A.D. 1330 ± 55 (N-2351) and A.D. 1440 ± 75 (N-2352).
TP18		Ponte Nova (Soares da Silva 1934:175-177).
TP19	29	Cacimba: one site (Laroche et al. 1977; Laroche and Laroche 1980:5, 43). A.D. 1580 ± 95 (MC-1053), 1590 ± 135 (MC-1082), 1620 ± 110 (MC-1083) and 1655 ± 75 (MC-1088).
TG2		Montés Claros: (Dias 1975:15). See also TP2 Cocha Phase.
TG3		Morro da Viuva: (Beltrão and Faria 1970-1971:97-135).
TG4		Pixunas: (Beltrão and Faria 1970-1971:97-135).

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Figure 13	Figure 17	
TG5		Santa Anastacio: (Pereira Jr. 1967:121).
TG6		São Luiz do Maranhão: Cajari (Lathrap 1973:238; Simões et al. 1977).
TG7	20	São Raimundo Nonato: Queimada Nova (Missao 1973:3-4, 1974; Maranca 1976b:15-103). A.D. 260 ± 110 (Gsy- number not given).
TG8		Lagoa Santa: Sumidouro (Walter 1958:30-31, 80-82, figure 42-44; Junqueira and Malta 1978).
TG9		Rio Portinho: (Beltrão and Faria 1970-1971:97-135).
TG10		Aparecida: 3 sites (Pereira Jr. 1967:117; Maranca 1969:136-137).
TG11		Matao and Tatui: (Pallestrini 1975).
T1		Coribe Phase: 12 sites (Calderon 1969:139-140).

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Figure 13	Figure 17	
T2	20	Sernambitiba Phase: 7 sites (Dias Jr. 1969:22, 1972:79-80, 1975:9-12; PRONAPA 1970:14-16). A.D. 1380 ± 100 (SI-438).
T4		Morumbi (Pereira Jr. 1964).
C2		Itaocara Phase: 5 sites (Dias Jr. 1969a:122-124, 1972:79-80, 1975:9-10).
C3		Ipuca Phase: 4 sites (Dias Jr. 1969b:149-151, 1972:79, 80, 1975:9-10).
C4	27	Itabapoana Phase: 4 sites (Dias Jr. 1969b:147-149, 1972:79-80). A.D. 1840 ± 40 (SI-833).

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VITA

José Joaquim Justiniano Proenza Brochado was born on March 7, 1936 in Rio Grande, Rio Grande do Sul State, Brazil. He began research in archaeology as an amateur in his hometown in 1958. In 1962, he attended his first field school in the shellmiddens and caves of Paraná State under A. Laming-Emperaire. He graduated with a degree in history from the Universidade Federal do Rio Grande do Sul, at Porto Alegre in 1963. That same year, he began teaching anthropology at that university, where he is still an Assitant Professor.

In 1966, he started researching at the Museu Estadual de História Natural in Porto Alegre, backed by a scholarship from the Conselho Nacional de Pesquisas (now the Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq), which has sponsored all of his research since that time. He participated in the Programa Nacional de Pesquisas Arqueológicas (PRONAPA), sponsored by the Smithsonian Institution and directed by B. J. Meggers and C. Evans, from 1967 to 1970. He taught such subjects as history, art history, and history of economics in several schools and colleges until, in 1971, he was finally able to dedicate all his time to anthropological research and training.

After working with the PRONAPA, he continued fieldwork in Rio Grande do Sul until 1972, when he moved to Argentina to study at the Museo y Facultad de Ciencias Naturales de la Universidad Nacional de La Plata under L. M. Cigliano and A. Rex González. He returned to Brazil in 1973 and resumed research in Rio Grande do Sul, with occasional fieldwork in Goiás State with P. I. Schmitz.

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In 1977, he enrolled in the graduate program of the Department of Anthropology of the University of Illinois, where he studied until 1981, sponsored by scholarships from the Organization of American States (OAS) and the Coordenação do Aperfeiçoamento do Pessoal de Nível Superior (CAPES). He returned to Brazil to finish writing his dissertation and went back to the University of Illinois to defend it in 1983. His fieldwork in Rio Grande do Sul State has been focused on such cultural manifestations as: (1) coastal shellmounds (sambaquís), (2) Charrua mounds with Palo Blanco Tradition pottery, (3) perceramic sites with Altoparanaense lithic materials, (4) petroglyphs engraved into caves and rockshelters, (5) prehistoric Guarani villages, and (6) two reduciones of the seventeenth century and three missions of the eigthteenth century. He also did some work in sambaquís and percermic sites in caves in Paraná State, petroglyphs engraved in rocky floors, and prehistoric Tupinambá, Gê, and Carajá villages in Goiás State, with pottery of the Tupinambá, subtradition, and the Aratú and Urú Traditions, respectively. He has also visited the caves with petroglyphs in Minas Gerais State and the Pacoval site in Marajó.

He has published 27 articles dealing with Brazilian archaeology, some of them in coloboration with other researchers of PRONAPA, or with P. I. Schmitz of the Instituto Anchietano de Pesquisas of the Universidade do Vale do Rio dos Sinos (UNISINOS). Most of these articles are in Portuguese, and have been published in Brazil. A few are in Spanish or English, and have been published in Argentina or the United States. His personal bibliography follows.

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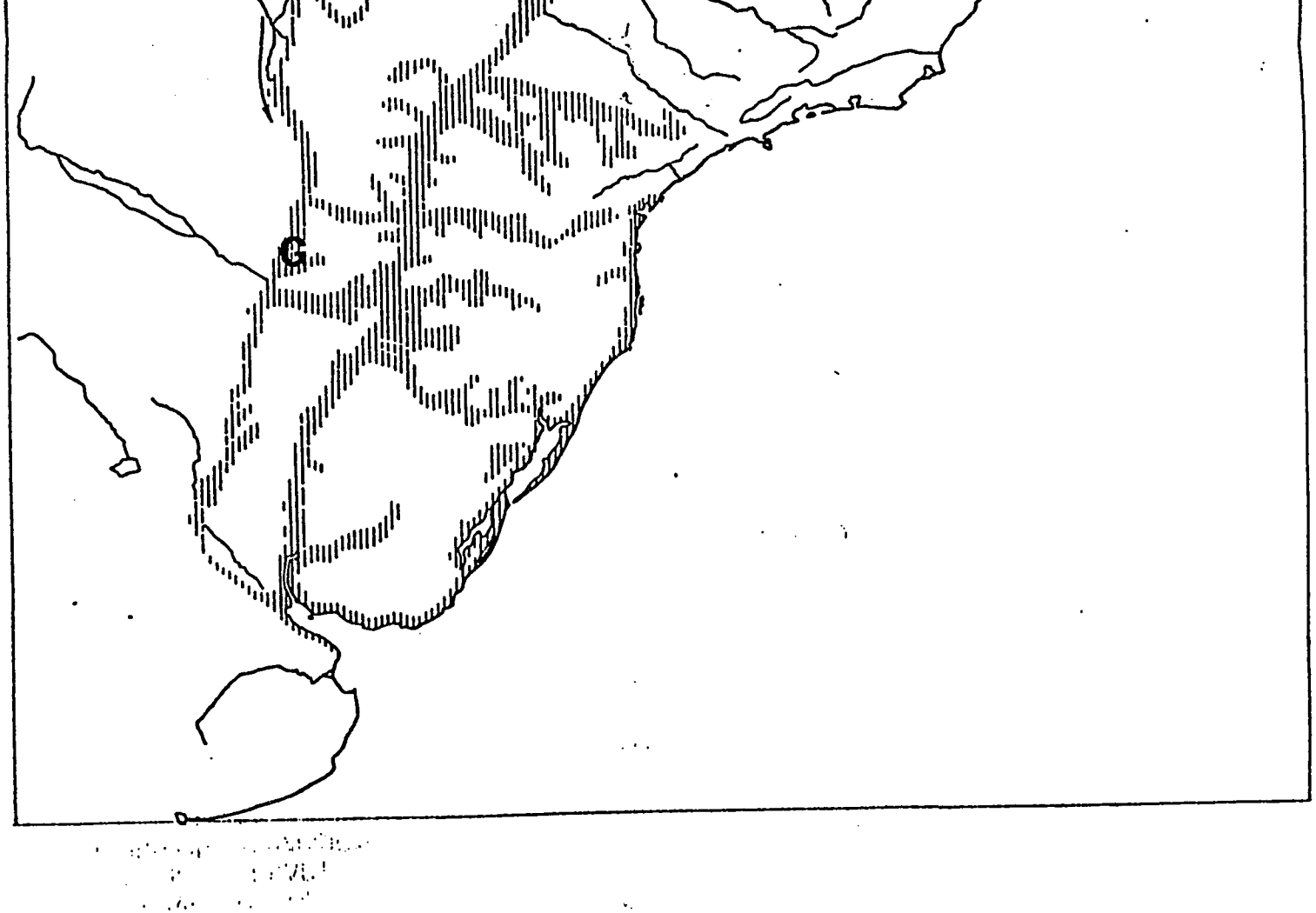

Figure 1. Map of the distribution of Guarani-speaking groups as of the time of European contact. Compiled from Métraux (1928a: map 4), Loukotka (1939, 1945, and 1969), Nimuendajú (Lowie 1946), Steward and Mason (Mason 1948), Steward and Faron (1959:23), Greenberg (1960) and Rowe (1973); corrected using the archaeological data shown in Figure 13, and considerations of the details of ecology and topography of the area. "G" indicates the probable center of dispersion of the Guarani within Eastern South America.

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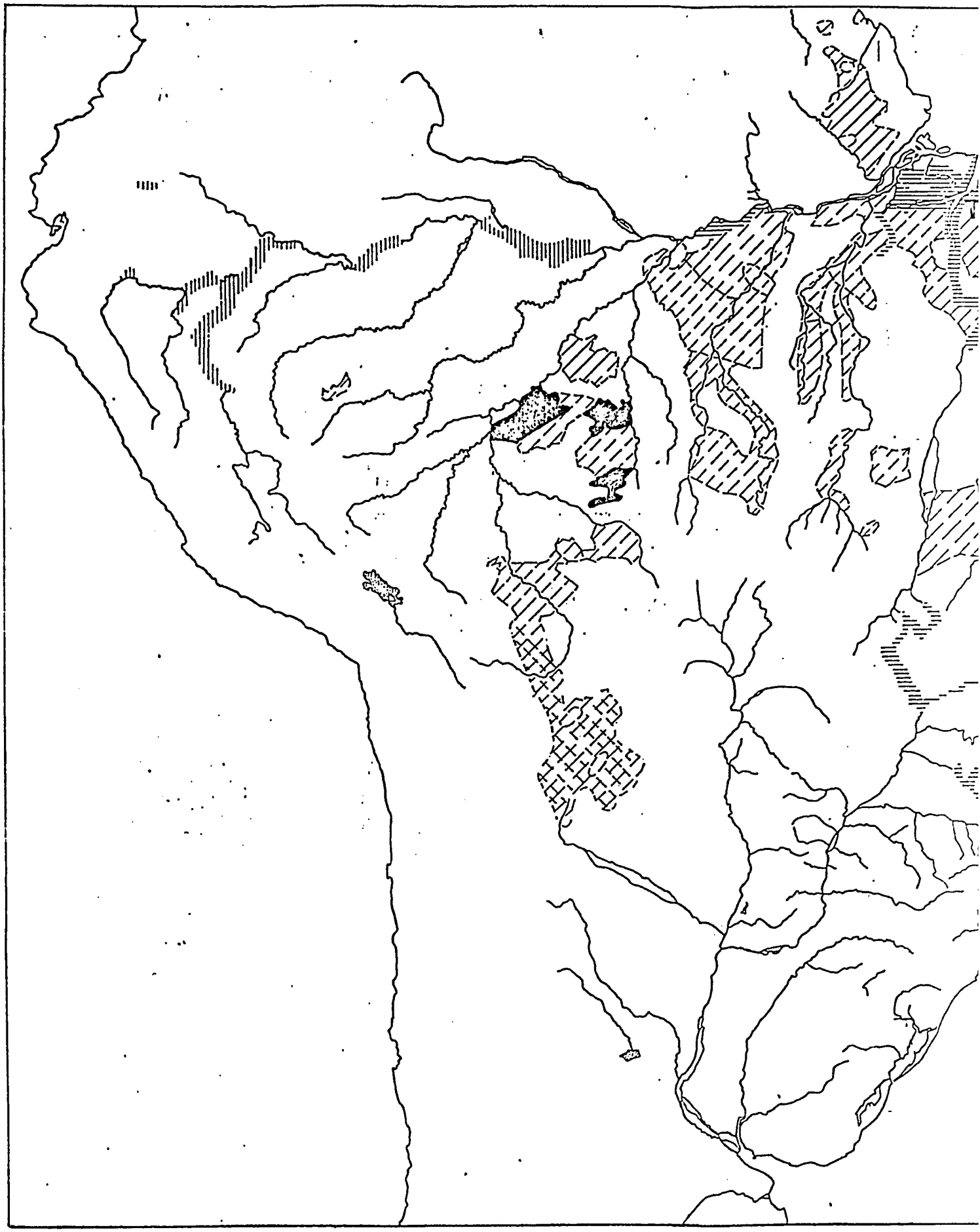

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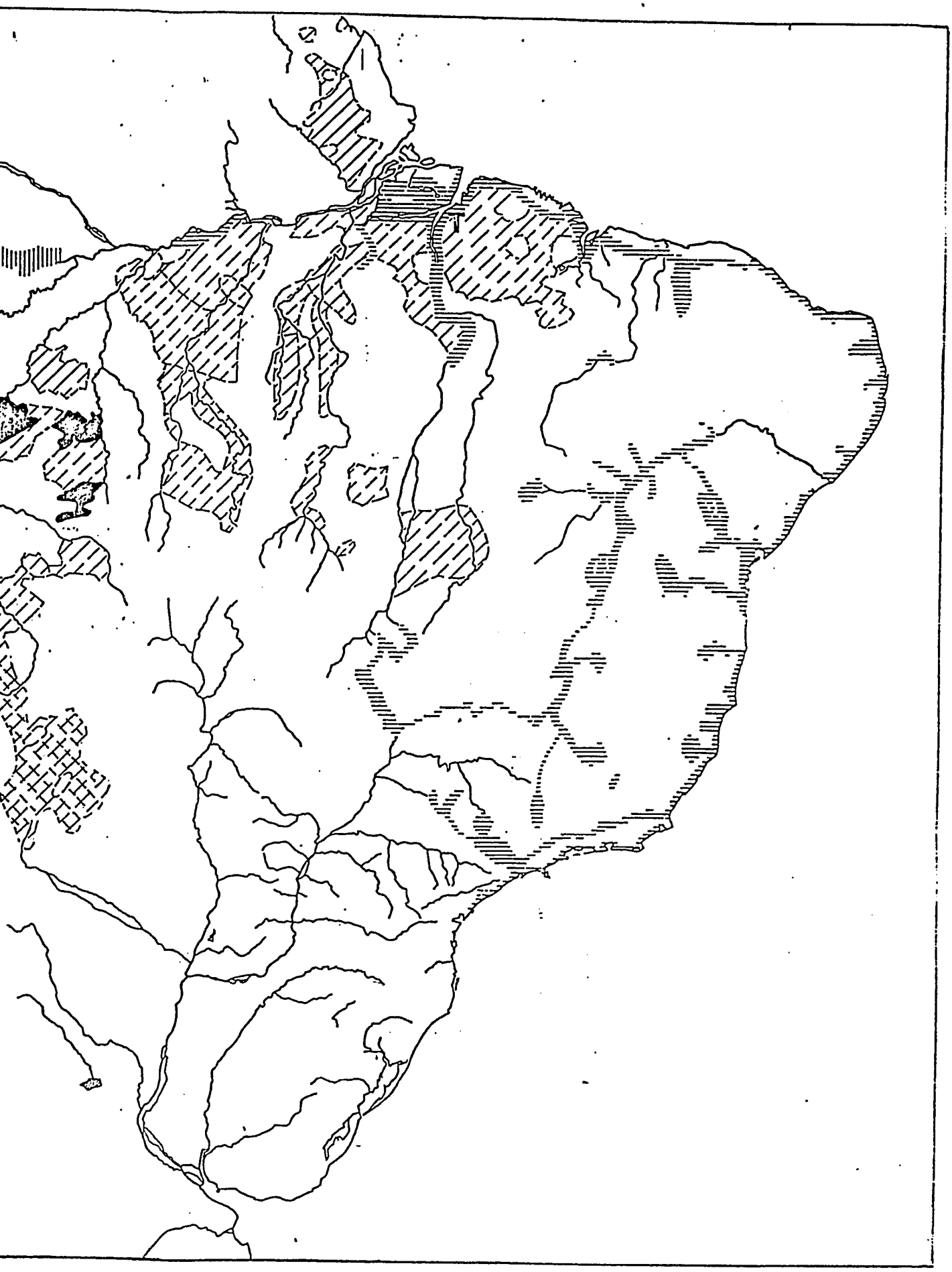

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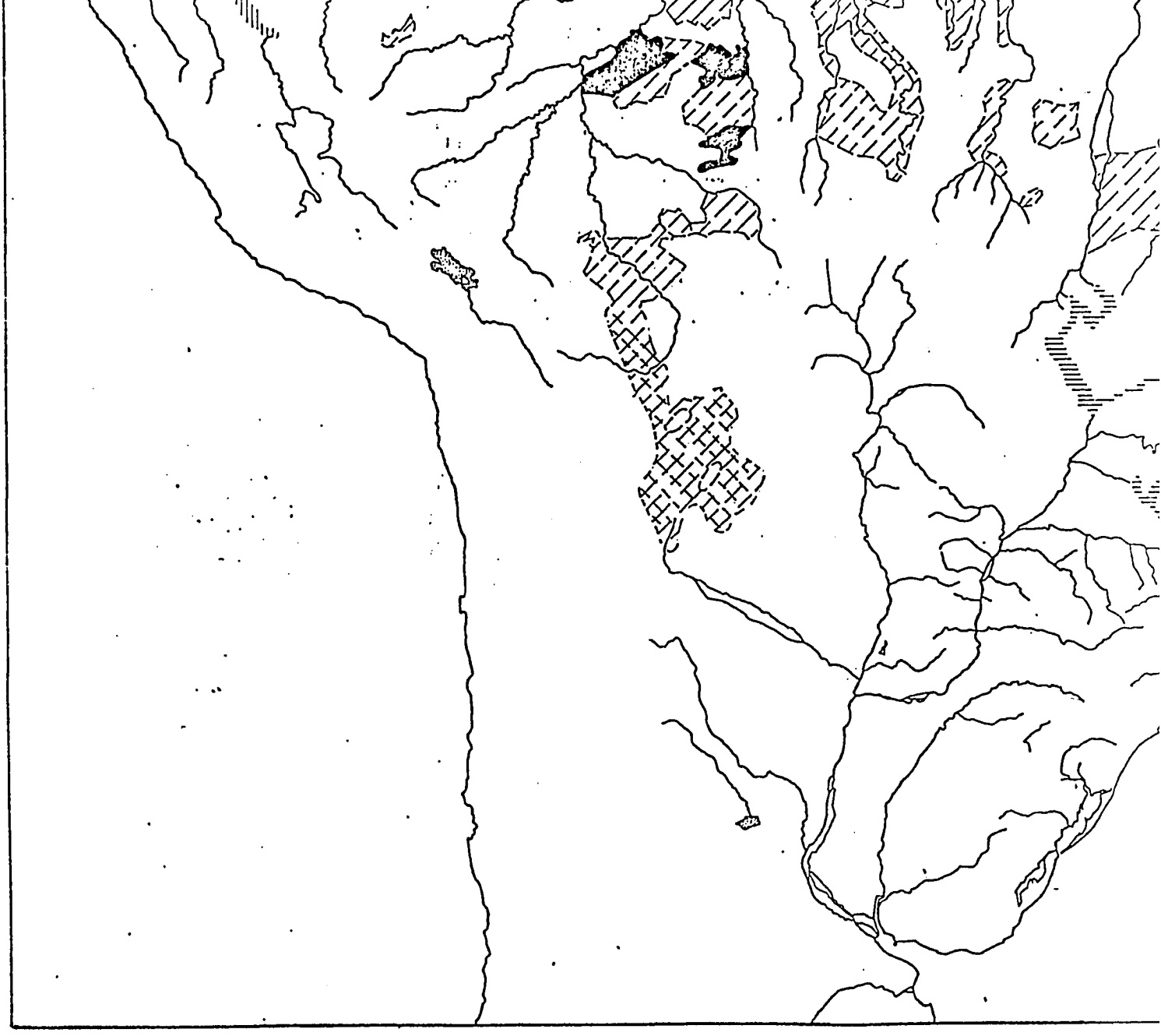

Figure 2. Map of the distribution of all other Tupí-speaking groups. (1928a: map 4), Loukotka (1939, 1945, and 1969), Nimuendajú and Mason (Mason 1948), Steward and Faron (1959:23), Gr (1973); corrected using the archaeological data shown considerations of the details of ecology and topography. (Tupinambá; vertically hachured = Cocama, Omágua, and Yurimagu divergent languages of the Tupian stock; and inclined int other Tupians. With the exception of Chiriguano (cross hatch languages are excluded from this map; their distribution is "T" indicates the probable center of dispersion of the Tupina and Eastern Brazil.

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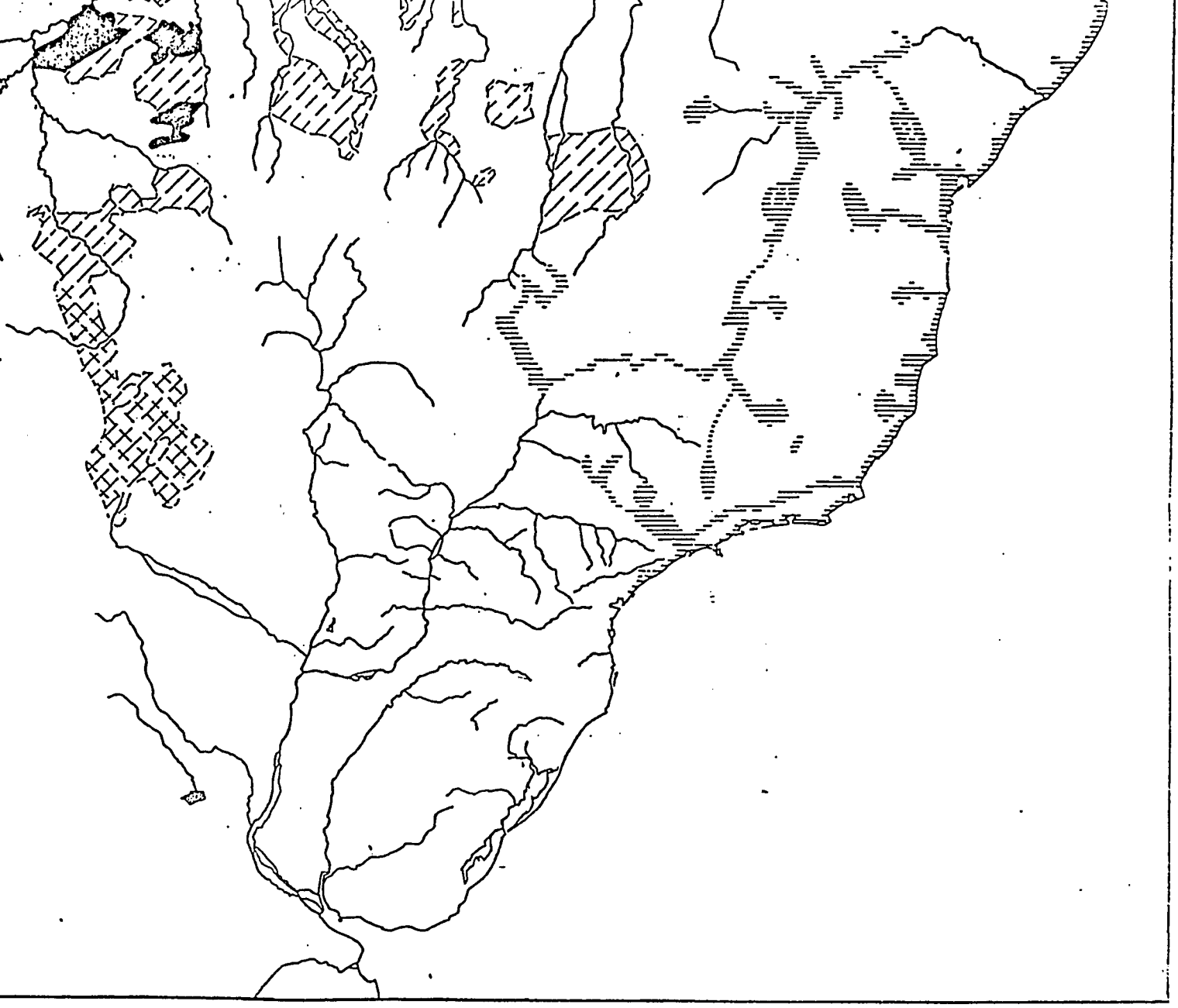

e distribution of all other Tupí-speaking groups. Compiled from Métraux
4), Loukotka (1939, 1945, and 1969), Nimuendajú (Lowie 1946), Steward
(Mason 1948), Steward and Faron (1959:23), Greenberg (1960) and Rowe
rrected using the archaeological data shown in Figure 13, and
ons of the details of ecology and topography. (horizontally hachured =
vertically hachured = Cocama, Omágua, and Yurimagua; black = the most
languages of the Tupian stock; and inclined interrupted hachured = all
ns. With the exception of Chiriguano (cross hatching) all other Guarani
are excluded from this map; their distribution is presented in Figure 1.
es the probable center of dispersion of the Tupinambá into Northeastern
Brazil.

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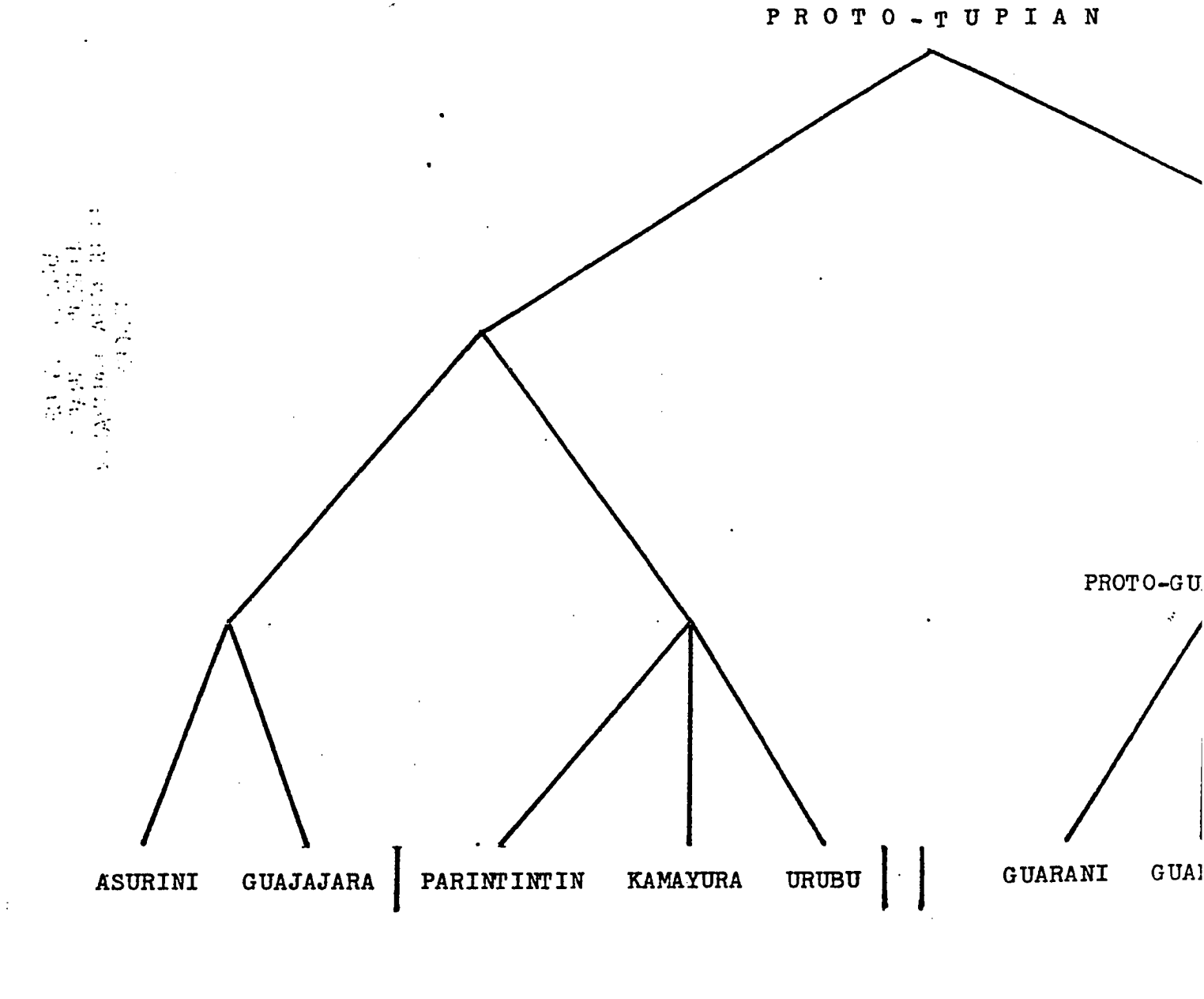

Figure 3. Phylogenetic tree of some Tupian languages, based on Leml
developed in the major argument of this thesis, the node la
have a date of between 2000-3000 B.C., the node labeled Pro
have a date of no later than 500 B.C., the node labeld Prot
date of no later than 200 B.C., and the node labeled Proto-
date no later than A.D. 100.

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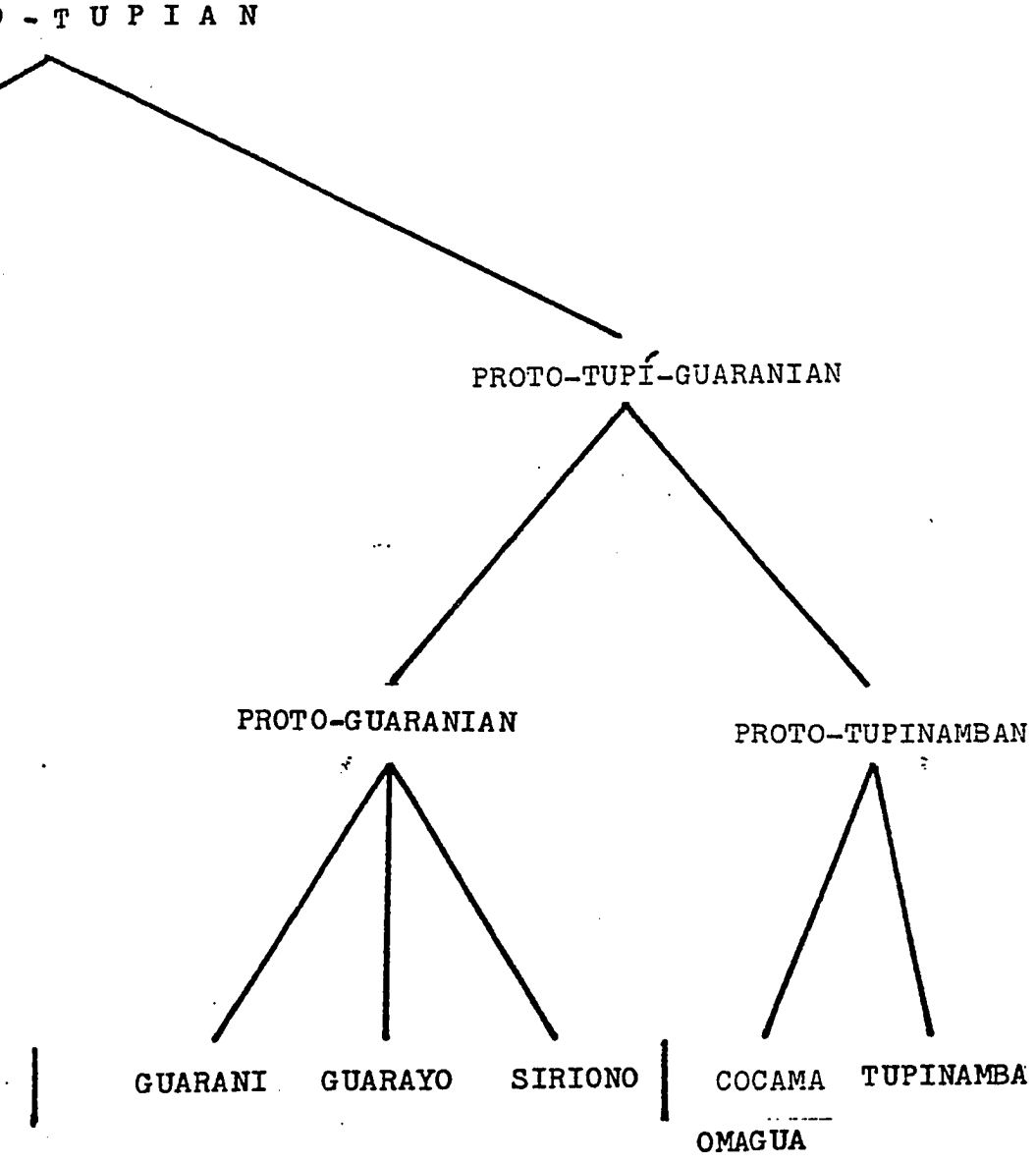

anguages, based on Lemle (1971). As will be
this thesis, the node labeled Proto-Tupian should
B.C., the node labeled Proto Tupí-Guaranian should
B.C., the node labeld Proto-Guaranian should have a
nd the node labeled Proto-Tupinambán should have a

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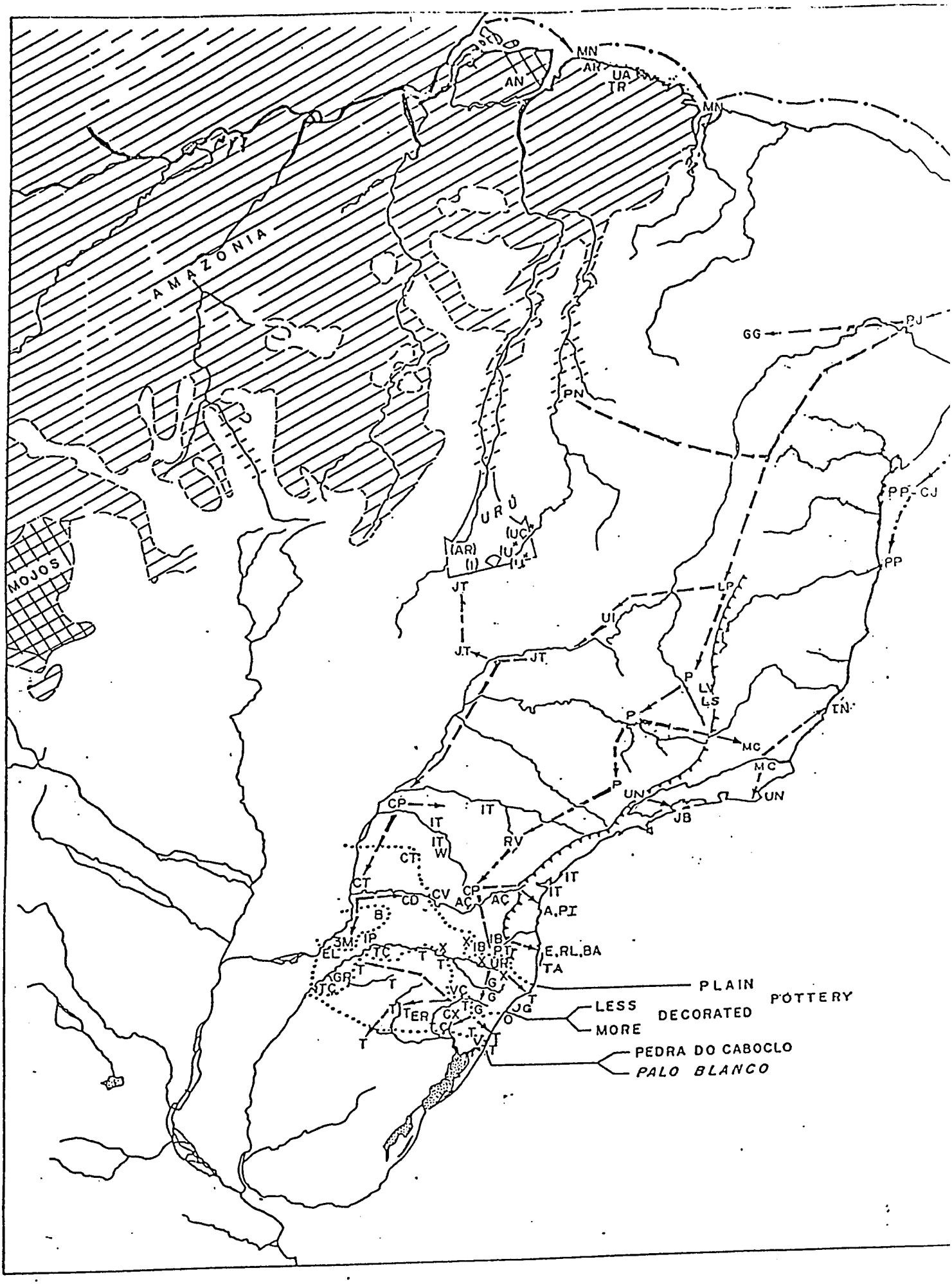

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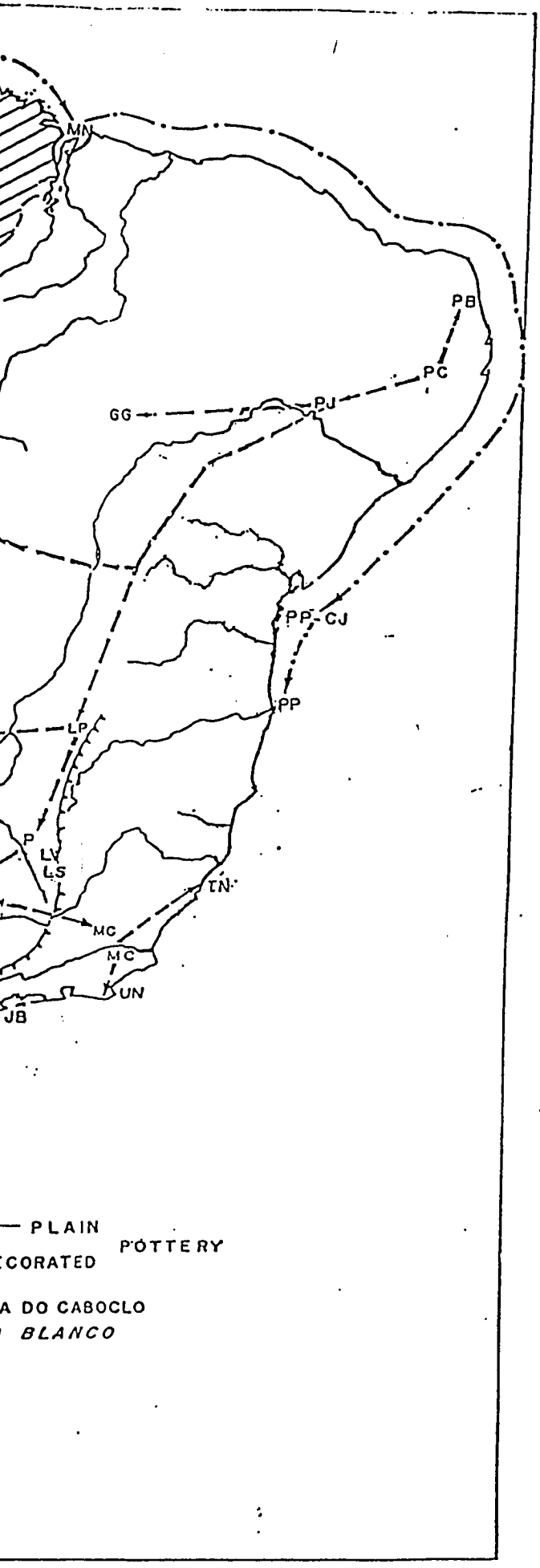

LEGEND

Text Reference

MN = Mina Ceramic Tradition 90
PP = Periperi pottery 91
CJ = Cajaiba pottery 92
AN = Ananatuba pottery 92
AR = Areão pottery 92
PC = Pedra do Caboclo Style 94
PB = Pabeba pottery 96
PJ = Pajeú pottery 97
GG = Toca do Gongo pottery 98
PN = (Porto Nacional) rockshelter on Balsas River Pottery 98
LV = Lapa Vermelha IV pottery 100
P = Piumhi pottery 100
MC = Mucuri pottery 100
TN = Tangul pottery 100
UN = Una Style 100
UI = Unaí pottery 100
JB = Jabaquara pottery 100
LP = Lapa Pequena pottery 100
LS = Lagoa Santa area pottery 100
JT = Jataí Style 106
IT = Itararé Style 109
CP = Casa de Pedra pottery 109
CD = Candói pottery 110
W = Wobeto rockshelter pottery 109
CT = Cantu pottery 110
AÇ = Açungui pottery 110
IB = Ibirama pottery 111
E = (Enseada) Guaratuba Bay pottery 111
RL = (Rio Lessa) Santa Catarina Island pottery 111
A = Araquari pottery 112
PI = Piraí pottery 111
BA = Base Aérea pottery 112
T = Taquara Style 117
CX = Caxias pottery 118
O = Osório pottery 118
ER = Erveiras pottery 118
TC = Taquaruçu Style 118
X = Xaxim Style 119
G = Guatambu pottery 119
VC = Vacaria pottery 119
UR = Urubici pottery 119
EL = Eldoradense pottery 119
IP = Itapiranga pottery 119
GR = Giruá pottery 119
JG = Jaguaruna pottery 119
C = Caí pottery 119
3M = Tres de Mayo pottery 120

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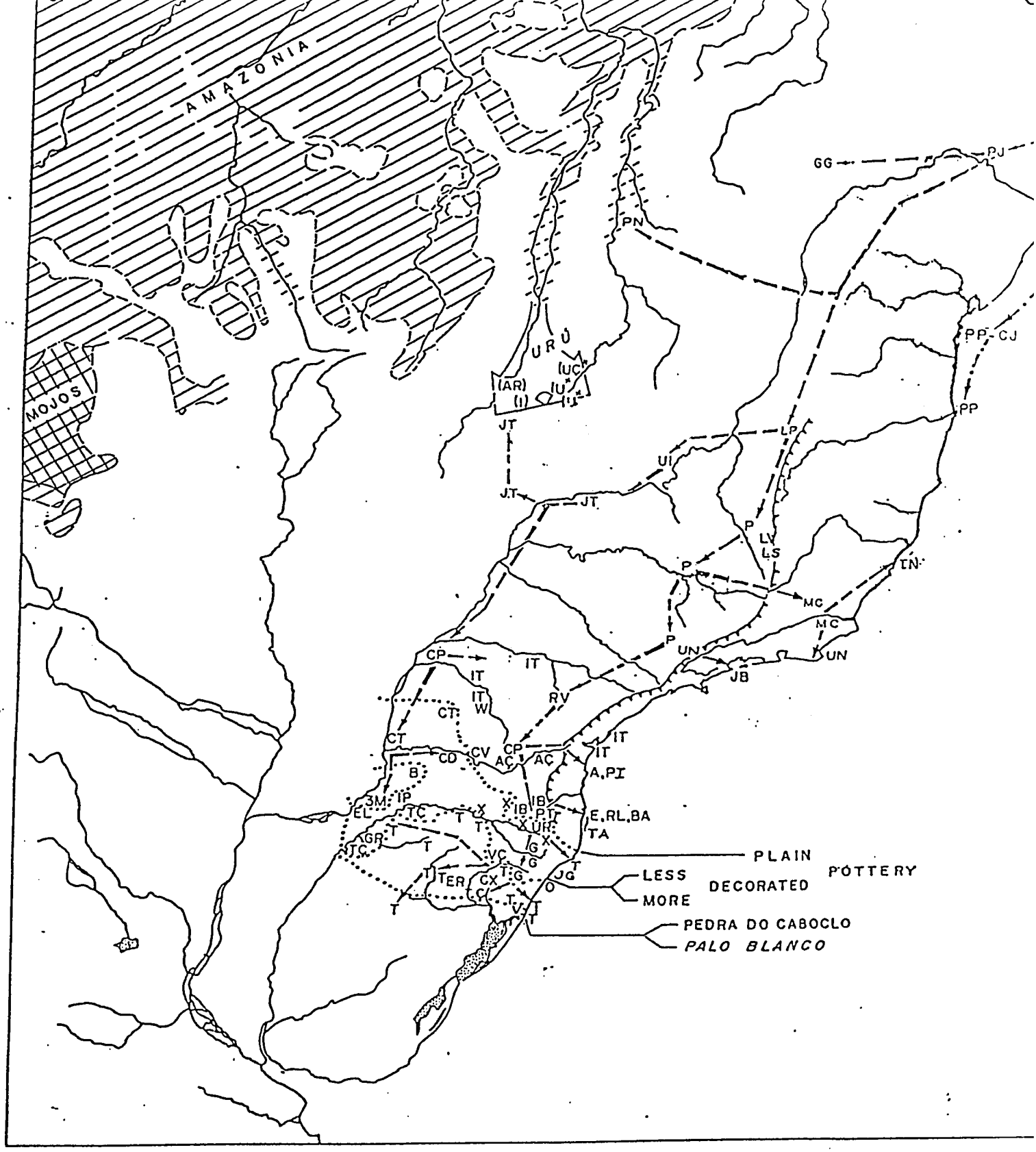

Figure 4. Map of the distribution of the sites of Pedra do Caboclo ceramic tradition.

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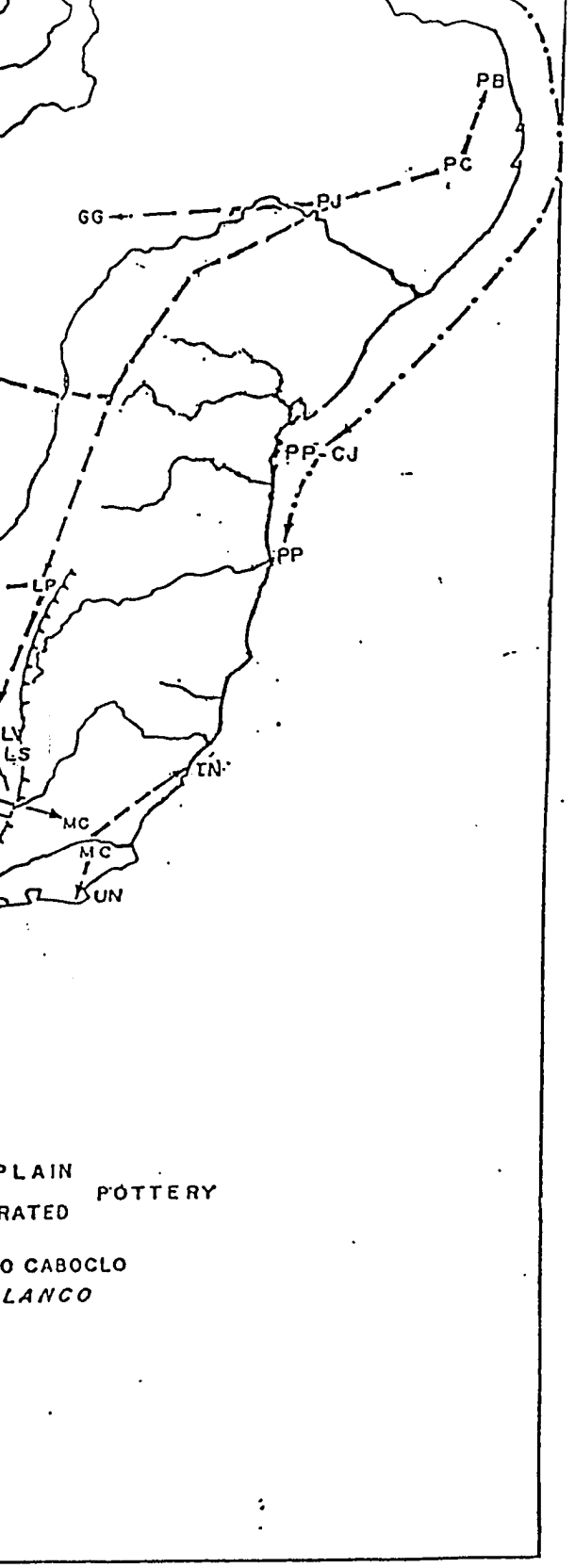

AN = Ananatuba pottery 92
AR = Aredo pottery 92
PC = Pedra do Caboclo Style 94
PD = Pabeba pottery 96
PJ = Pajeú pottery 97
GG = Toca do Gongo pottery 98
PN = (Porto Nacional) rockshelter on Balsas River Pottery 98
LV = Lapa Vermelha IV pottery 100
P = Piumhi pottery 100
MC = Mucuri pottery 100
TN = Tangul pottery 100
UN = Una Style 100
UI = Unaí pottery 100
JB = Jabaquara pottery 100
LP = Lapa Pequena pottery 100
LS = Lagoa Santa area pottery 100
JT = Jataí Style 106
IT = Itararé Style 109
CP = Casa de Pedra pottery 109
CD = Candói pottery 110
W = Wobeto rockshelter pottery 109
CT = Cantu pottery 110
AÇ = Açungui pottery 110
IB = Ibirama pottery 111
E = (Enseada) Guaratuba Bay pottery 111
RL = (Rio Lessa) Santa Catarina Island pottery 111
A = Araquari pottery 112
PI = Piraí pottery 111
BA = Base Aérea pottery 112
T = Taquara Style 117
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UR = Urubici pottery 119
EL = Eldoradense pottery 119
IP = Itapiranga pottery 119
GR = Giruá pottery 119
JG = Jaguaruna pottery 119
C = Caí pottery 119
3M = Tres de Mayo pottery 120

Caboclo ceramic tradition.

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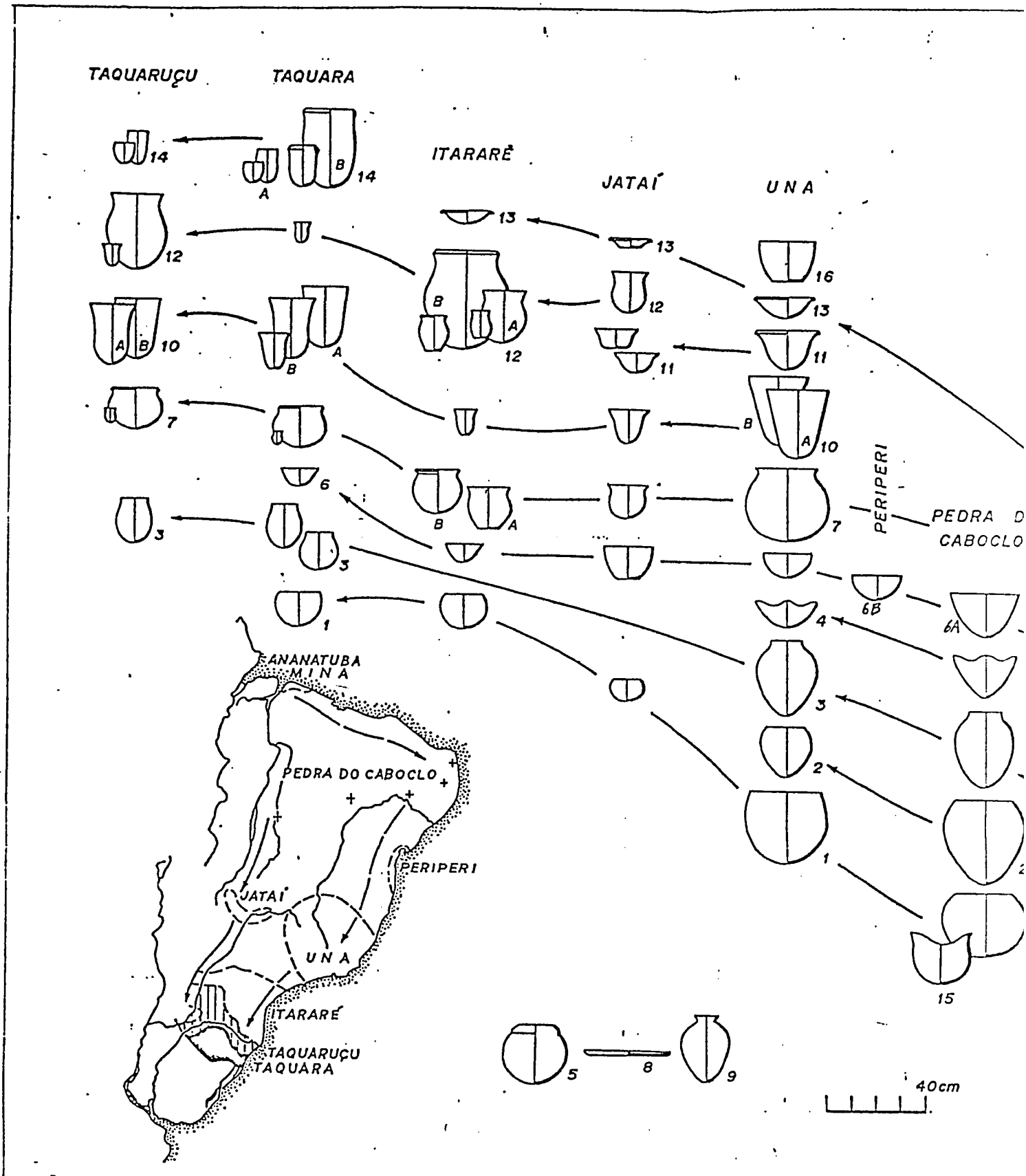

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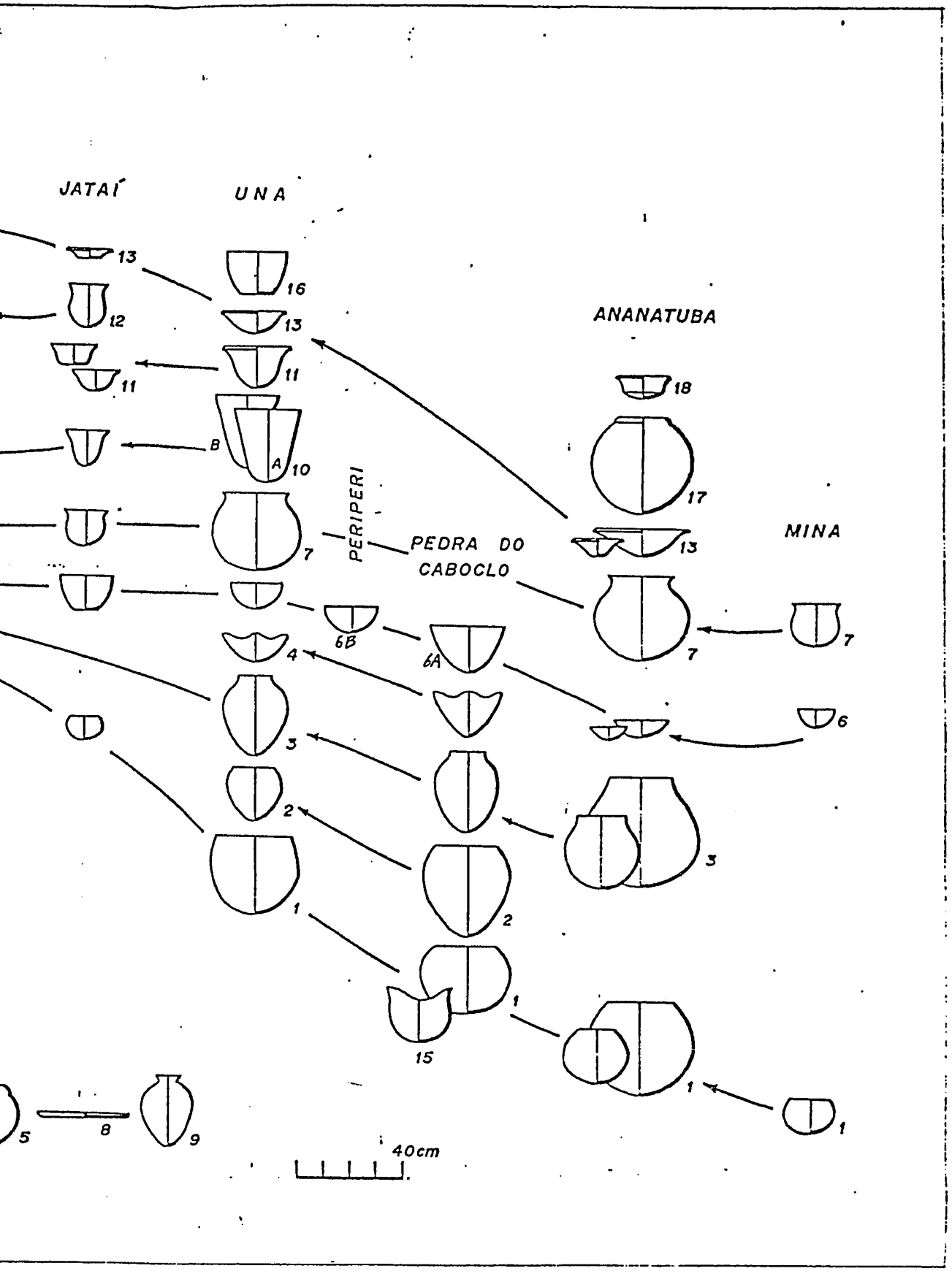

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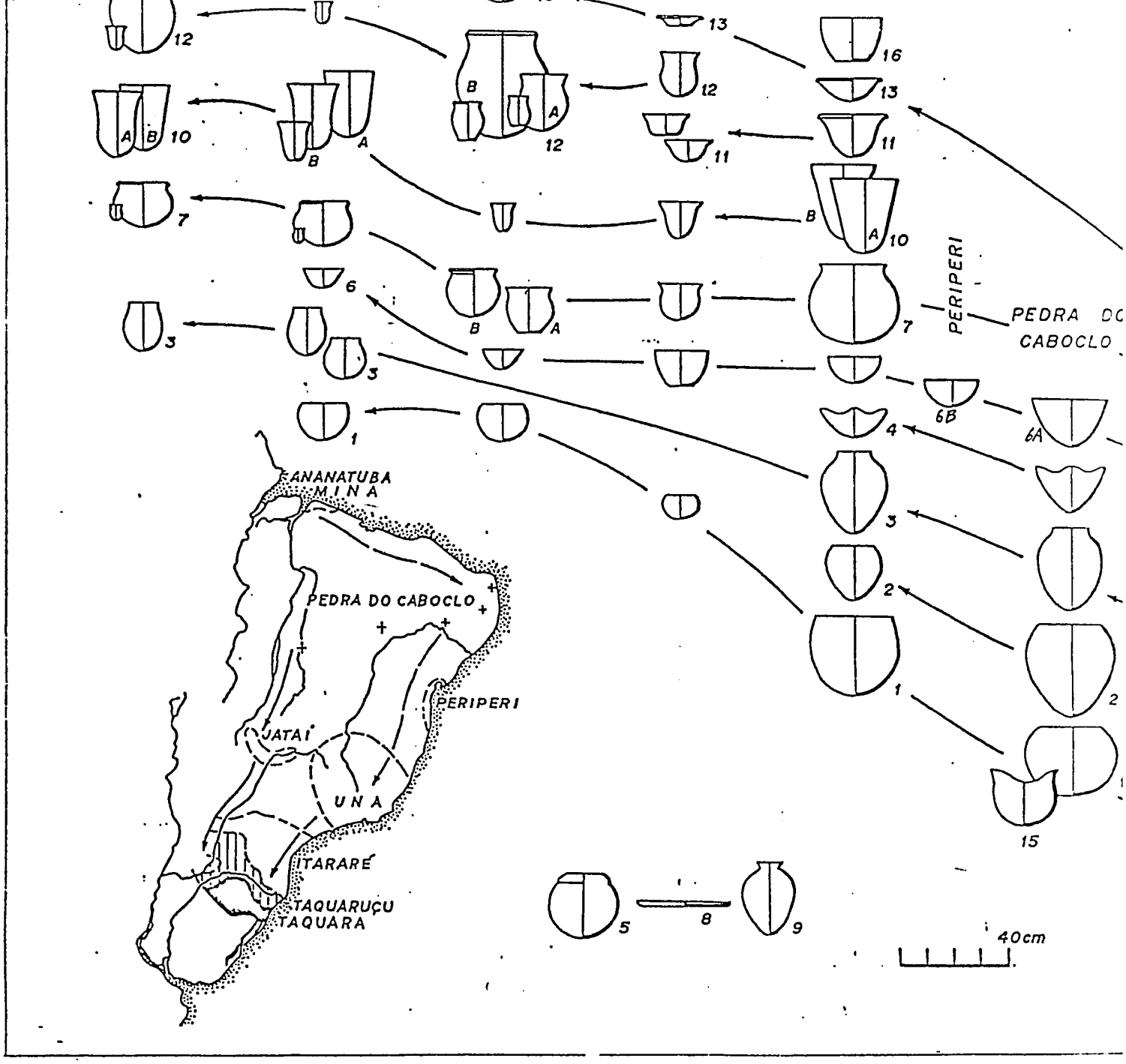

Figure 5. Chart of vessel forms of the Pedra do Caboclo tradition. Based
the text. Inset map shows the distribution of the different styl
in Eastern South America. The flow from right to left and
indicates the spread of the tradition from north to south in East
The C^{14} dates validating this reconstruction are presented in Fi

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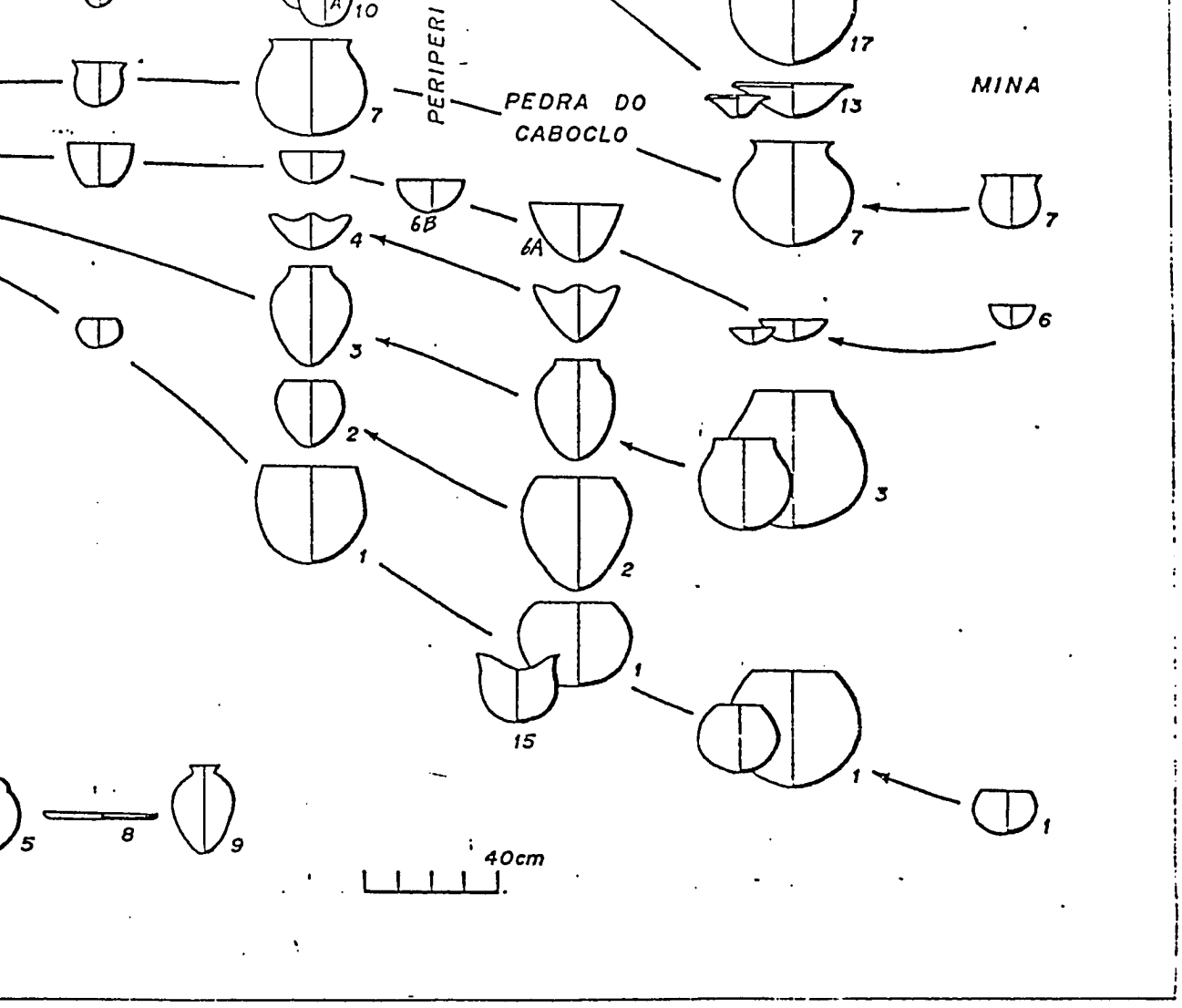

rms of the Pedra do Caboclo tradition. Based on authors cited in
p shows the distribution of the different styles of the tradition
America. The flow from right to left and from bottom to top
d of the tradition from north to south in Eastern South America.
ating this reconstruction are presented in Figure 6.

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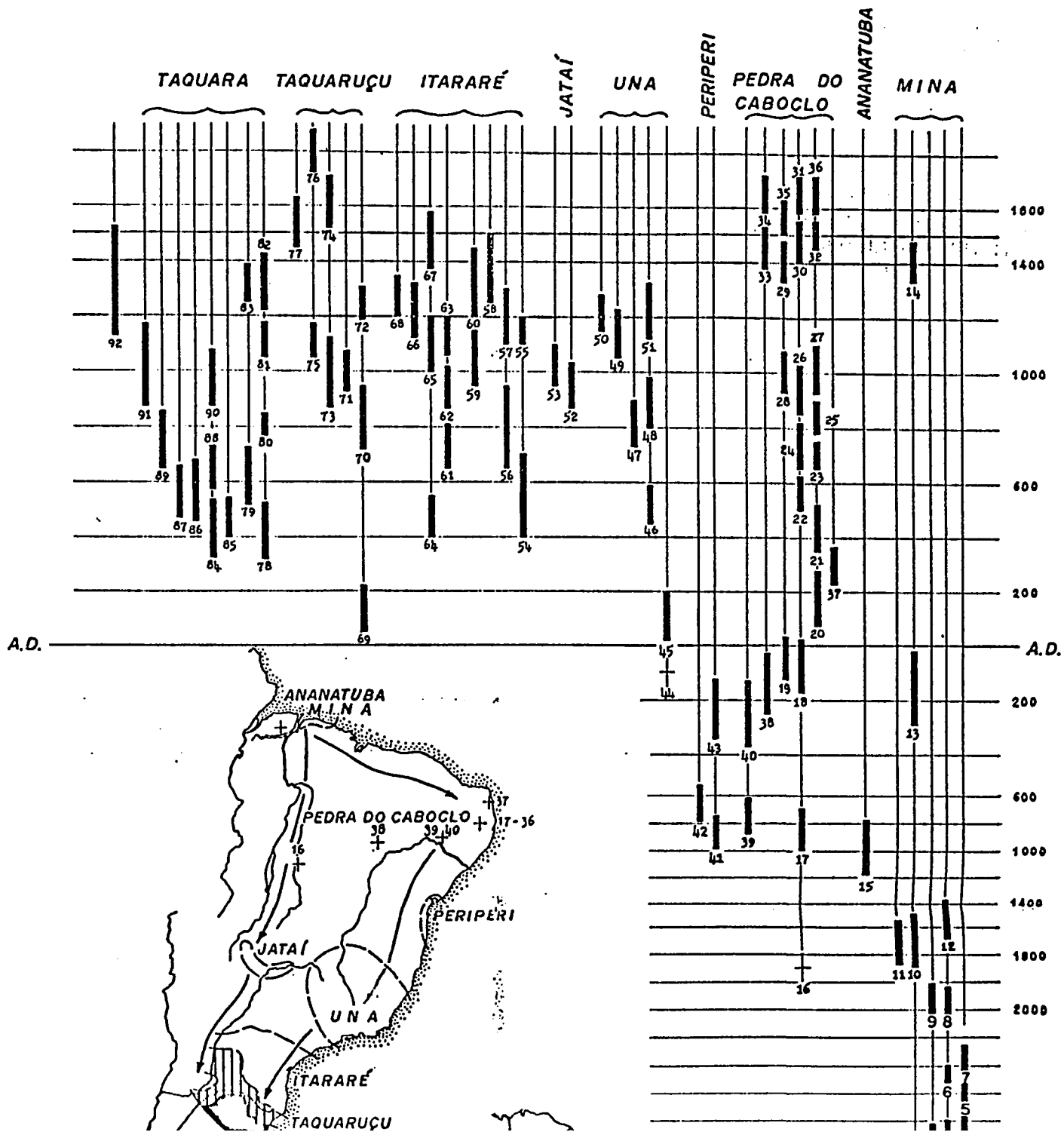

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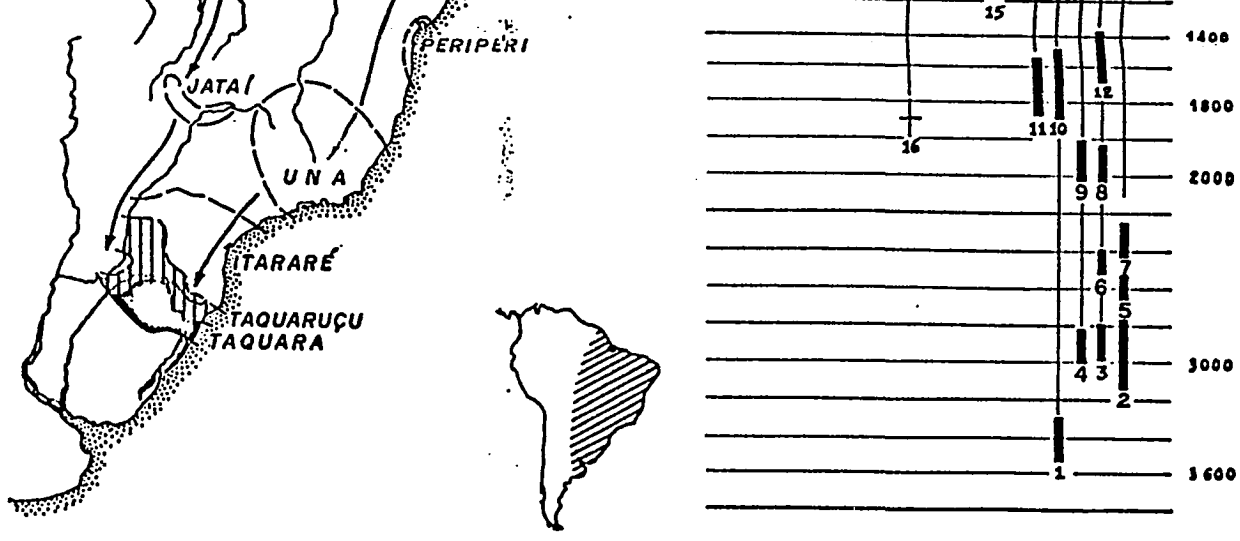

Figure 6. An array of C^{14} dates from sites of the Mina and Pedra do Caboclo traditions. The inset map shows the distribution of the several subtraditions in Eastern South America.

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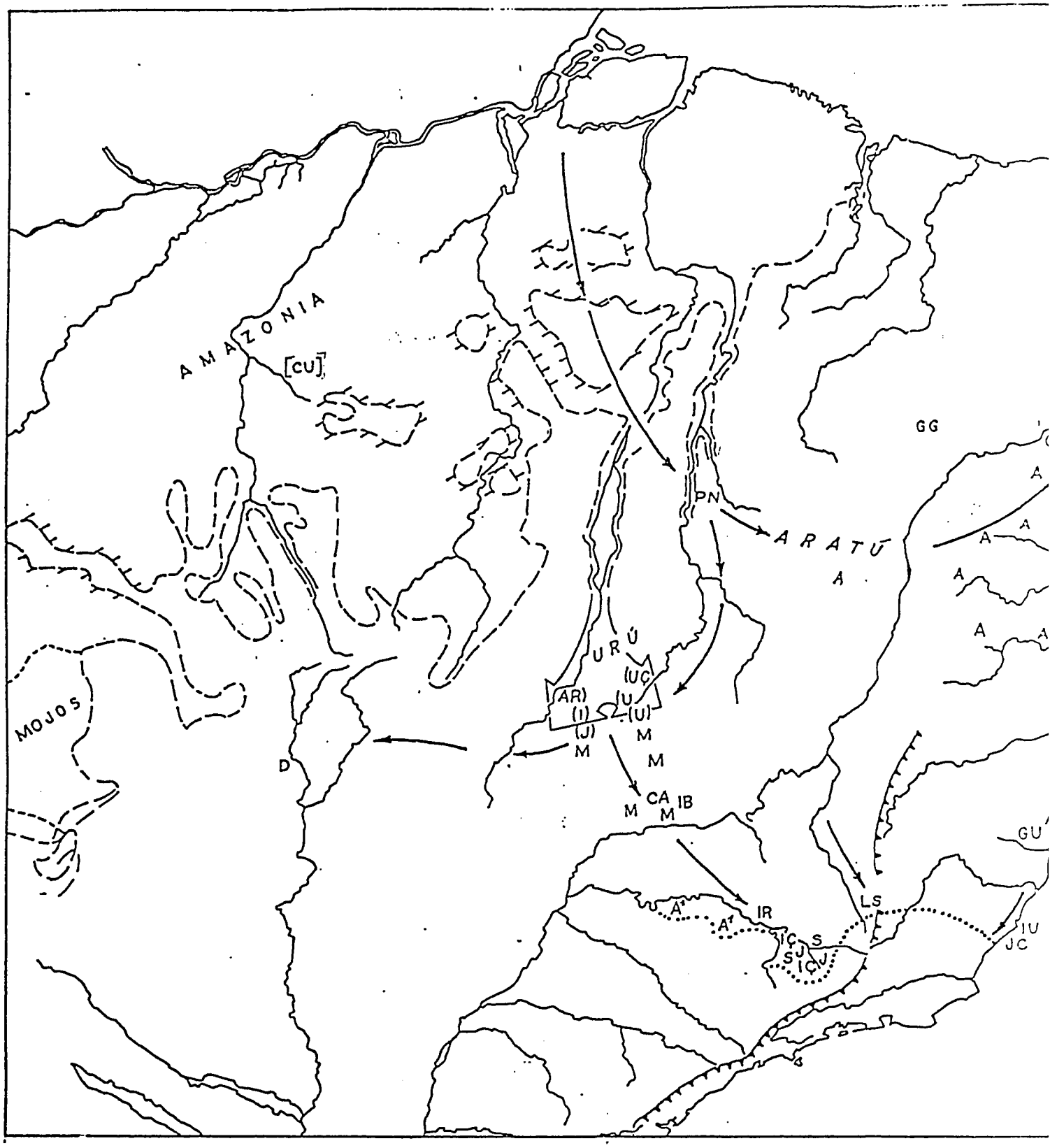

Figure 7. Map of the distribution of the sites of t
Caboclo ceramic tradition. The arrows indicate
indicated by the available C^{14} dates and other

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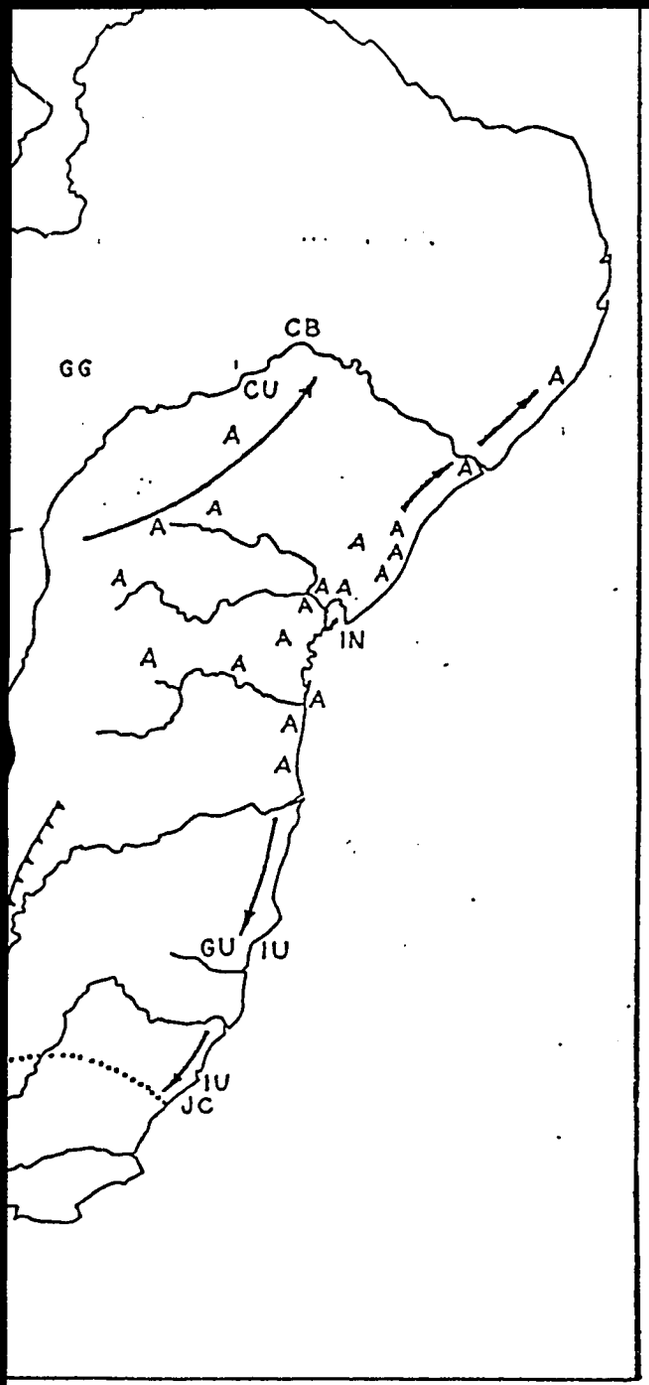

A = Aratú pottery 139
CU = Curaçá pottery 143
CB = Cabrobó pottery 143
IN = Itanhém pottery 144
IU = Itaúnas pottery 144
GU = Guarabu pottery 144
JC = Jacareípe pottery 144
S = Sapucaí pottery 146
JG = Jaraguá pottery 146
IC = Itaci pottery 146
IR = Ibiraci pottery 146
PR = Paraopeba pottery 146
M = Mossâmedes pottery 149
IB = Itaberaí pottery 149
CA = Cachoeira pottery 150
U = Urú pottery 150
UÇ = Uruaçu pottery 150
J = Jaupaci pottery 150
D = Descalvados pottery 154
AR = Aredo 235

the sites of the Aratú Subtradition of the Pedra do
arrows indicate the probable routes of colonization
ates and other information.

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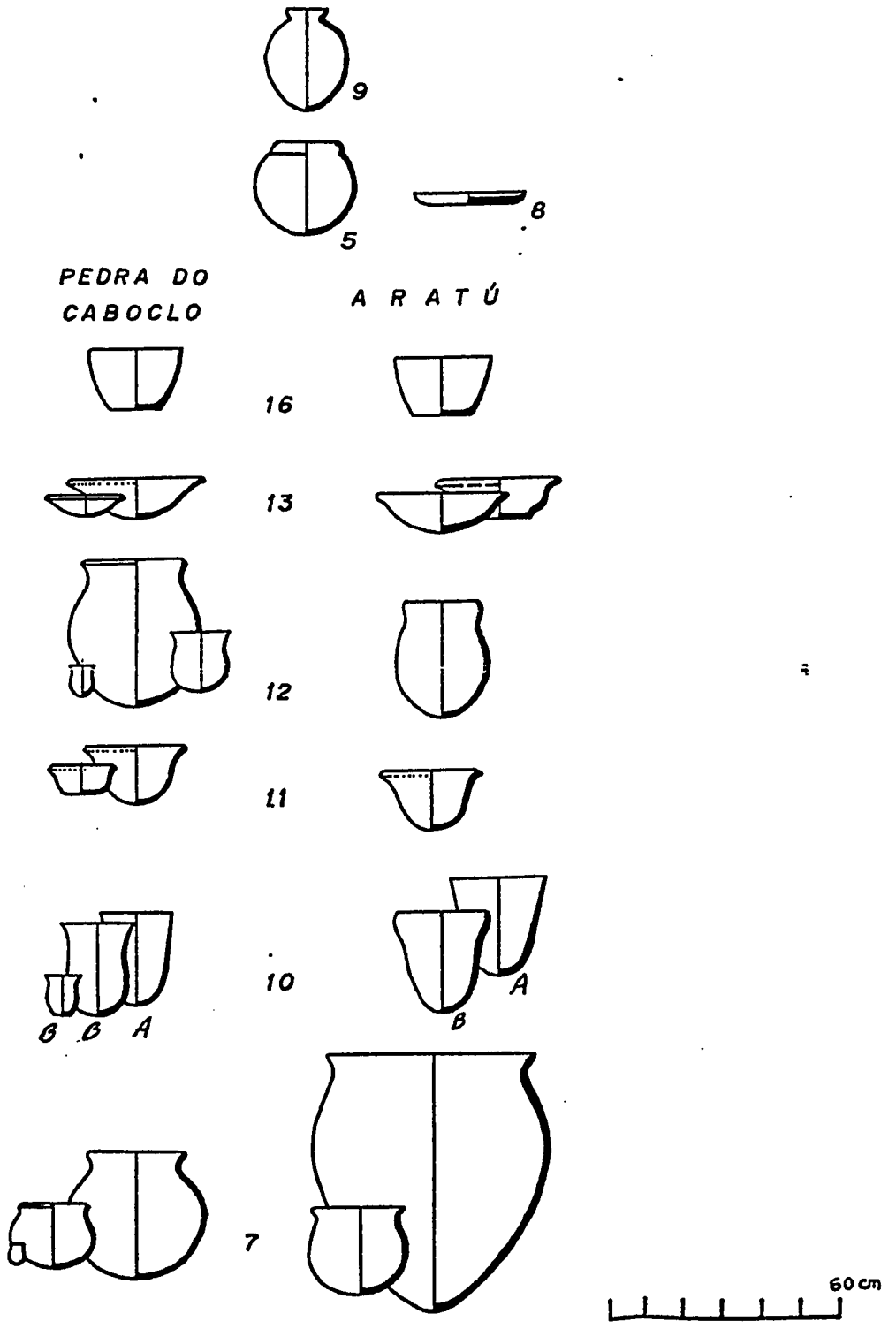

Figure 8. Comparison of the set of vessel forms of the Aratú Subtra
do Caboclo Tradition. Based on authors cited in the text

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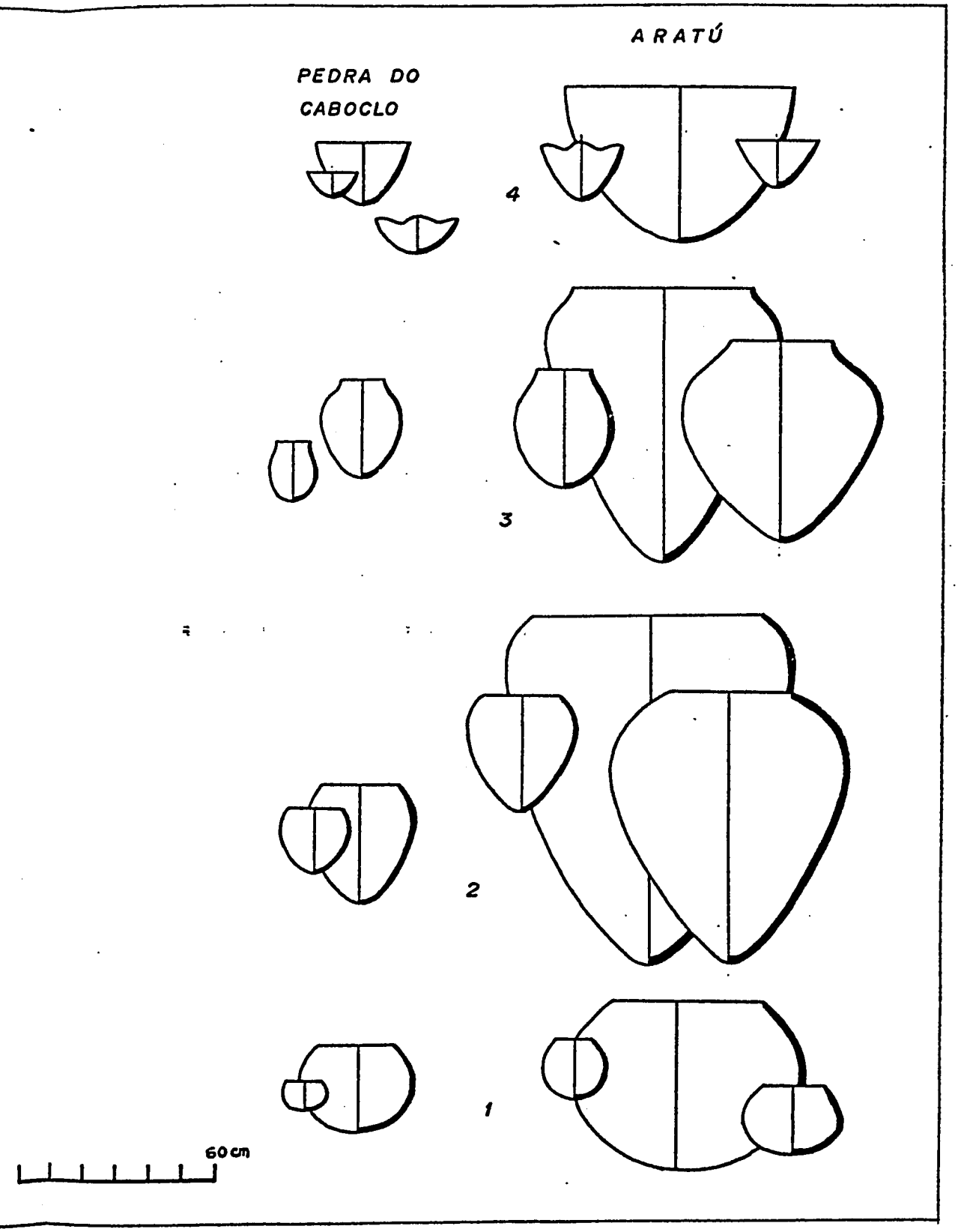

forms of the Aratú Subtradition to that of the Pedra
authors cited in the text.

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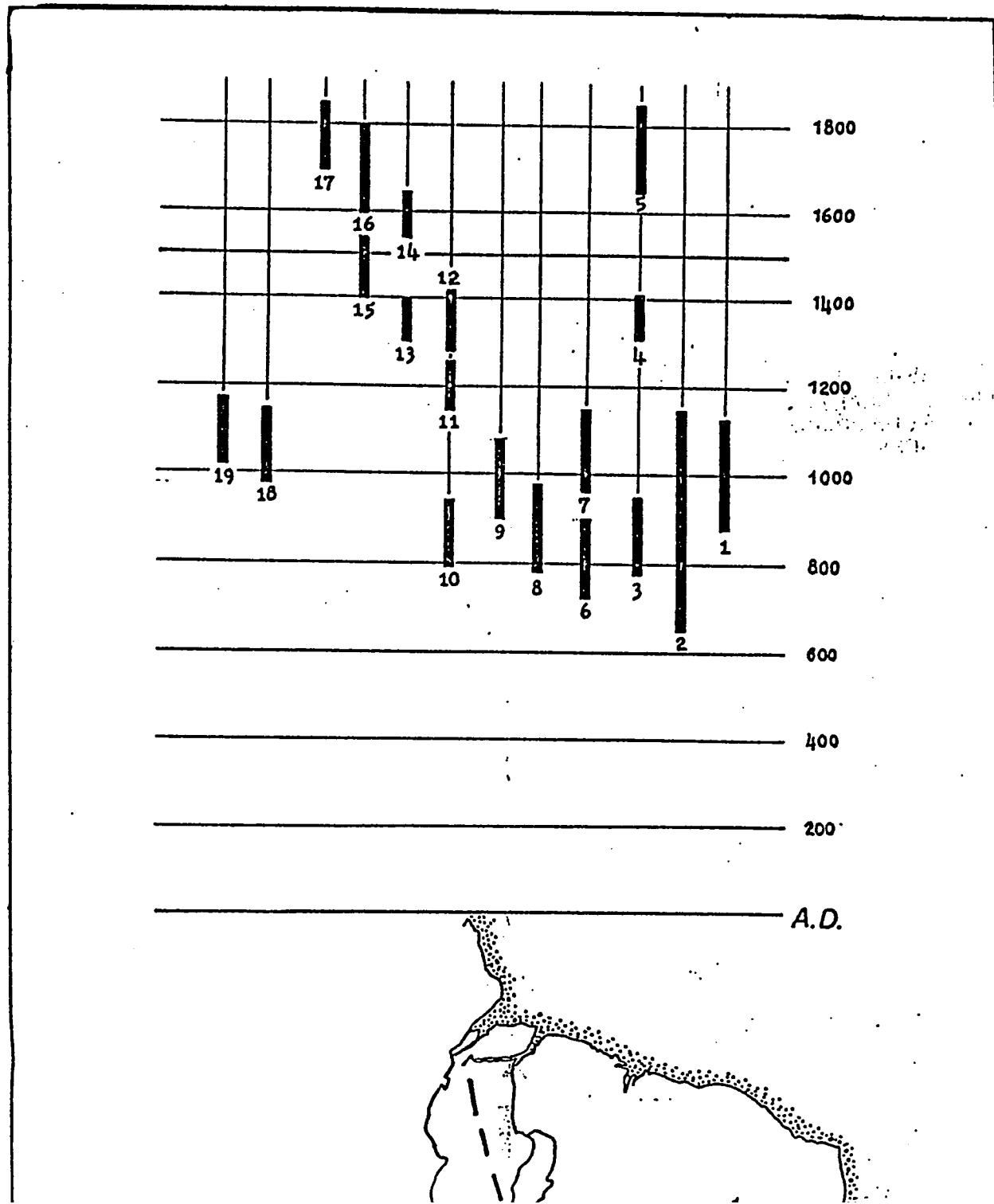

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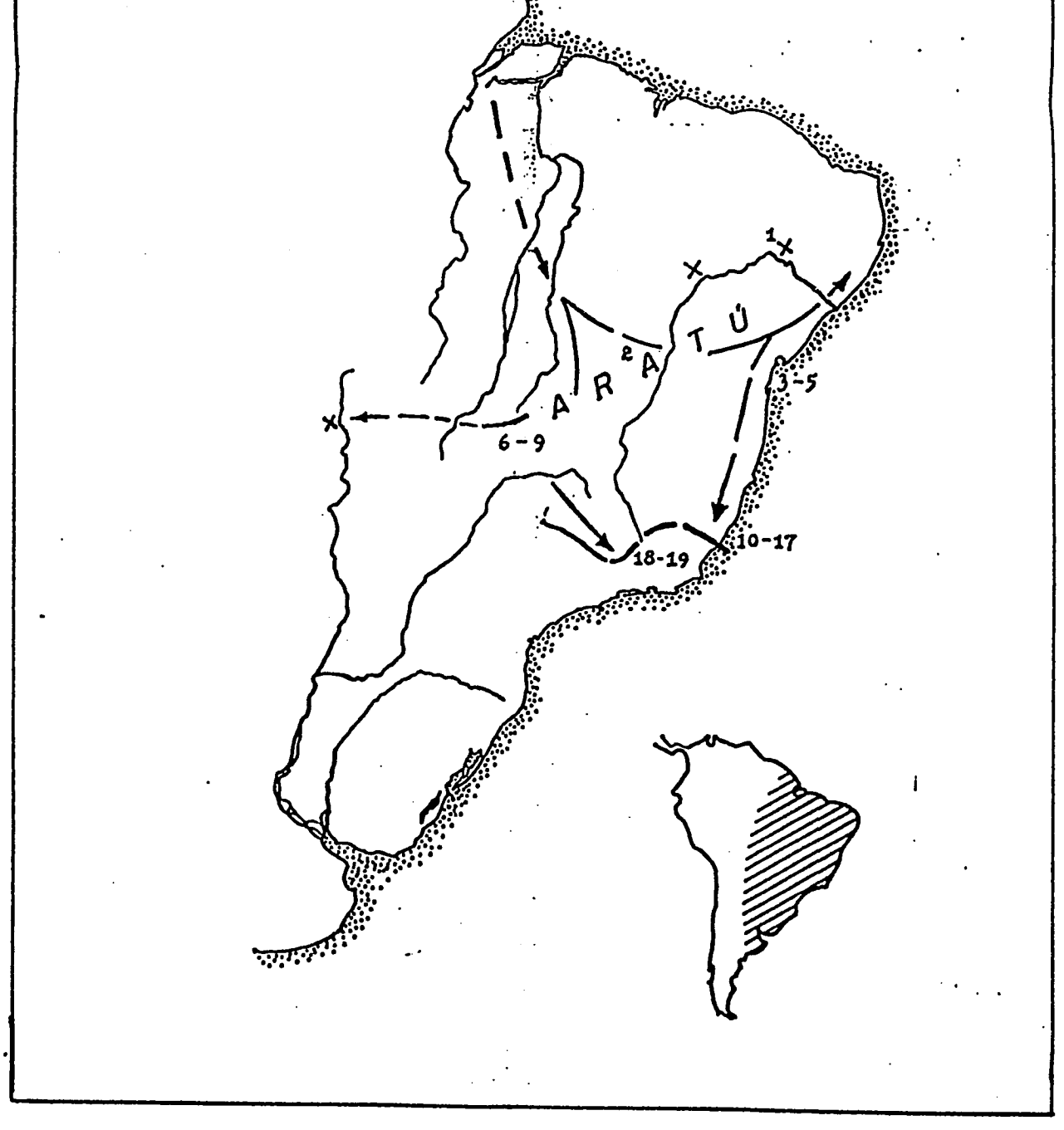

Figure 9. An array of C^{14} dates from sites of the Aratú Subtradition of the Pedra do Caboclo Tradition. Inset map shows their distribution in Northeastern and Eastern Brazil.

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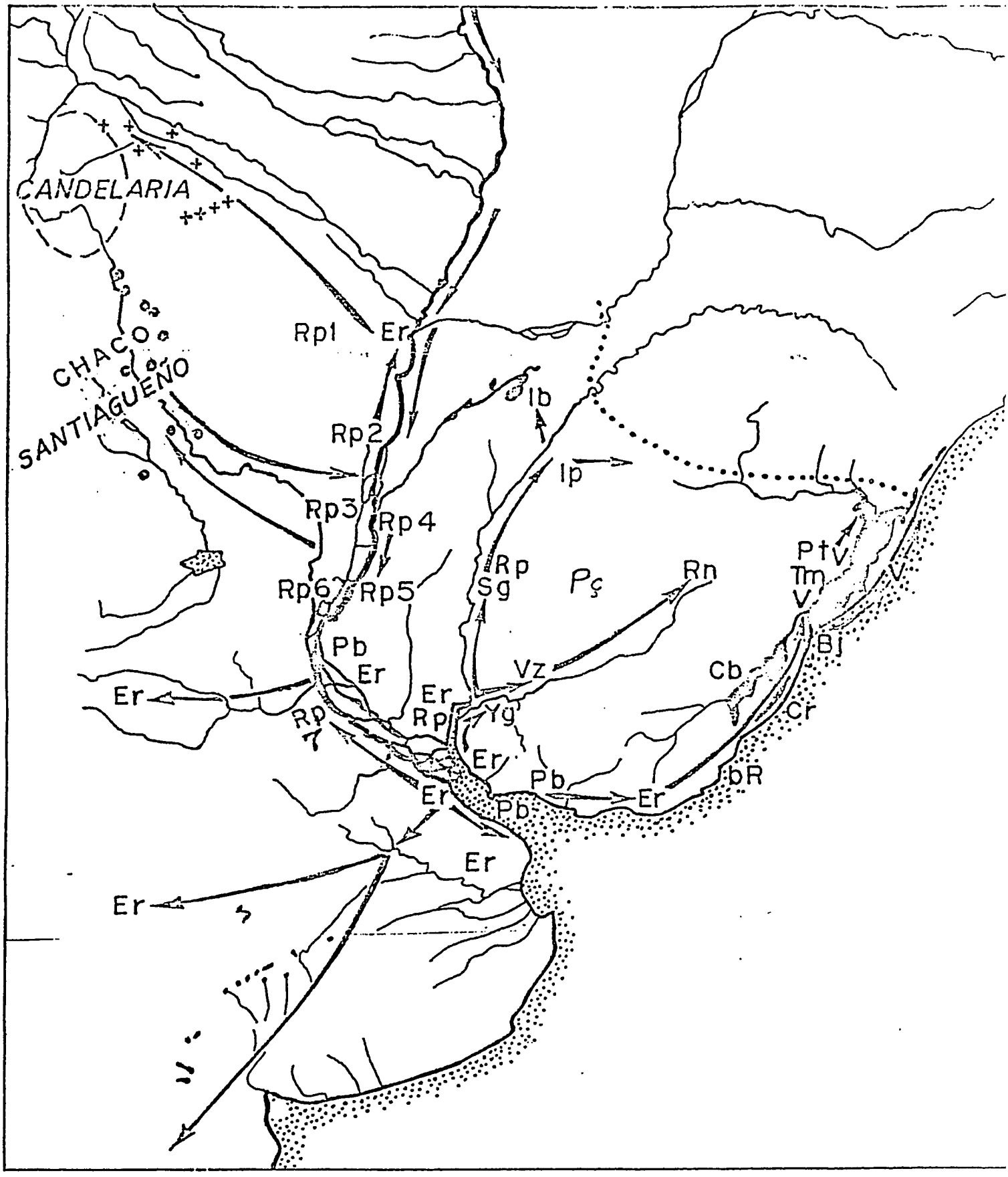

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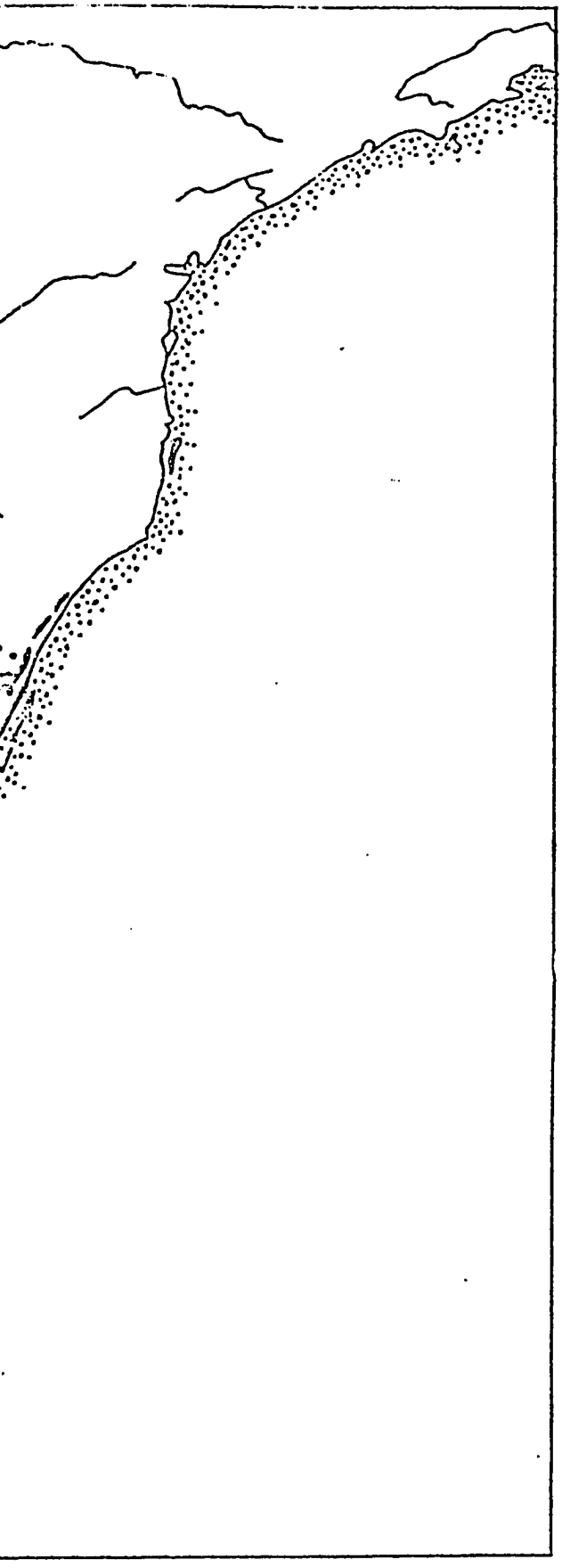

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Text Reference

Pb = Palo Blanco 156
Sg = Salto Grande 158
Yg = Yeguada 160
Vz = Vizcaíno 160
Ip = Ibirapuitã 161
Ib = Esteros del Iberá 163
Er = Entrerriana 165
Rp1-Rp6 = Ribereños plásticos 172
Rp1 = Cayastá 174
Rp2 = Malabrigo 174
Rp3 = Las Mulas 174
Rp4 = Los Galpones 175
Rp5 = Las Conchas 175
Rp6 = Árbol Solo 175
Rp7 = Los Marinos 175
V = Vieira 183
bR = bandos de Rocha 186
Cb = Cèibos 186
Cr = Cerritos 186
Tm = Torotama 187
Bj = Bojuru 190
Pt = Piratini 192
Rn = Rivera 193
Pç = Picaça 194

+ = Gran Chaco sites probably related to the Palo Blanco Tradition

● = Sites in Chaco-Santiagueño phases or complexes

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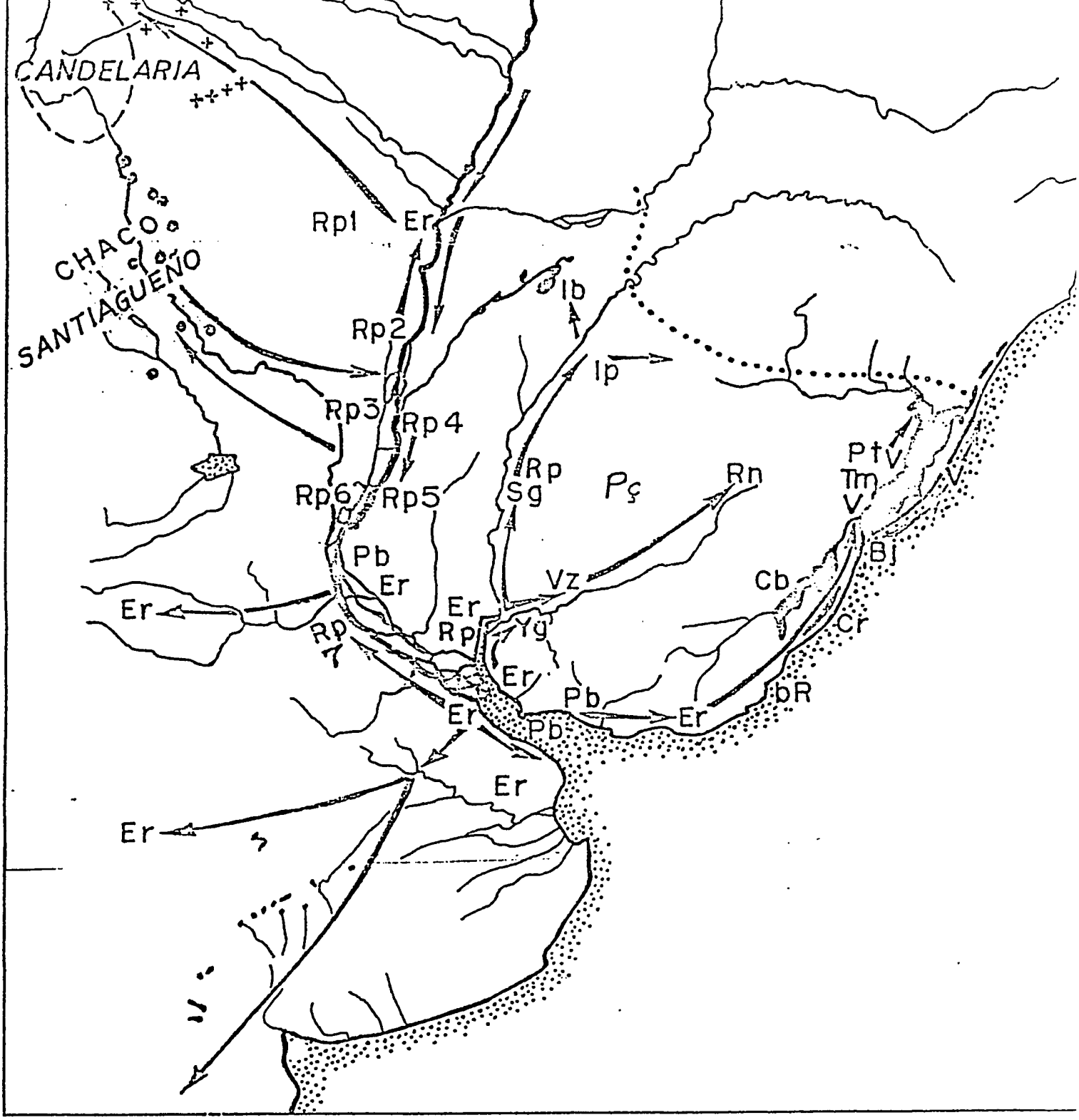

Figure 10. Map of the distribution of the sites of the Palo Blanco ceramic tr
indicate probable routes of the expansion of the Tradition.

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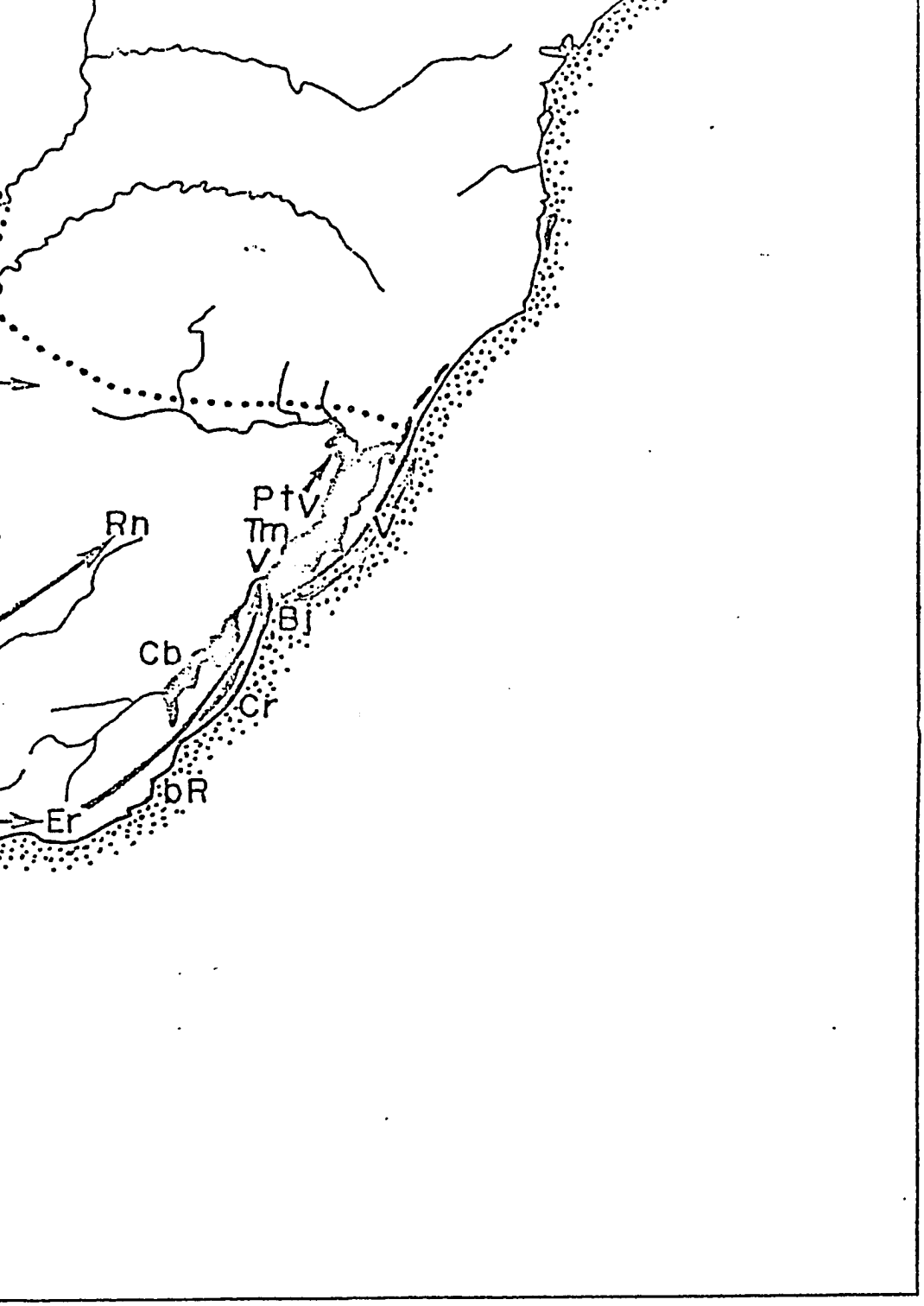

Sg = Salto Grande .....
Yg = Yeguada .....
Vz = Vizcaíno .....
Ip = Ibirapuitã .....
Ib = Esteros del Iberá .....
Er = Entrerriana .....
Rp1-Rp6 = Ribereños plásticos .
Rp1 = Cayastá .....
Rp2 = Malabrigo .....
Rp3 = Las Mulas .....
Rp4 = Los Galpones .....
Rp5 = Las Conchas .....
Rp6 = Árbol Solo .....
Rp7 = Los Marinos .....
V = Vieira .....
bR = bandos de Rocha .....
Cb = Cèibos .....
Cr = Cerritos .....
Tm = Torotama .....
Bj = Bojuru .....
Pt = Piratini .....
Rn = Rivera .....
Pç = Picaça .....

+ = Gran Chaco sites probably Palo Blanco Tradition

● = Sites in Chaco-Santiagueñ

the sites of the Palo Blanco ceramic tradition. Arrows
the expansion of the Tradition.

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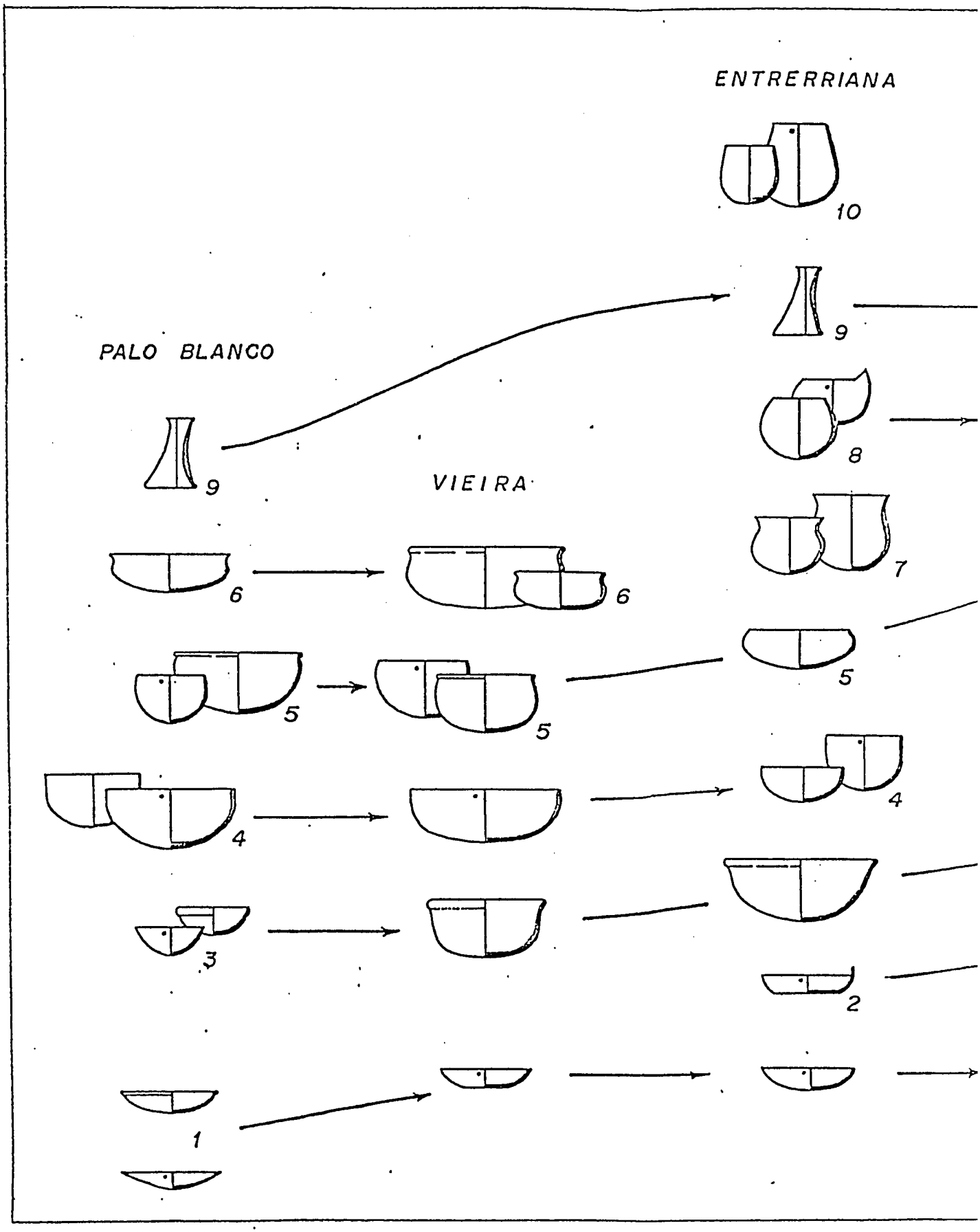

Figure 11. Chart of the sets of vessel forms of the Palo Blanco Tradition. cited in the text. Figure 12 gives the dating and distributi subtraditions.

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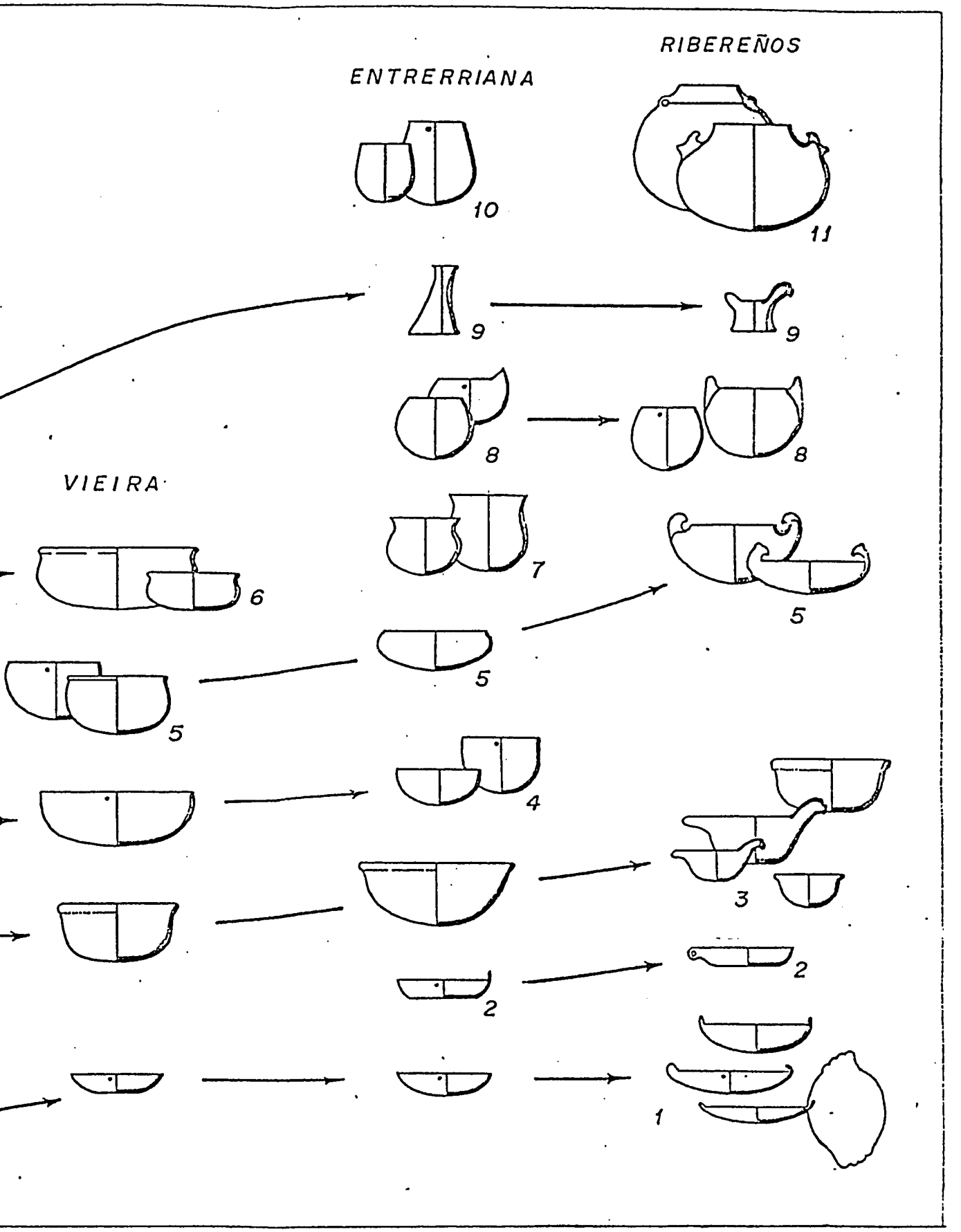

f the sets of vessel forms of the Palo Blanco Tradition. Based on authors
n the text. Figure 12 gives the dating and distribution of the major
itions.

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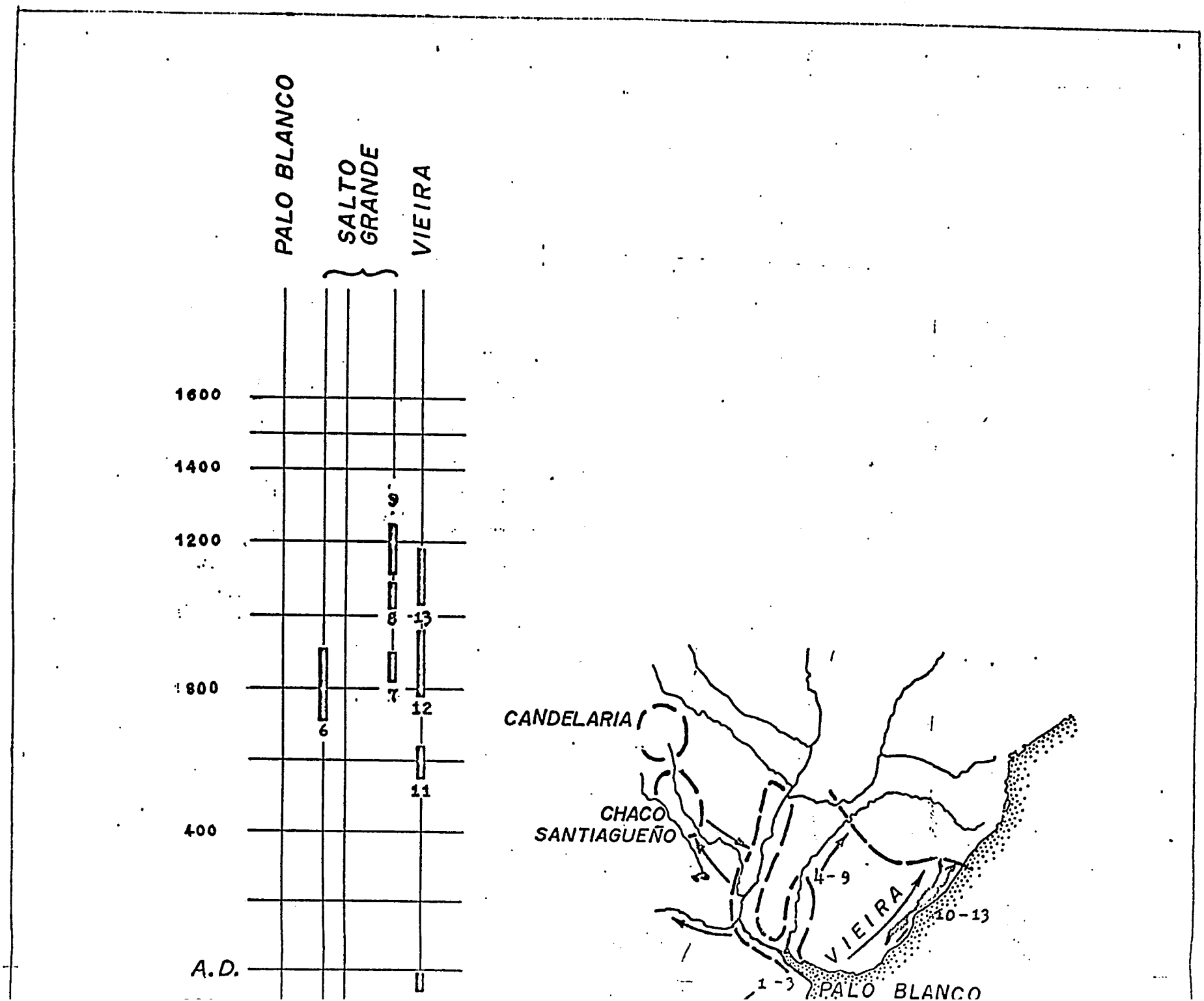

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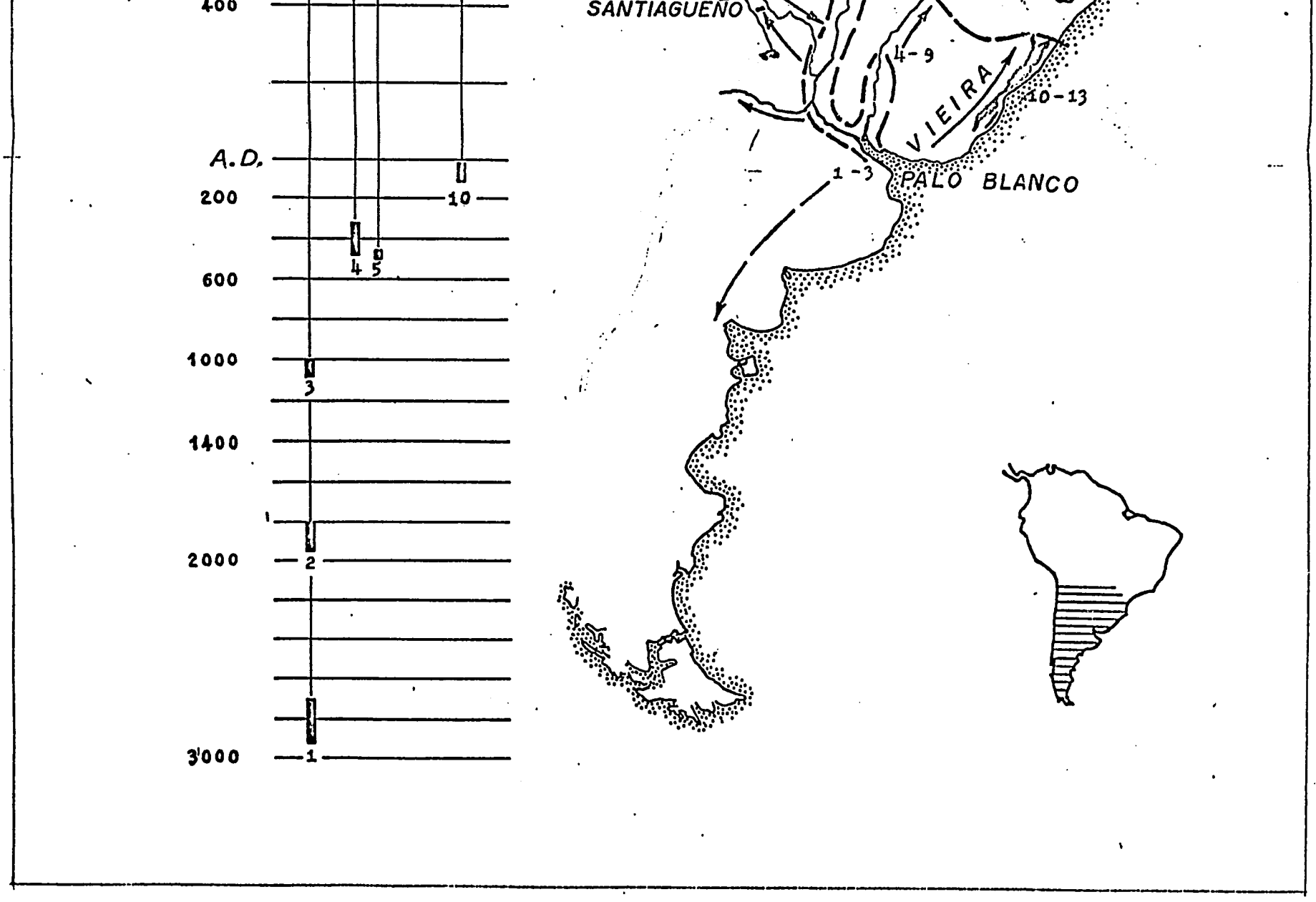

Figure 12. An array of C^{14} dates from sites of the Palo Blanco Tradition. Inset map shows their distribution in Eastern South America. See Figure 10 for text references.

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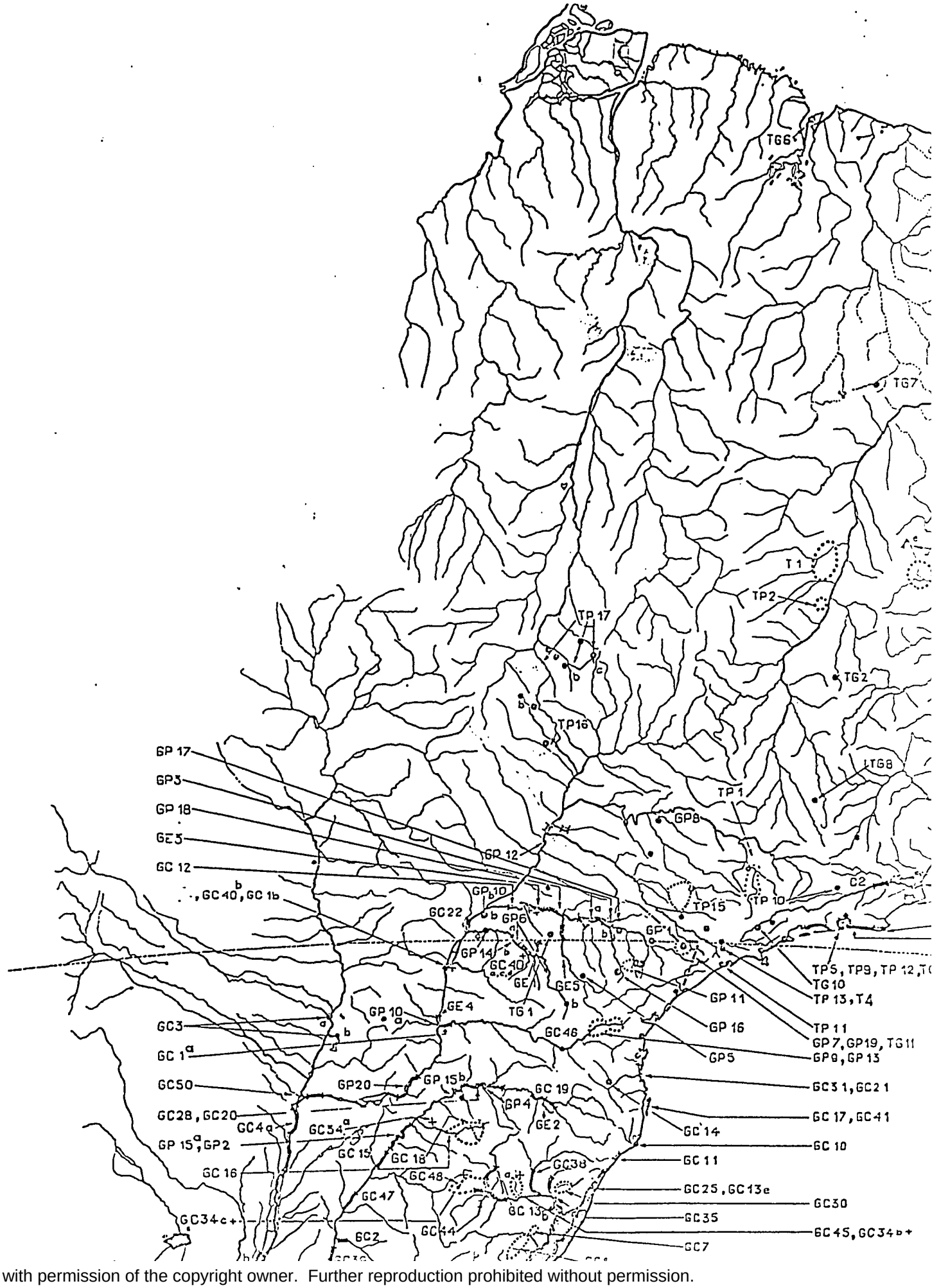

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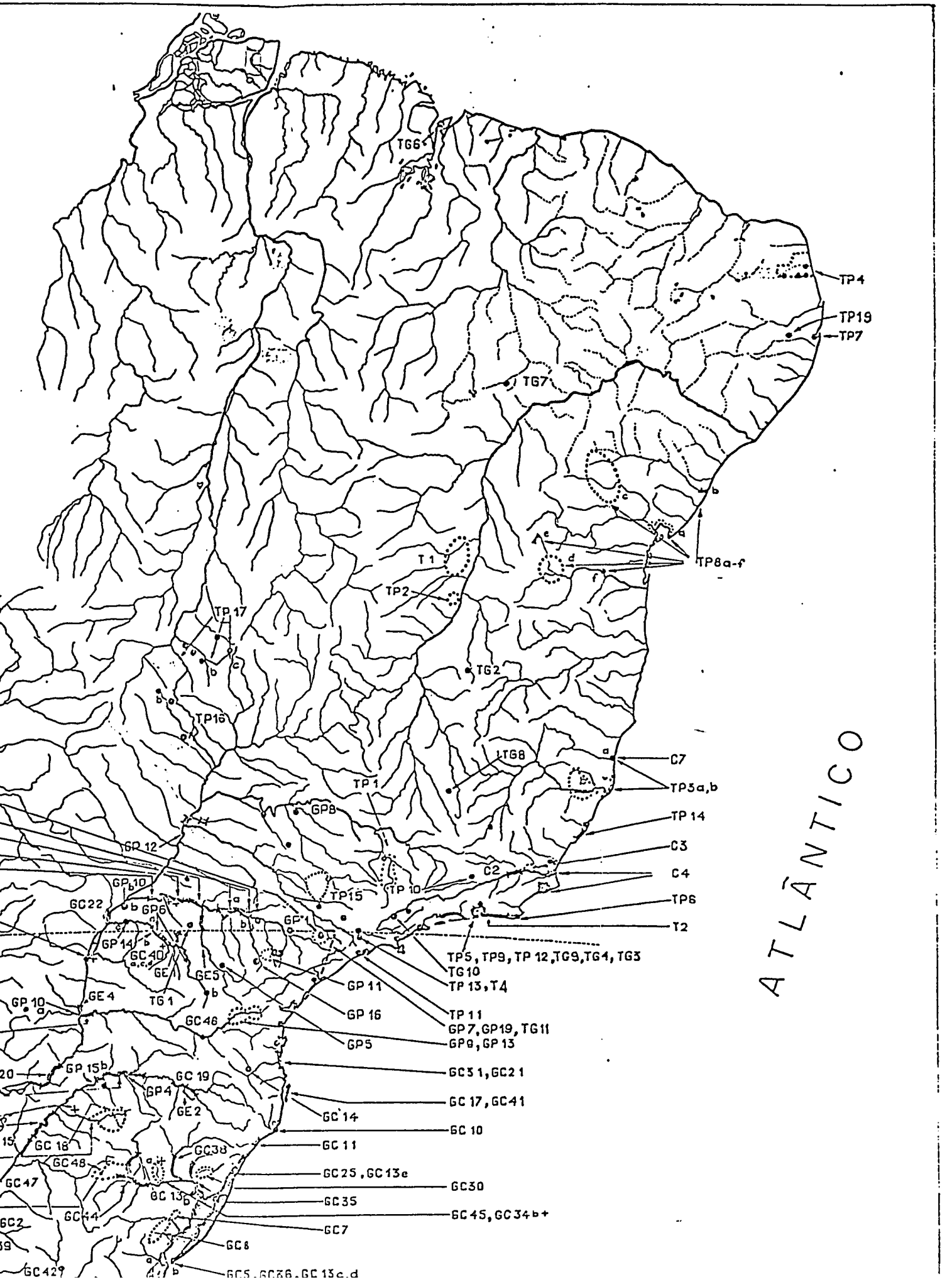

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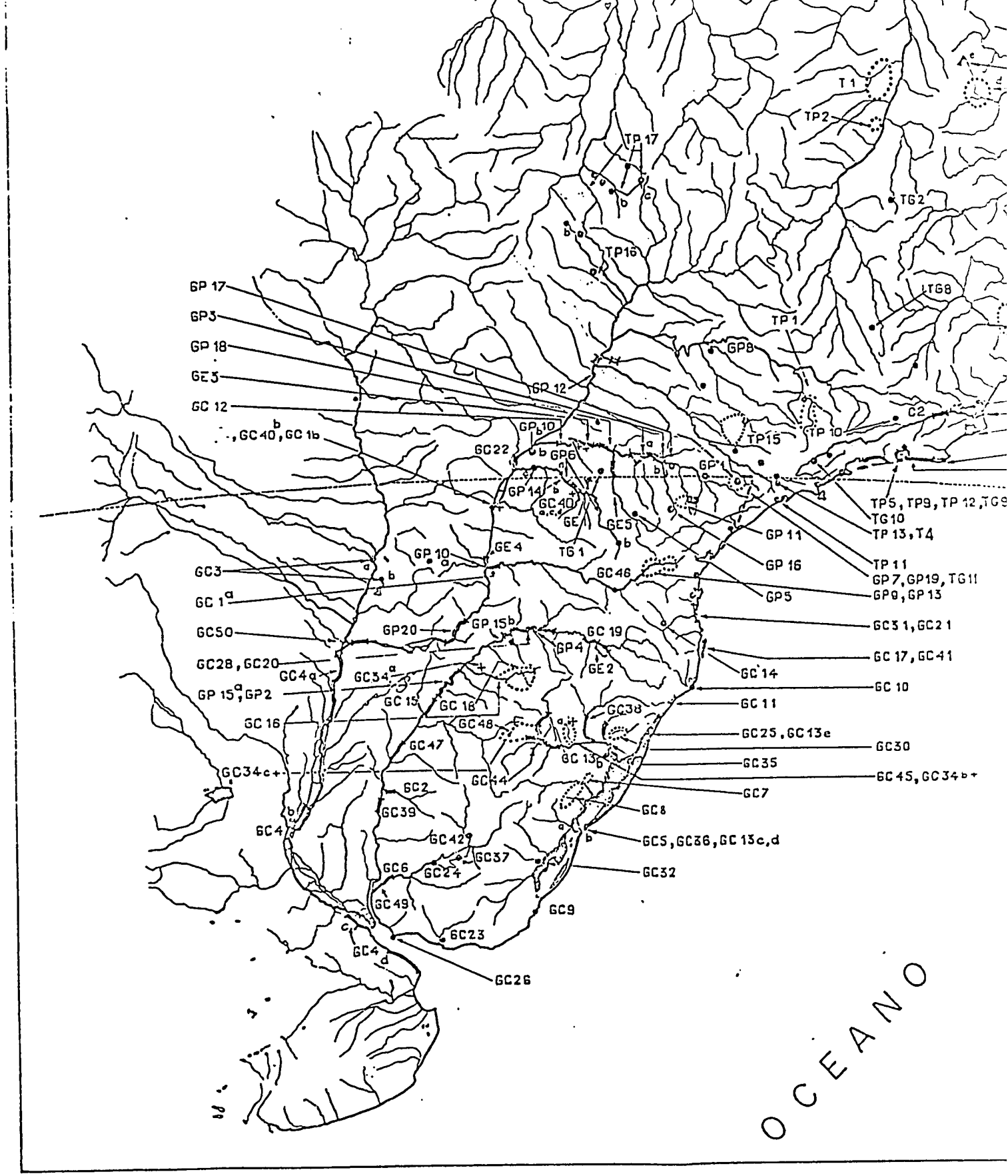

Figure 13. Map of distribution of sites of the Guarani and Tupinambá Su
Amazonian Polychrome Tradition in Eastern South America. GP,
sites; TP, TC, TG, and C = Tupinambá sites. Compare with Figur
references are to Appendix 1 and Appendix 2.

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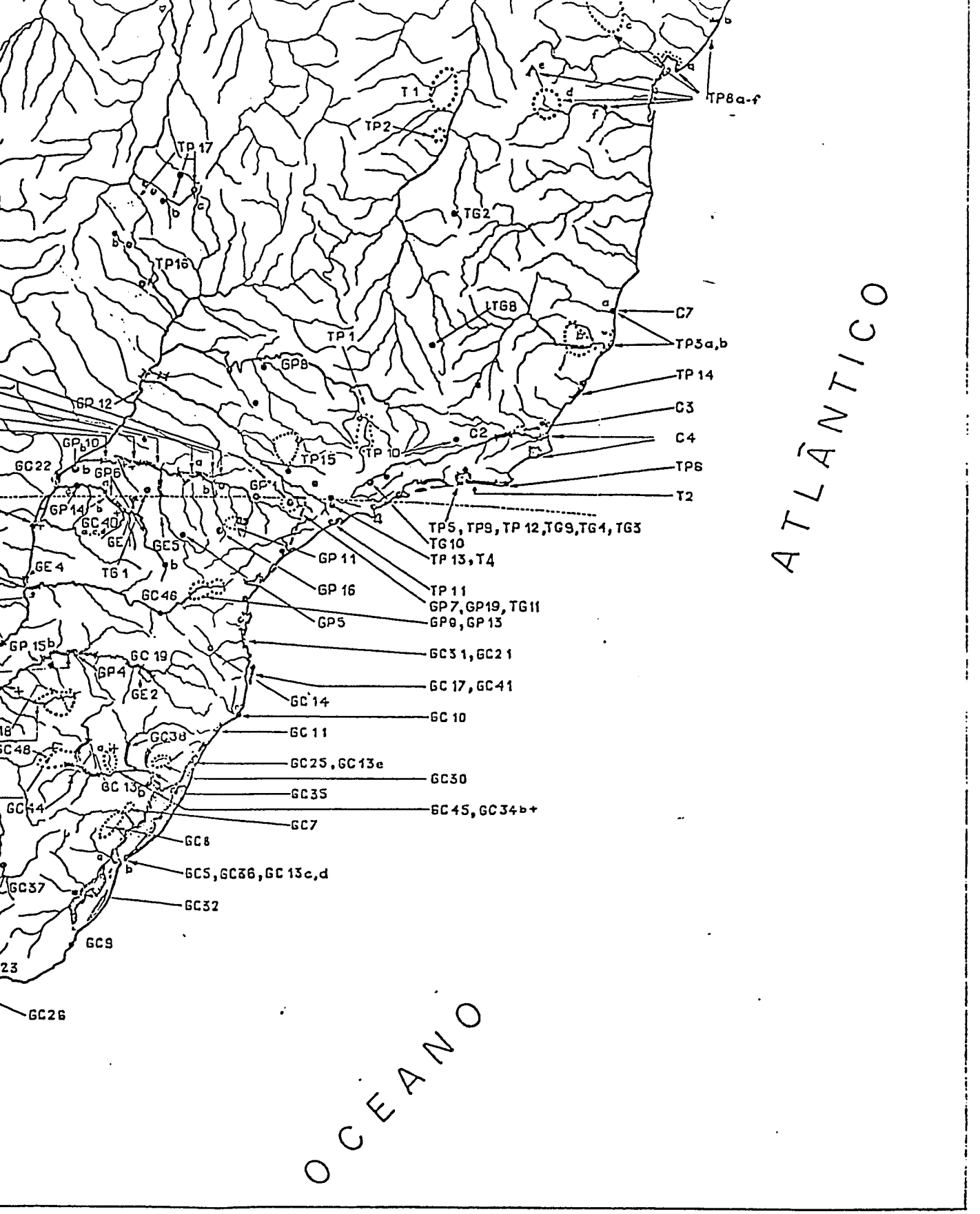

ribution of sites of the Guarani and Tupinambá Subtraditions of the Polychrome Tradition in Eastern South America. GP, GC, and GE = Guarani TC, TG, and C = Tupinambá sites. Compare with Figures 1 and 2. All are to Appendix 1 and Appendix 2.

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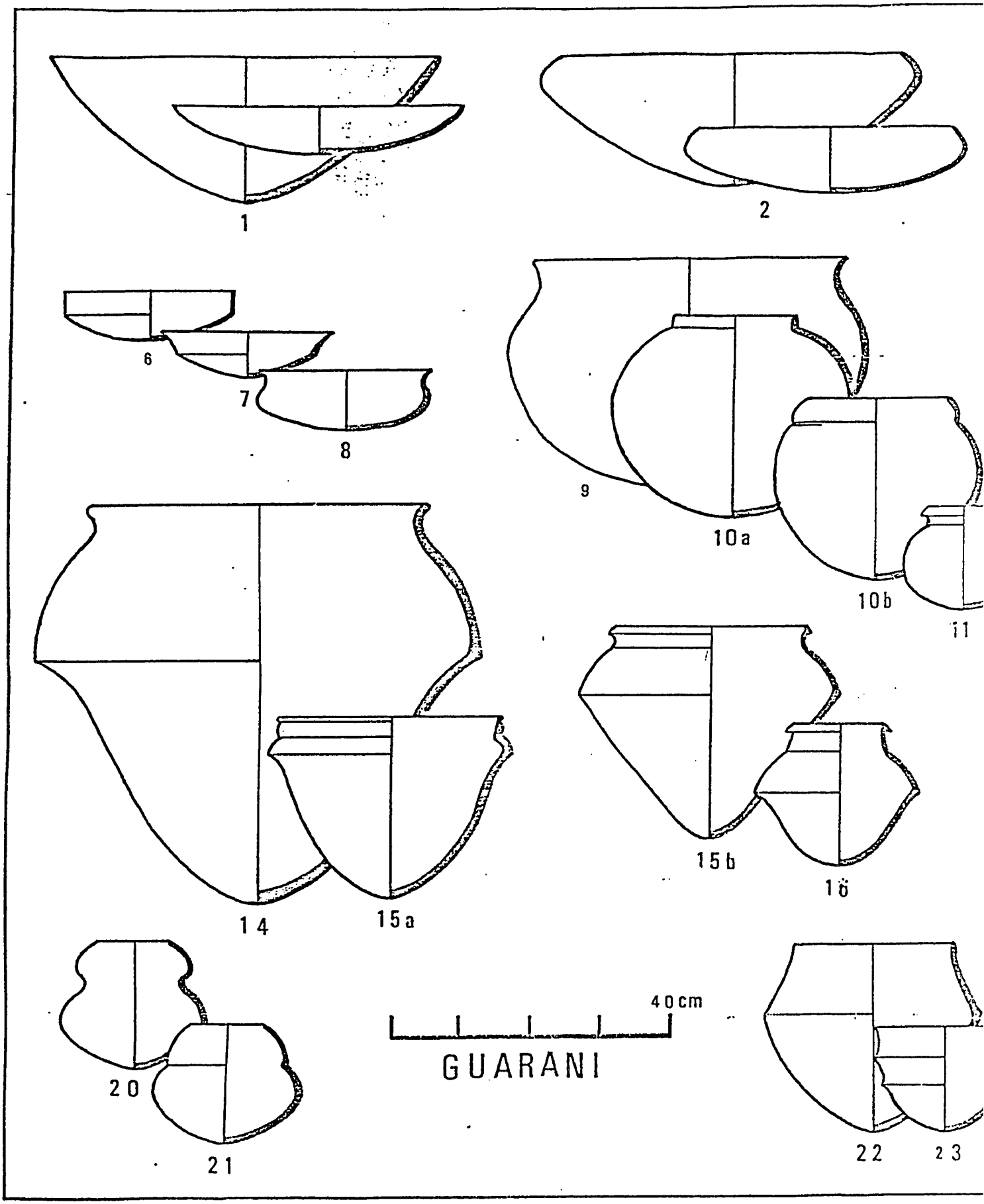

Figure 14. Synoptic presentation the set of vessel forms of t
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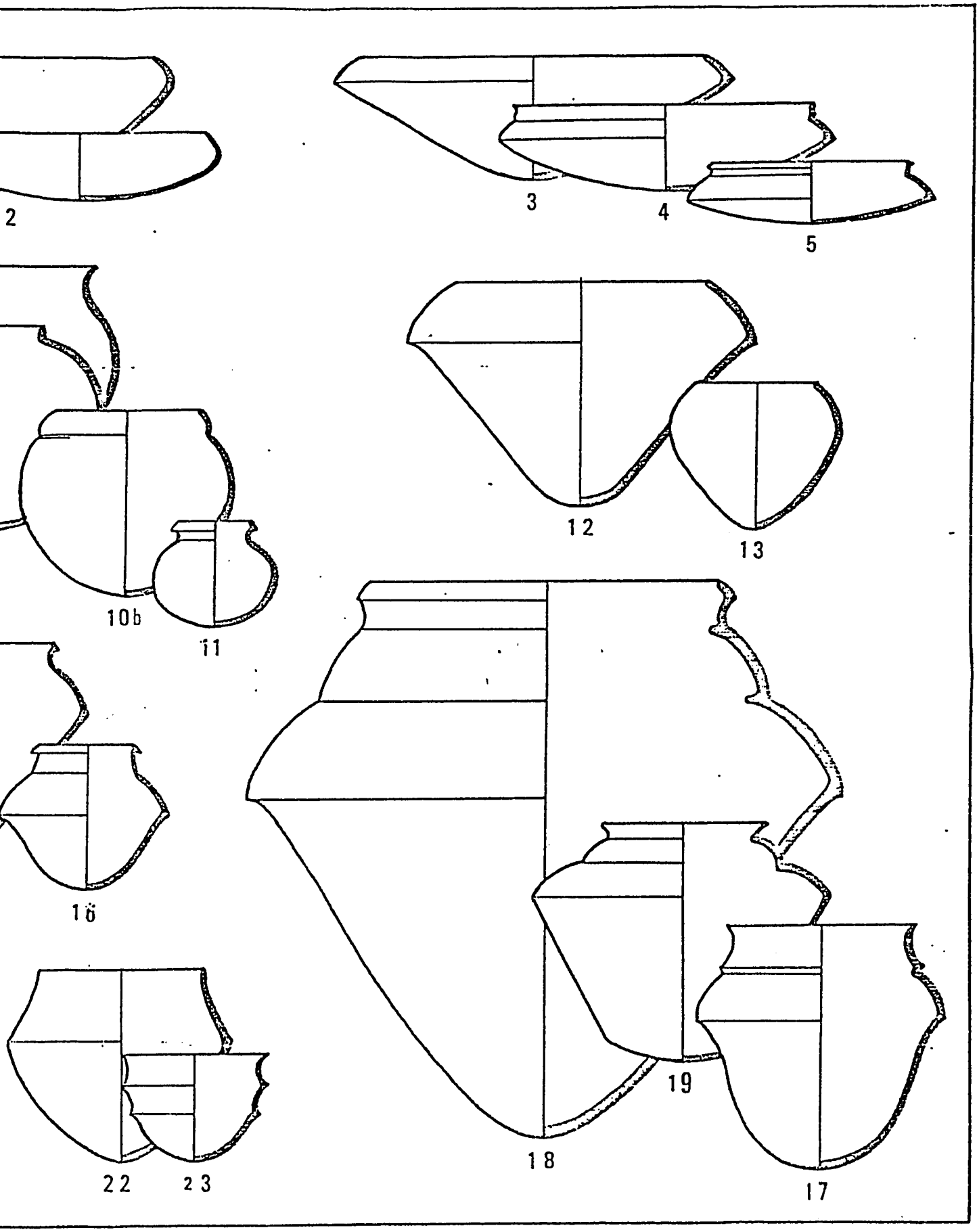

t of vessel forms of the Guarani Subtradition. Based on

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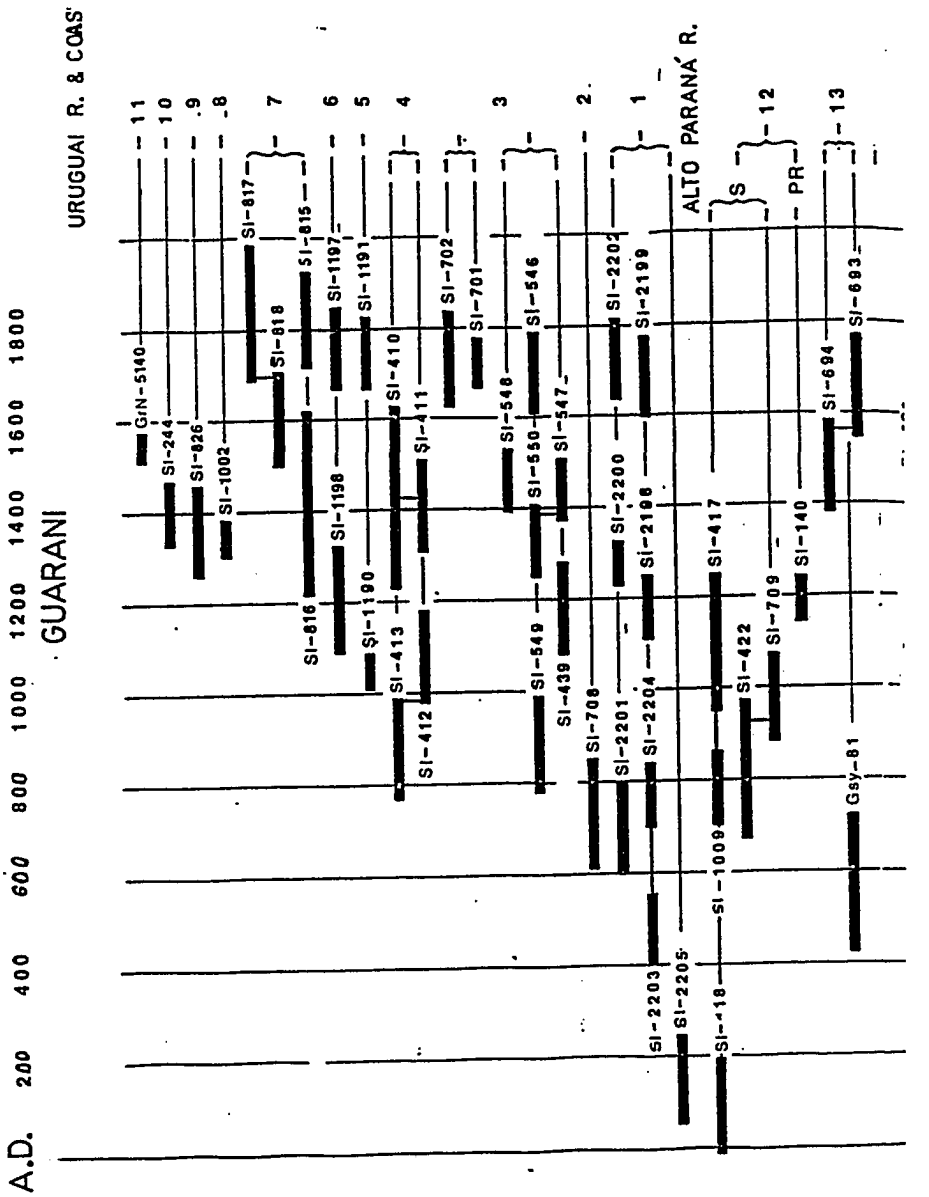

Figure 15. An array of C^{14} dates from sites of the Guarani Subtra map shows their distribution in Eastern South Amer hatching indicates the initial hearth of Guarani in th Vertical cross-hatching indicates the earliest expan hearth. Horizontal hatching represents the nex colonization. Stippled and untextured arrows represen stages of colonization extending up to the time of dates for the Alto Paraná hearth are placed at the array. The cline upward to the right reflects colonization from this hearth. The cline upward reflects the progressive southward colonization from The location of the dated sites or site clusters is in number on the map and at the top of the chart of dates

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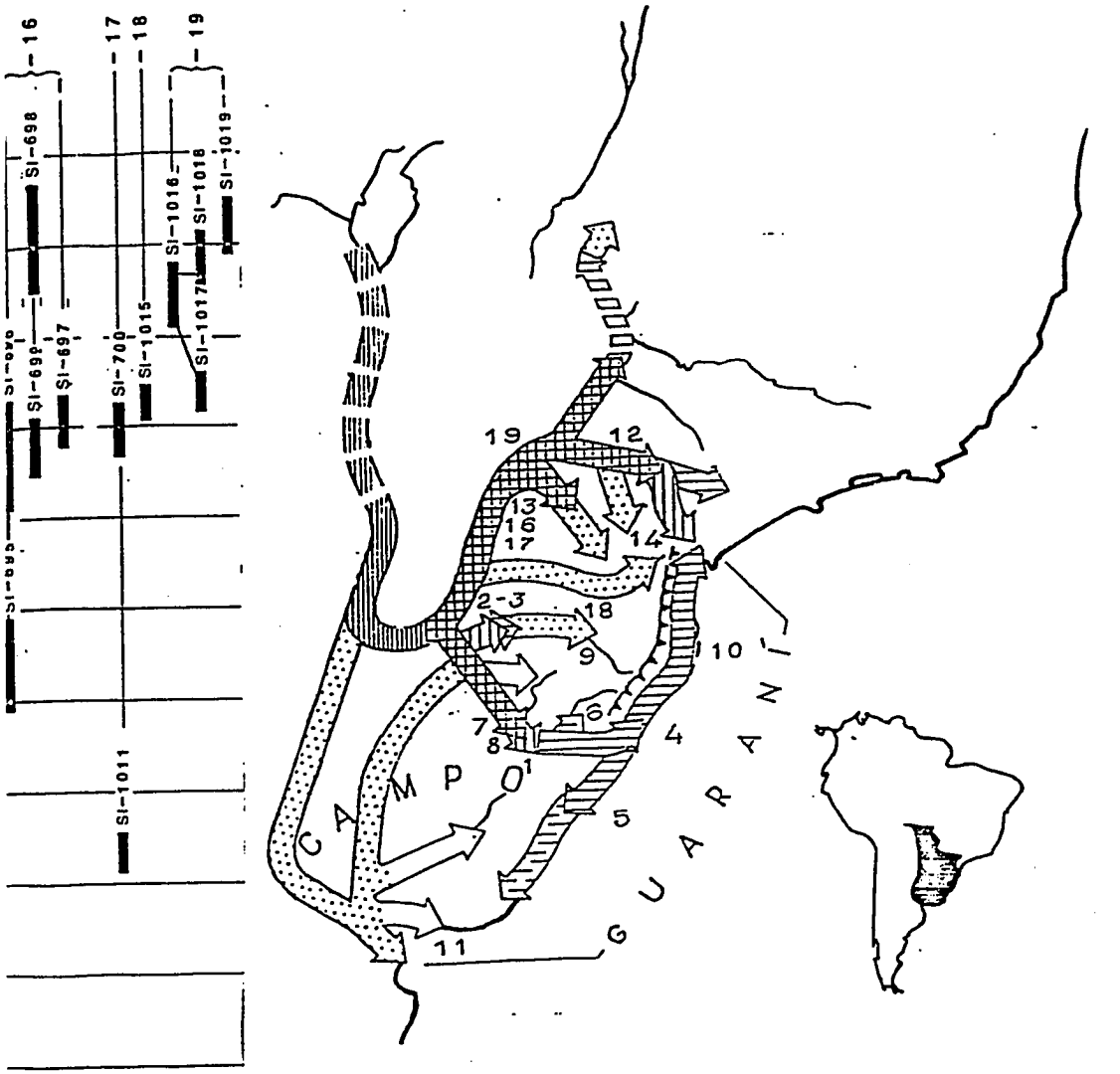

lition. Inset
.ca. Vertical
e Alto Paraná.
sion from this
stage of
the last two
Contact. The
center of the
the northward
to the left
this hearth.
dicated by the

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Dated Guarani Locations	Key in Appendix 1 and Figure 13
1	GC 13
2	GP 16
3	GC 28 and GP 4*
4	GC 25
5	GC 36
6	GC 35
7	GC 44
8	GC 48
9	GC 19
10	GC 41
11	GC 26
12	GP 3
13	GP 14
14	(These two almost in the same location. The only available dates are TL, which have been withdrawn for technical reasons.)
15	
16	GP 6
17	GC 40
18	GC 46
19	GC 22

* GC 28 corresponds to the earliest date;

GP 4 corresponds to the latest date

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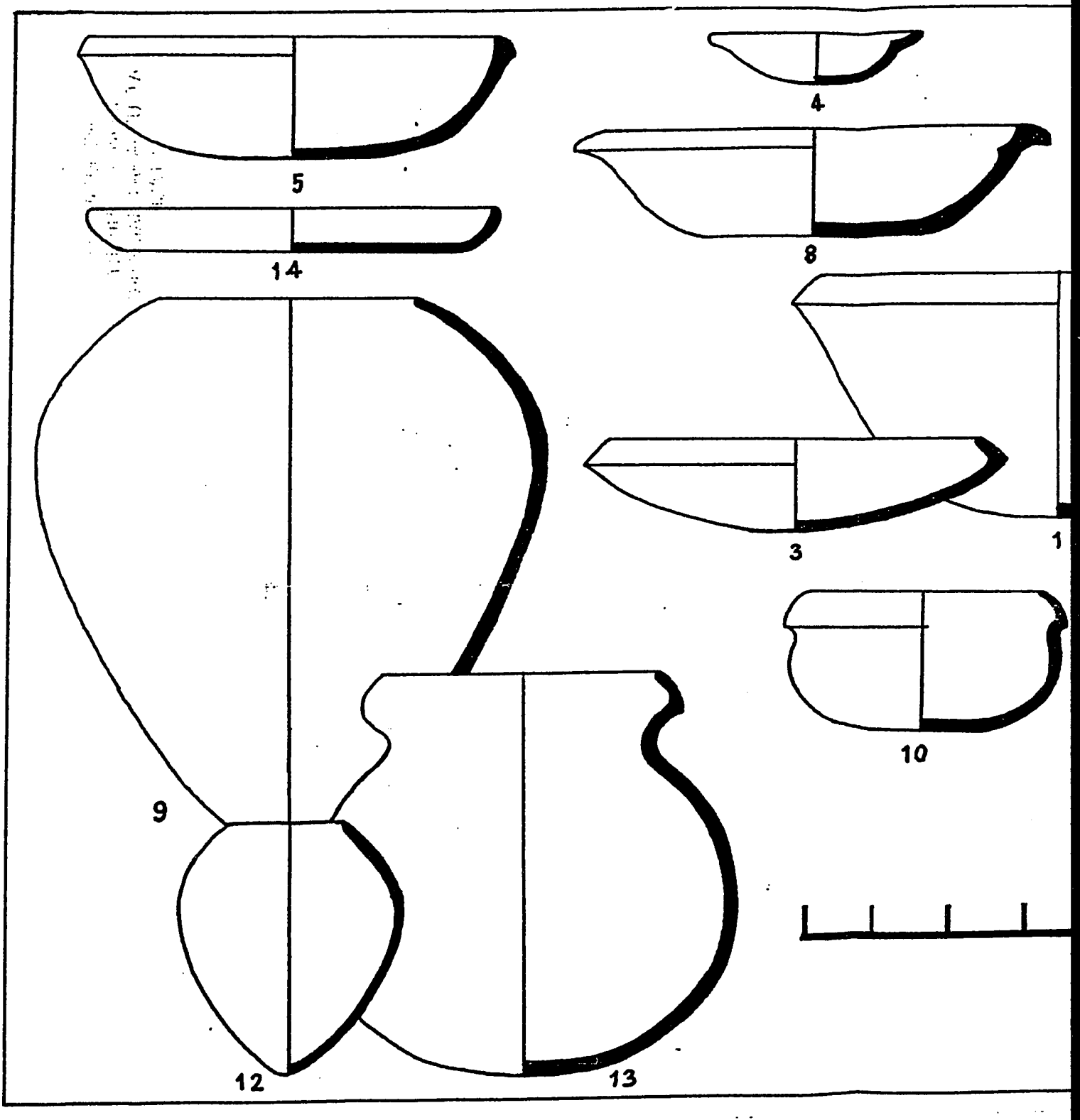

Figure 16. Synoptic presentation of the set of vessel forms of the T
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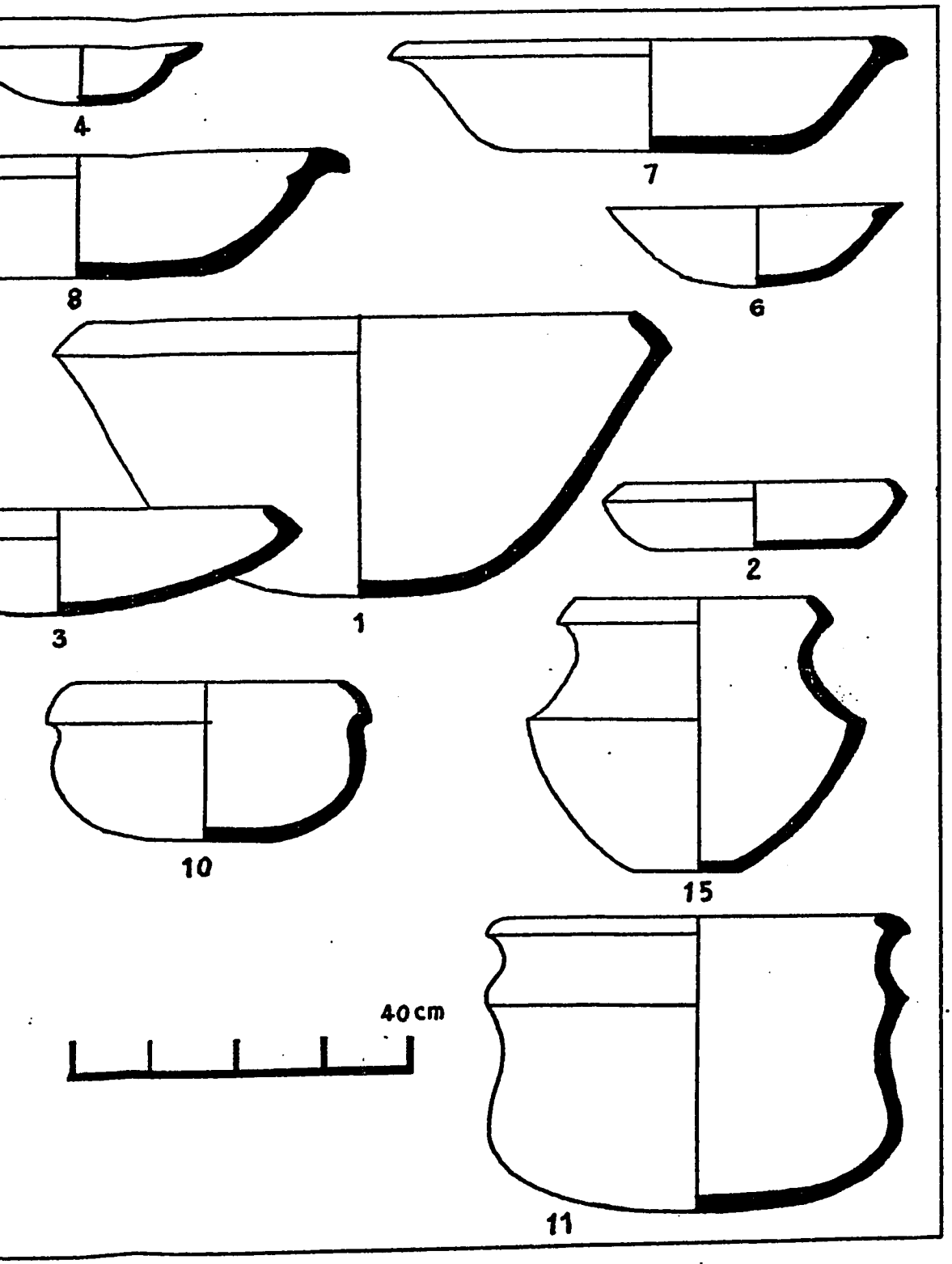

set of vessel forms of the Tupinambá Subtradition.
ext.

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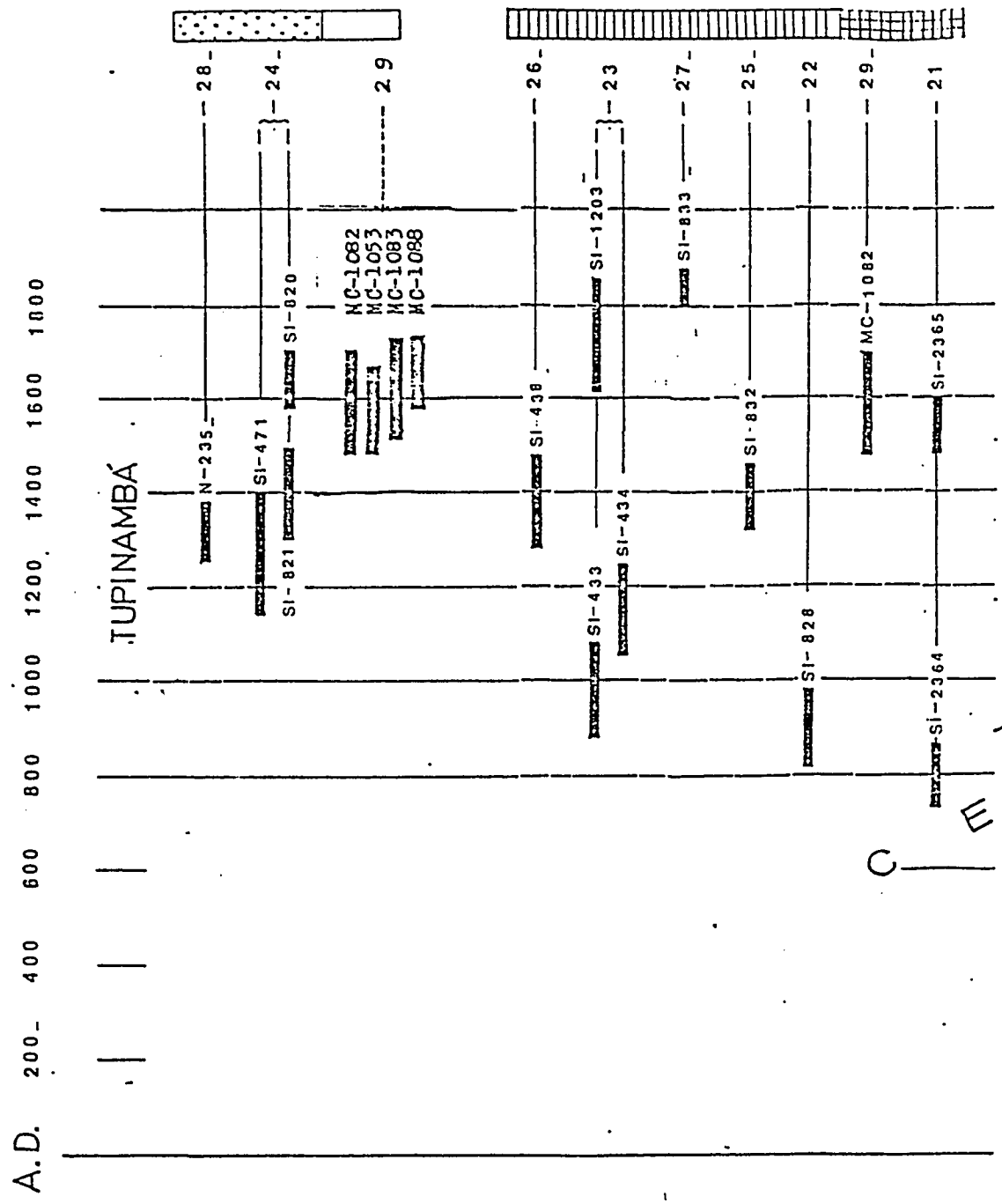

Figure 17. An array of C^{14} dates from sites of their distribution in Northeastern and E expansion are indicated from early t horizontal hatching (broken and unbroken the dated sites of site clusters is in top of the chart of dates.

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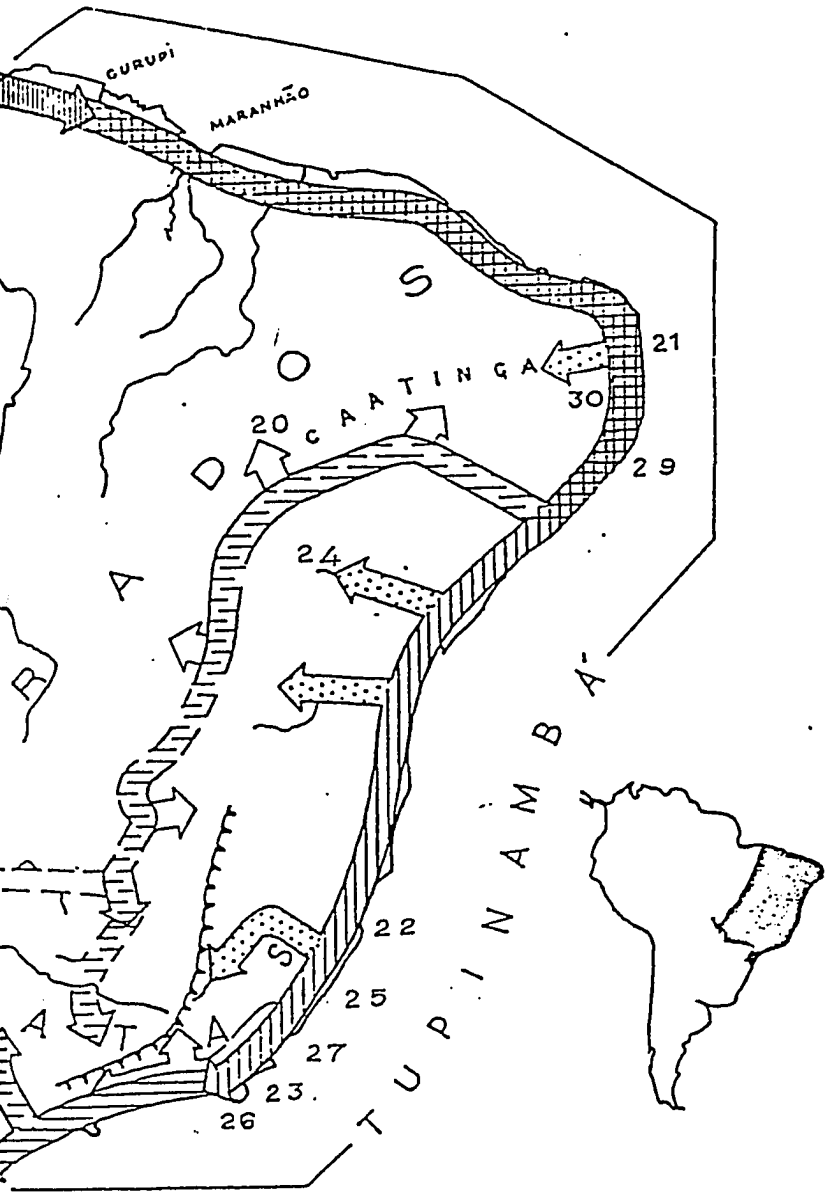

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Dated Tupinambá Locations	Key in Appendix 2 and Figure 13
20	TG 7
21	TP 4
22	TP 3
23	TP 6 and TP 9
24	TP 8
25	TP 14
26	T 2
27	C 4
28	TP 17
29	TP 19

* TP 6 corresponds to the earliest date

TP 9 corresponds to the latest date

sites of the Tupinambá Subtradition. Inset map shows tern and Eastern Brazil. The temporal stages of the n early to late by vertical hatching, cross-hatching, d unbroken), and untextured arrows. The location of ters is indicated by the numbers on the map and at the

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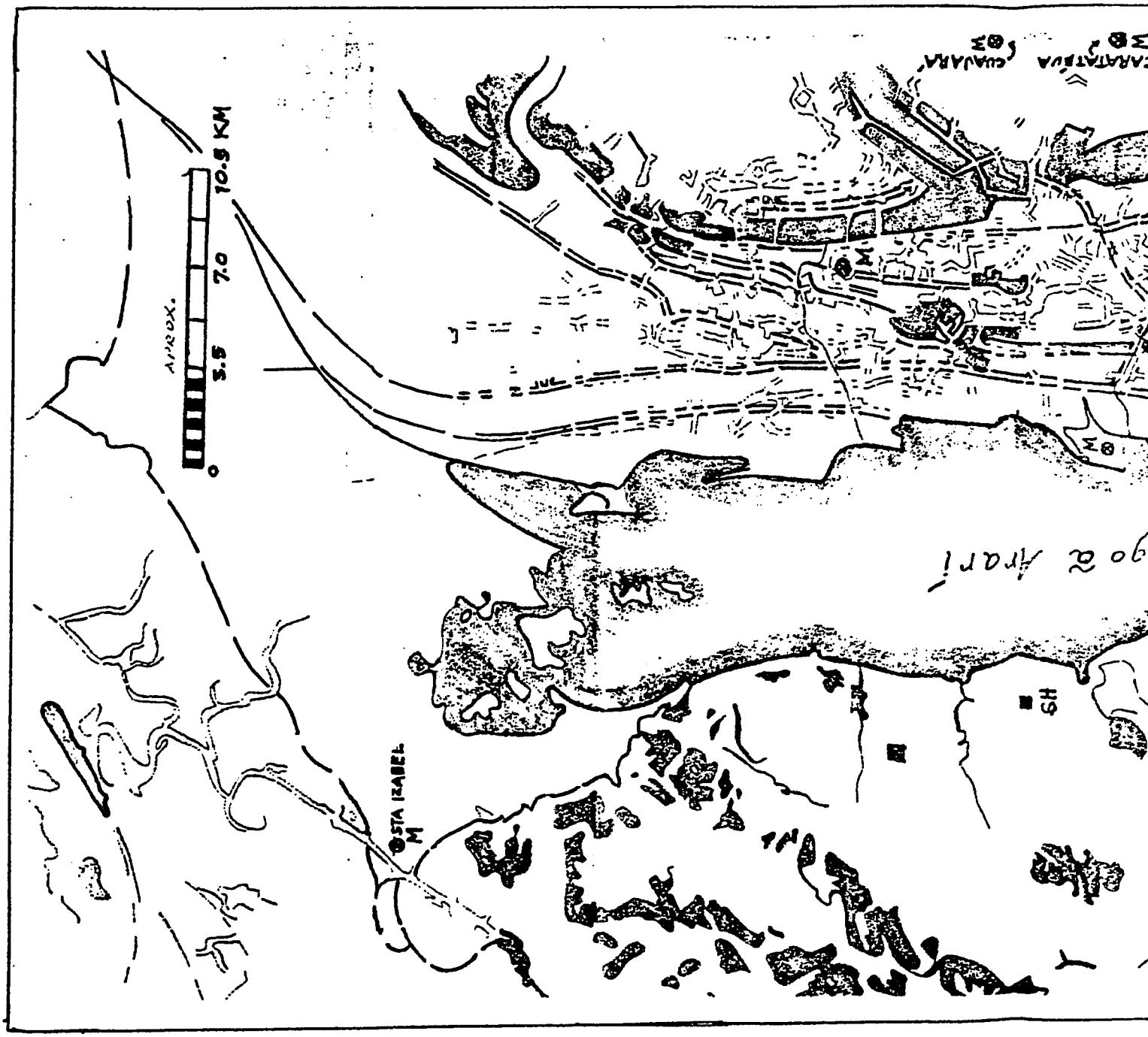

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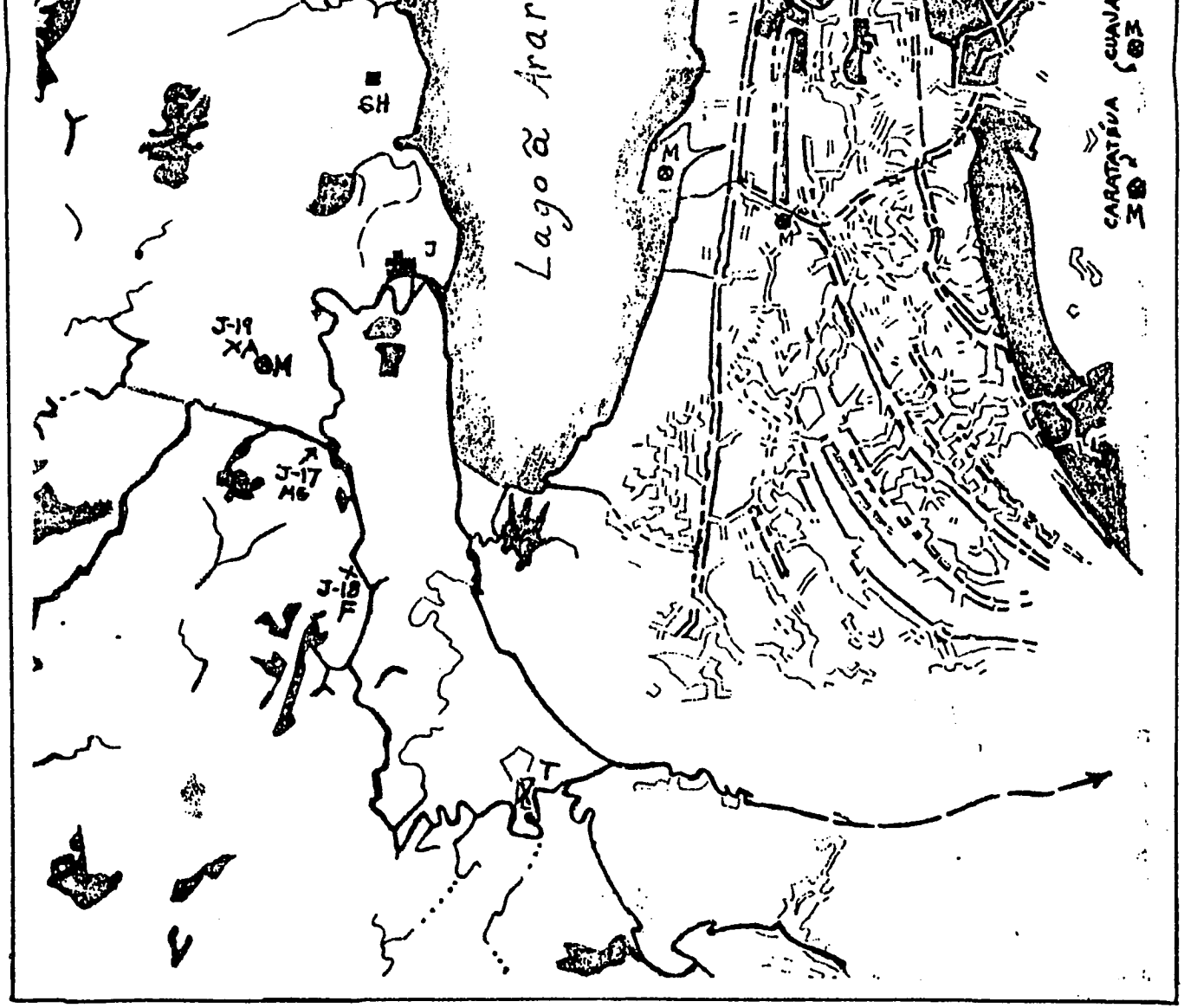

Figure 18. Map of the ridge-and-swale topography in the northeastern section of Marajó Island to the north and east of Lake Arari. Drawn from Projeto RADAM SLAR images.

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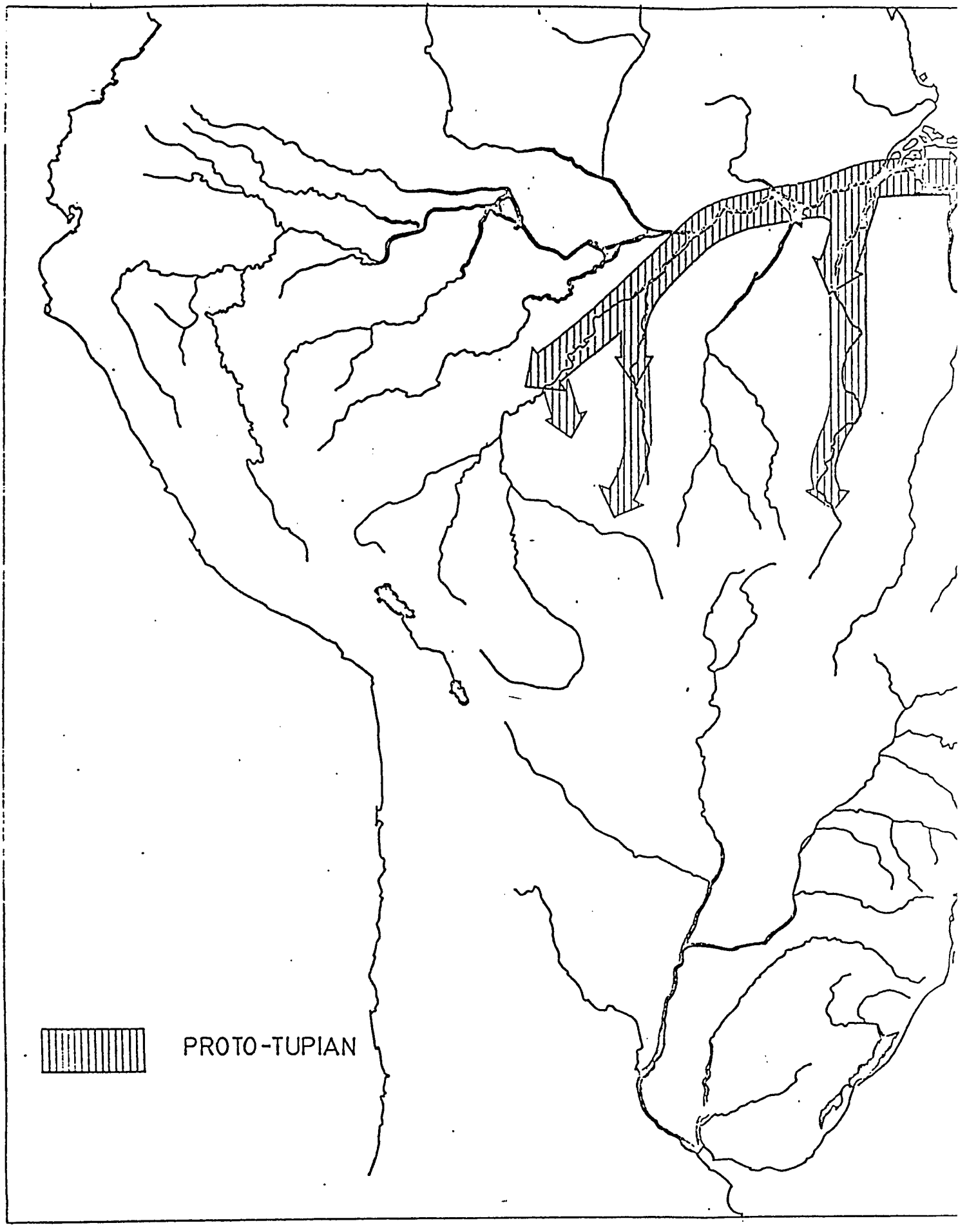

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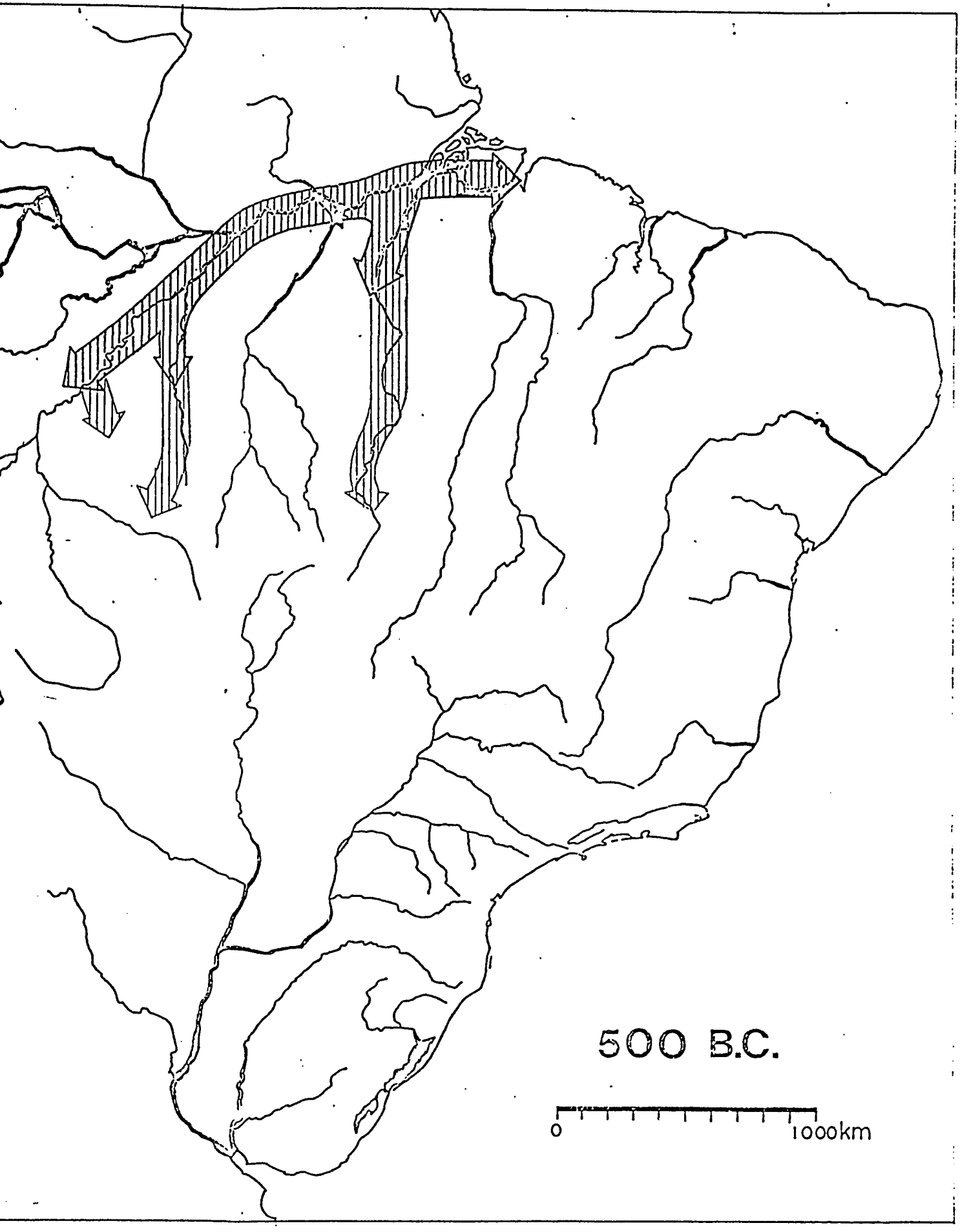

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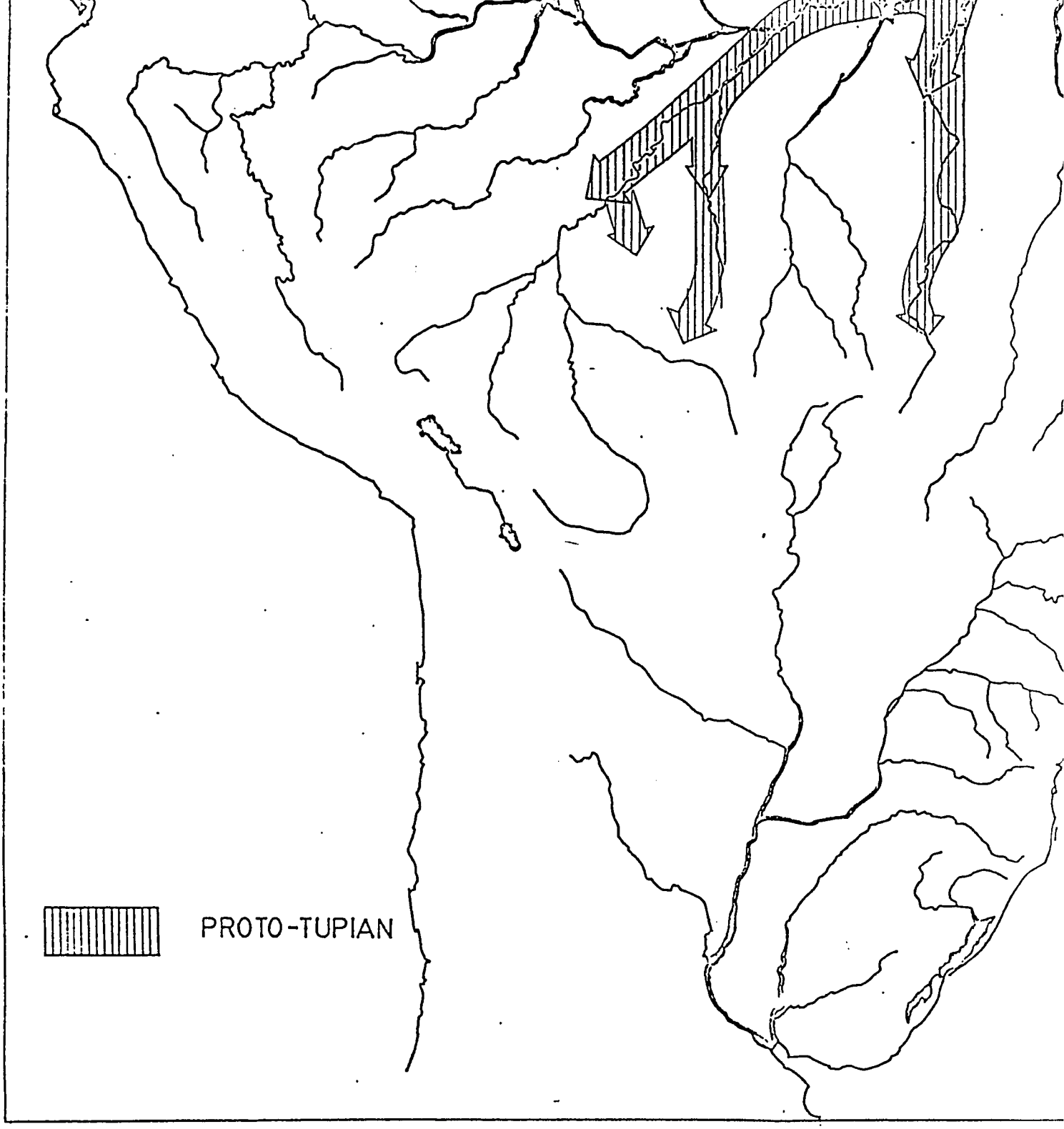

Figure 19. Map of the spread of the Tupí-speaking groups by ca. 500
(1970a), with some modifications.

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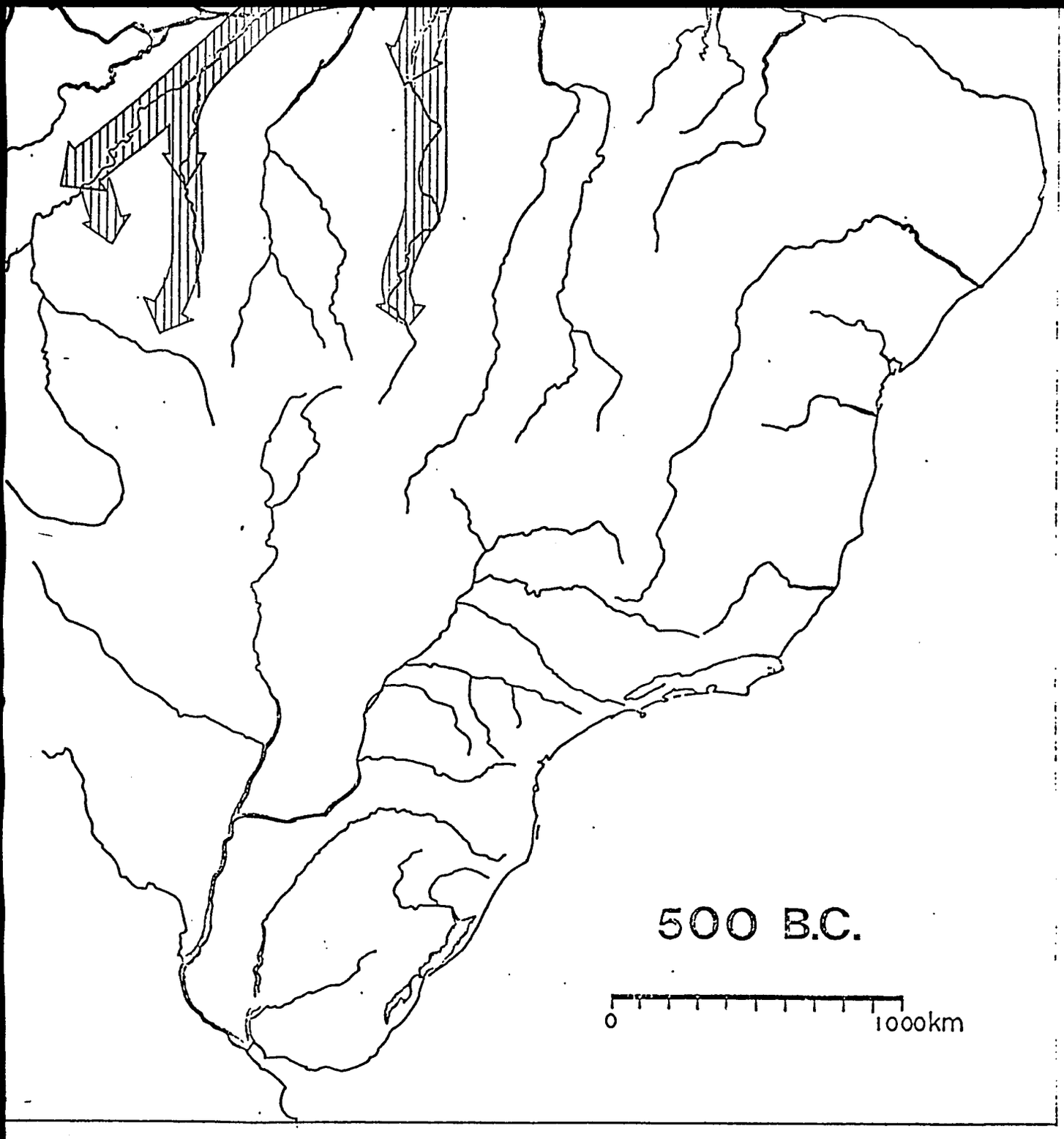

spread of the Tupi-speaking groups by ca. 500 B.C. Based on Lathrap some modifications.

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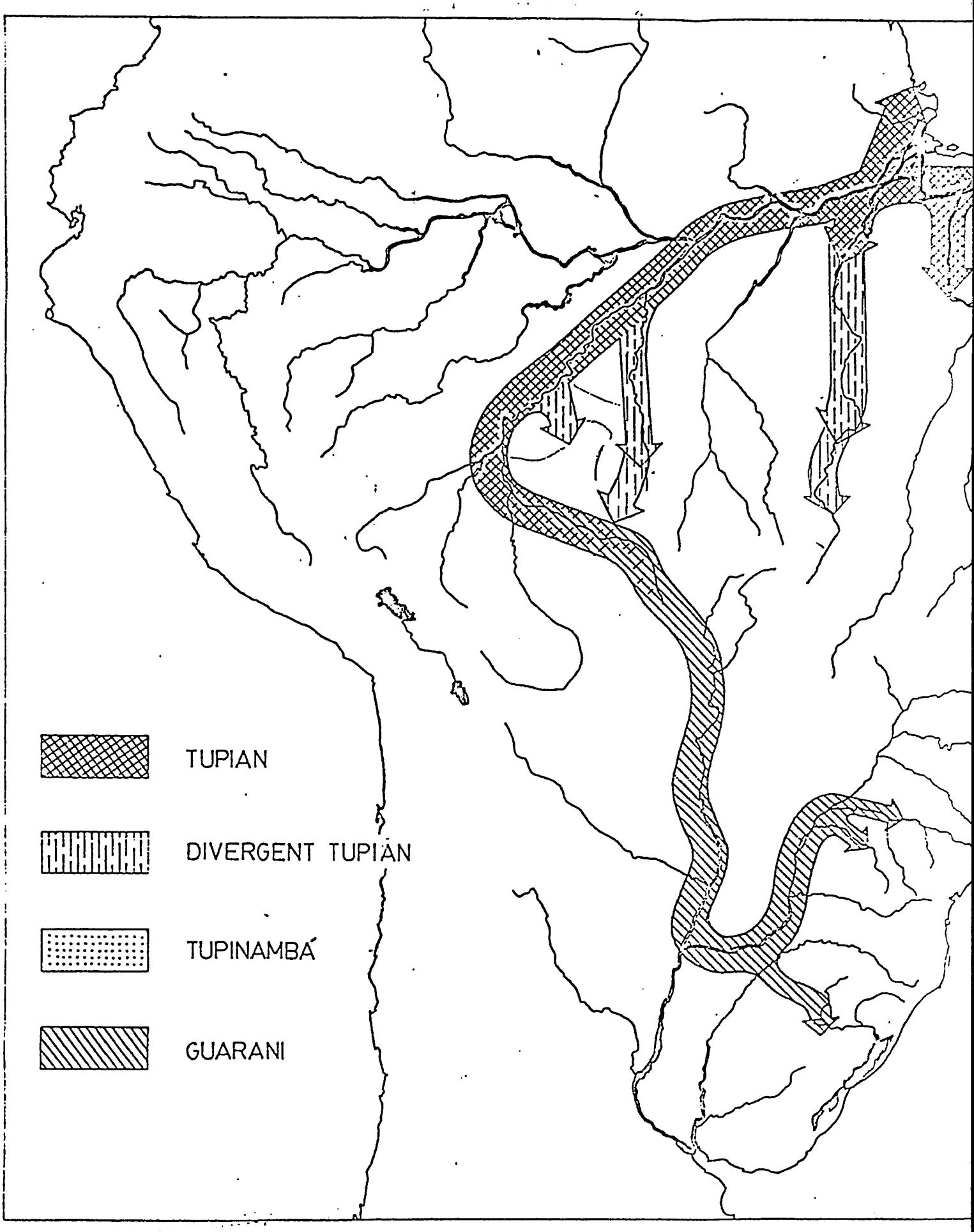

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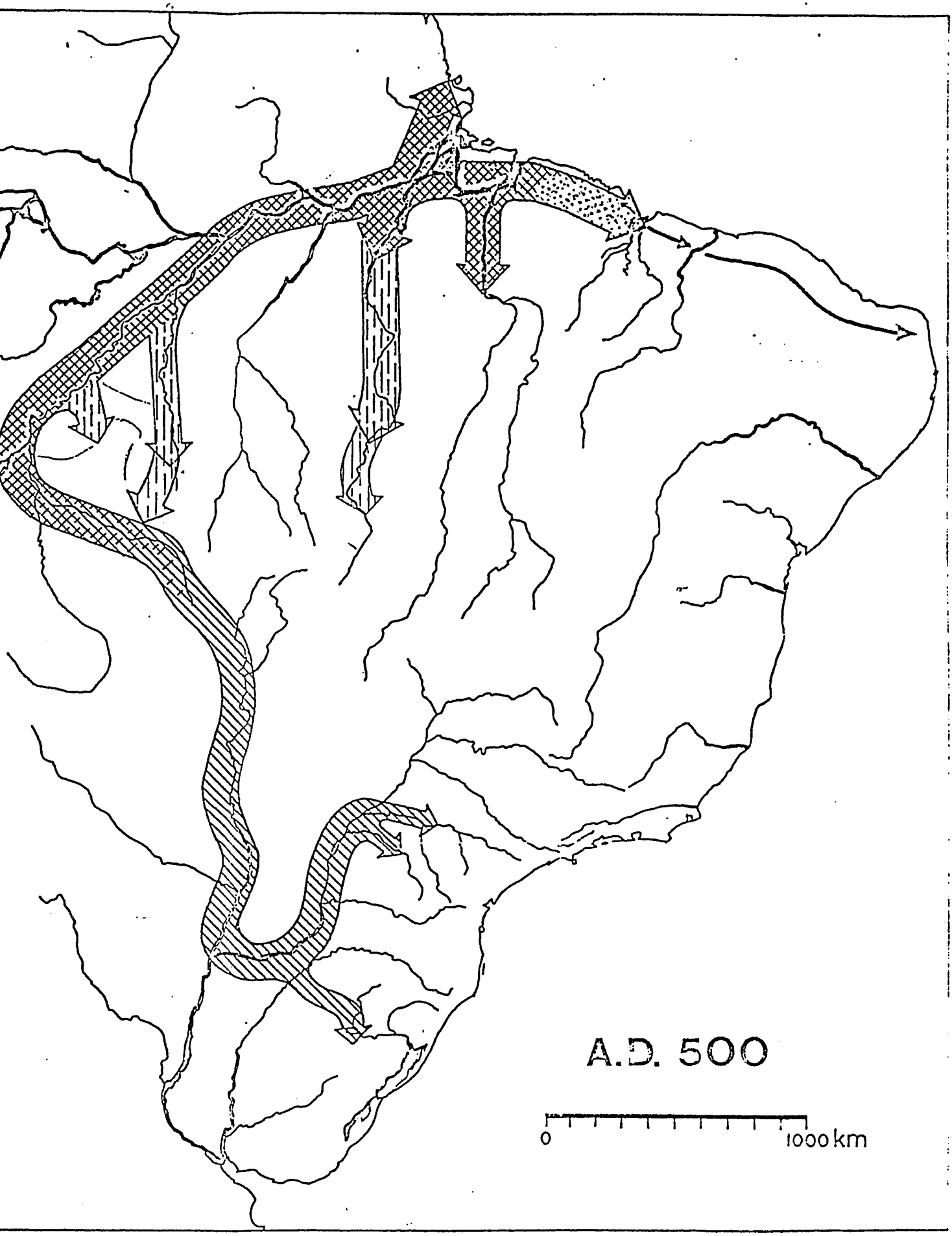

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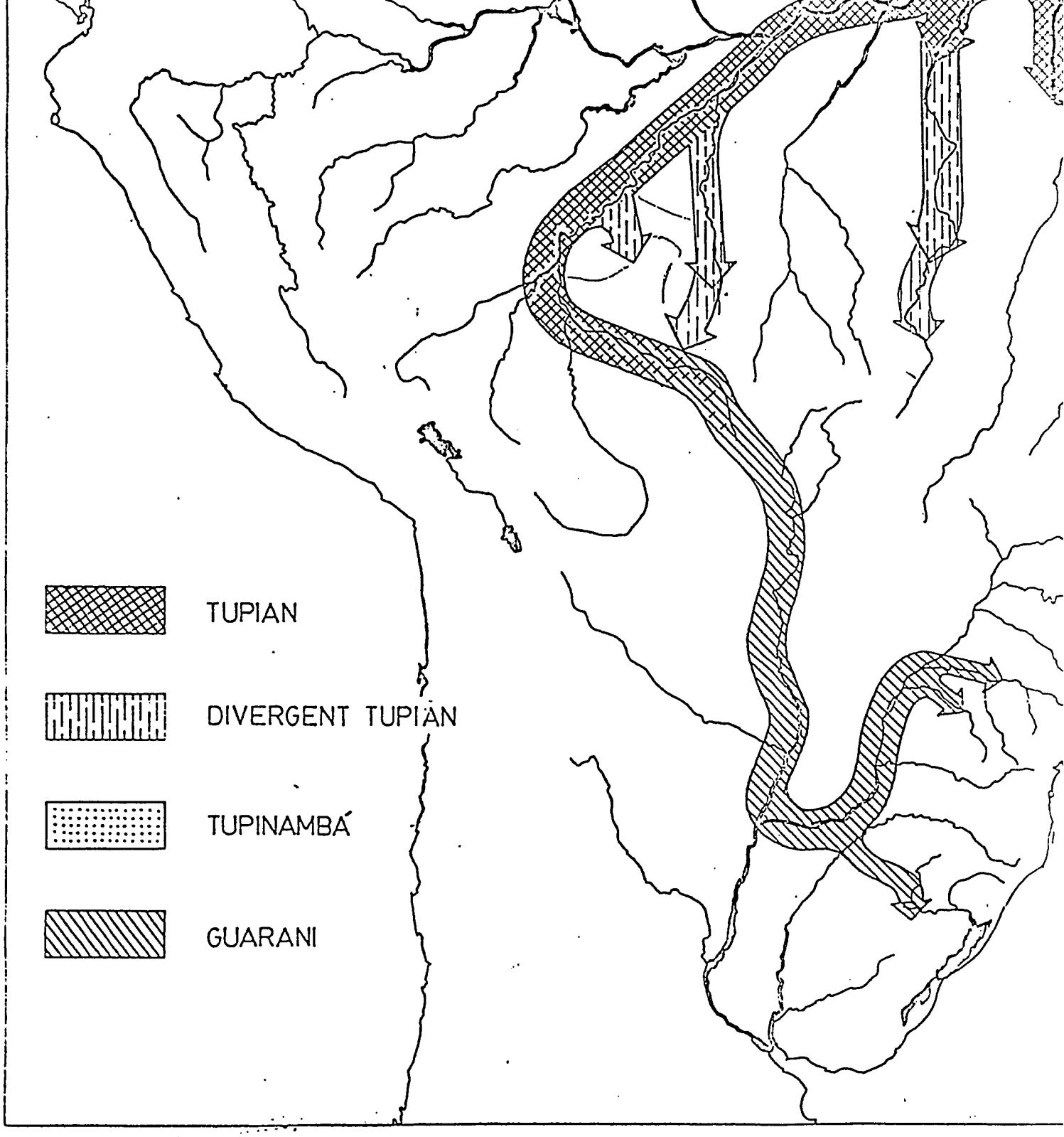

Figure 20. Map of the spread of the Tupí-speaking groups by ca. A.D
(1970a), with some modifications.

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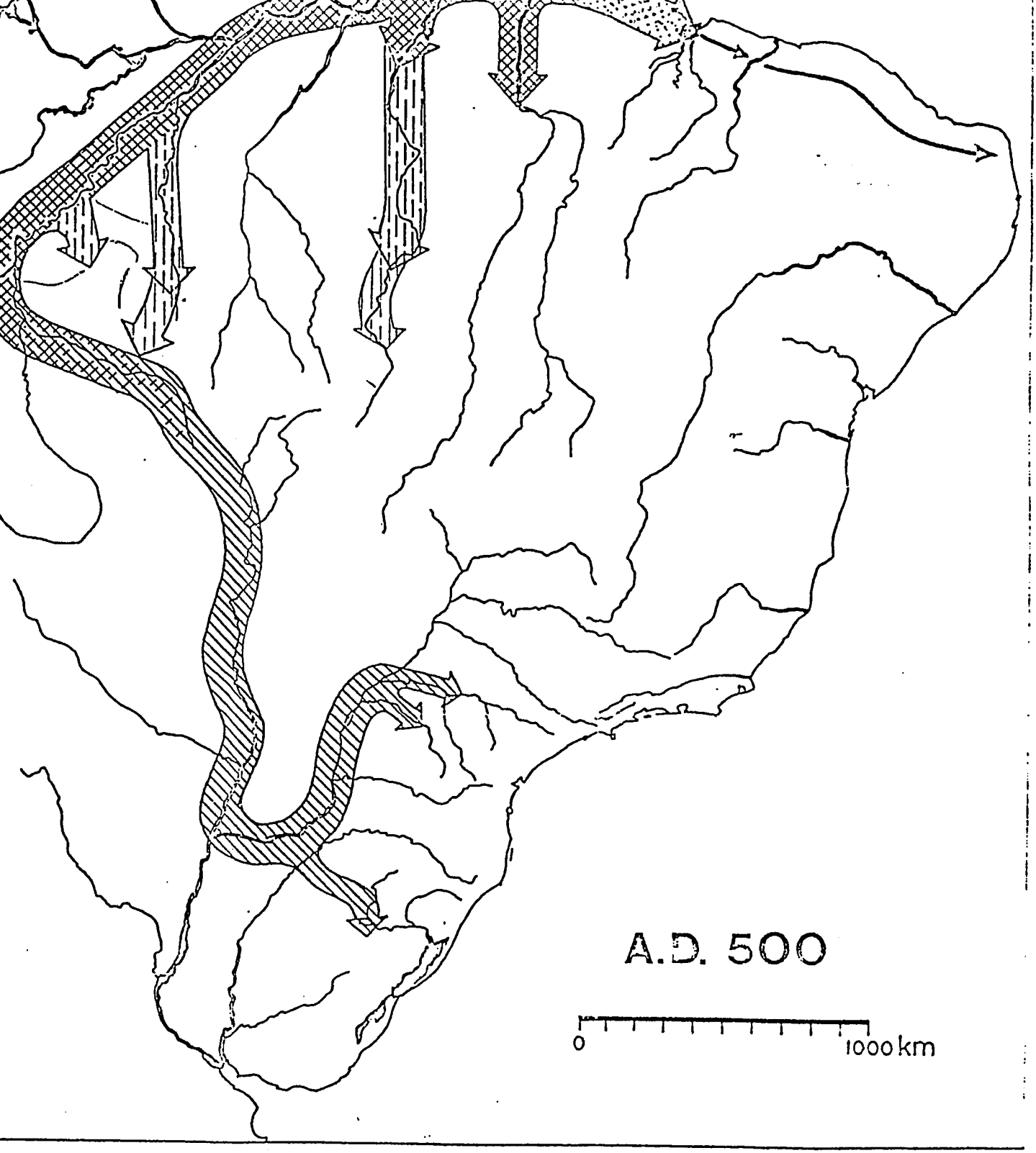

spread of the Tupí-speaking groups by ca. A.D. 500. Based on Lathrap some modifications.

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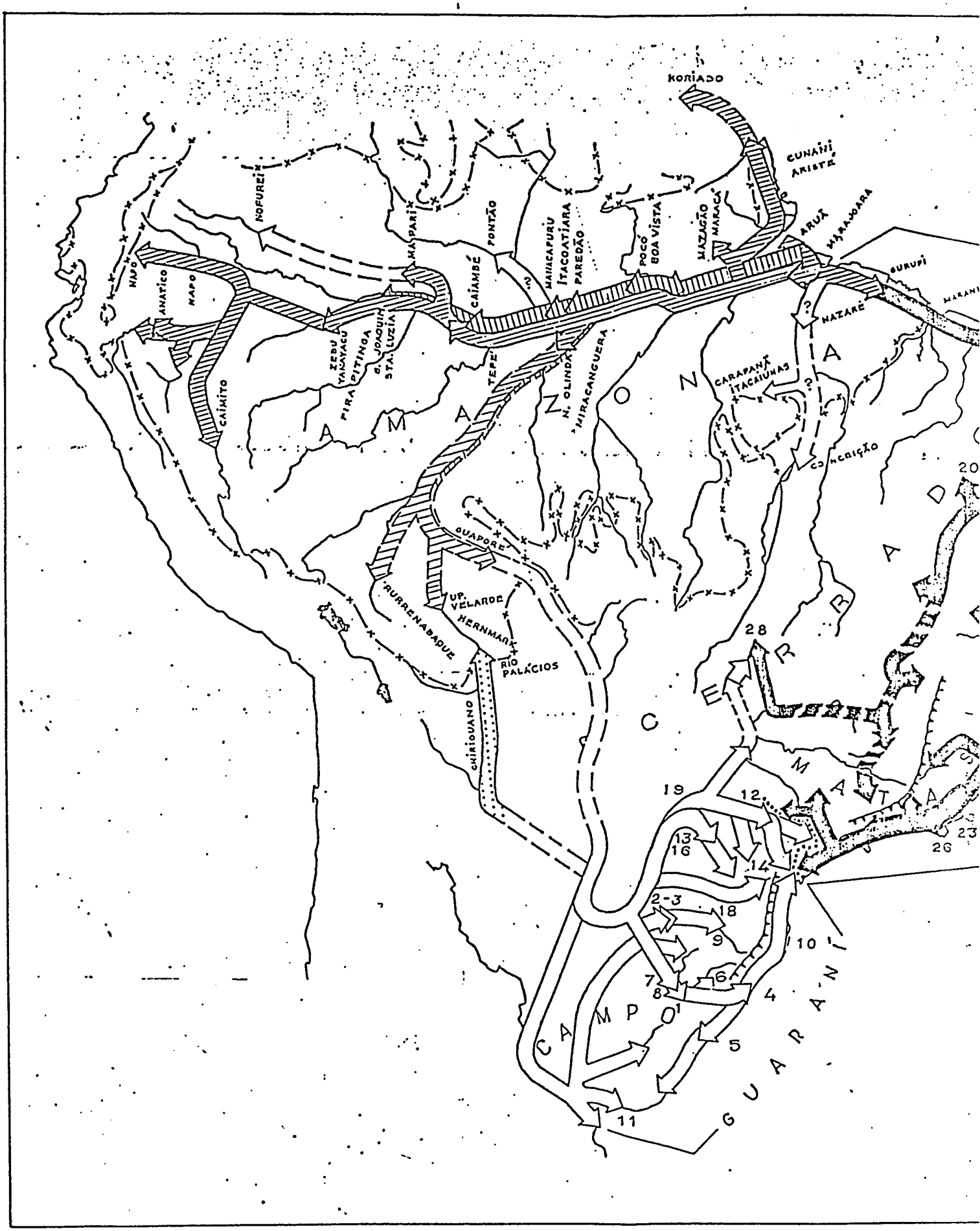

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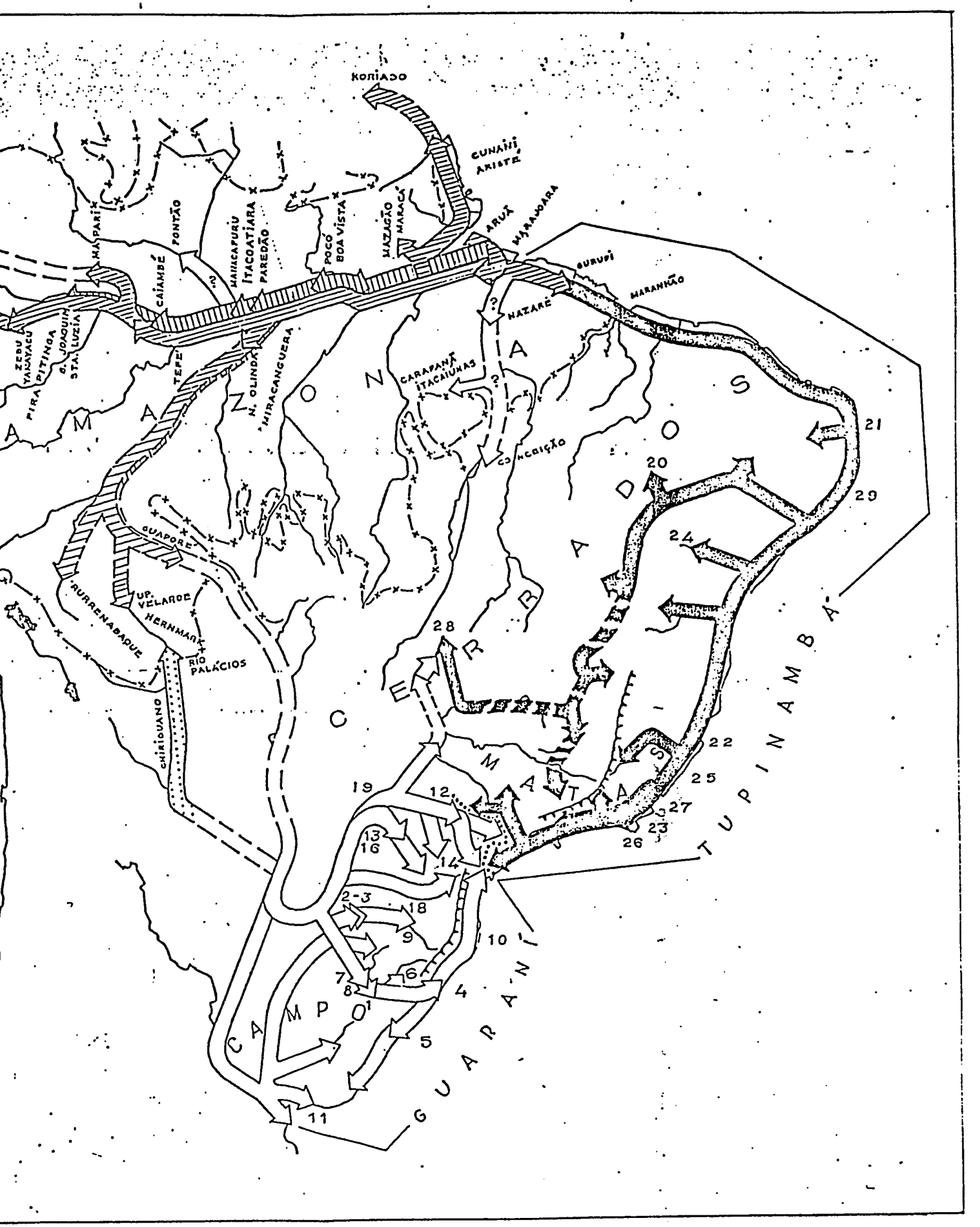

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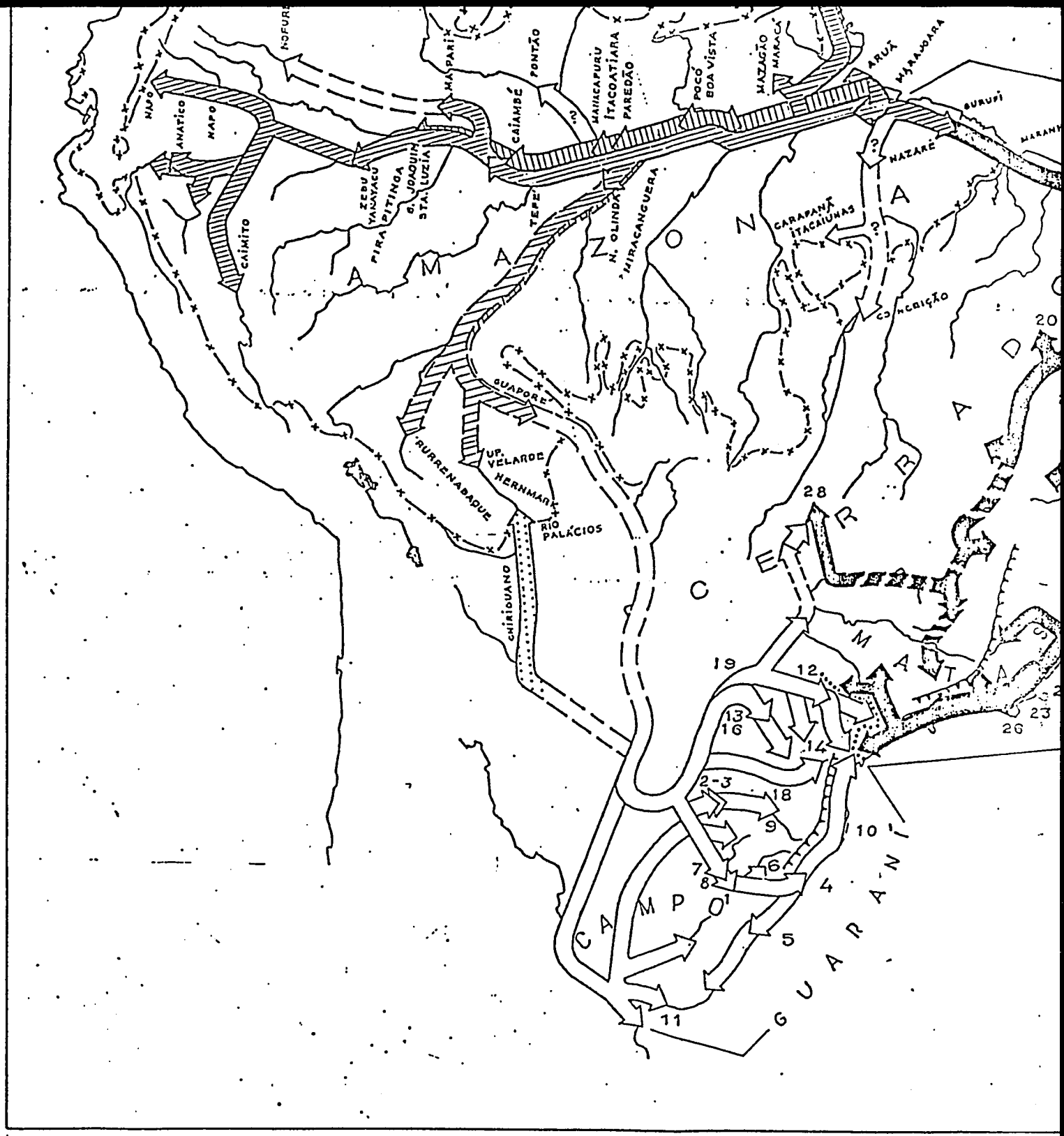

Figure 21. Map of the spread of the subtraditions of the Amazonian Polych
Vertically hachured arrow = Guarita Subtradition, horizontally hach
Miracanguera Subtradition, untextured arrows = Guarani Subtradition,
Tupinambá Subtradition, and stippled arrow = Chiriguano. Numbers rel
presented in Figures 15 and 17. Sites or site clusters within Amazon

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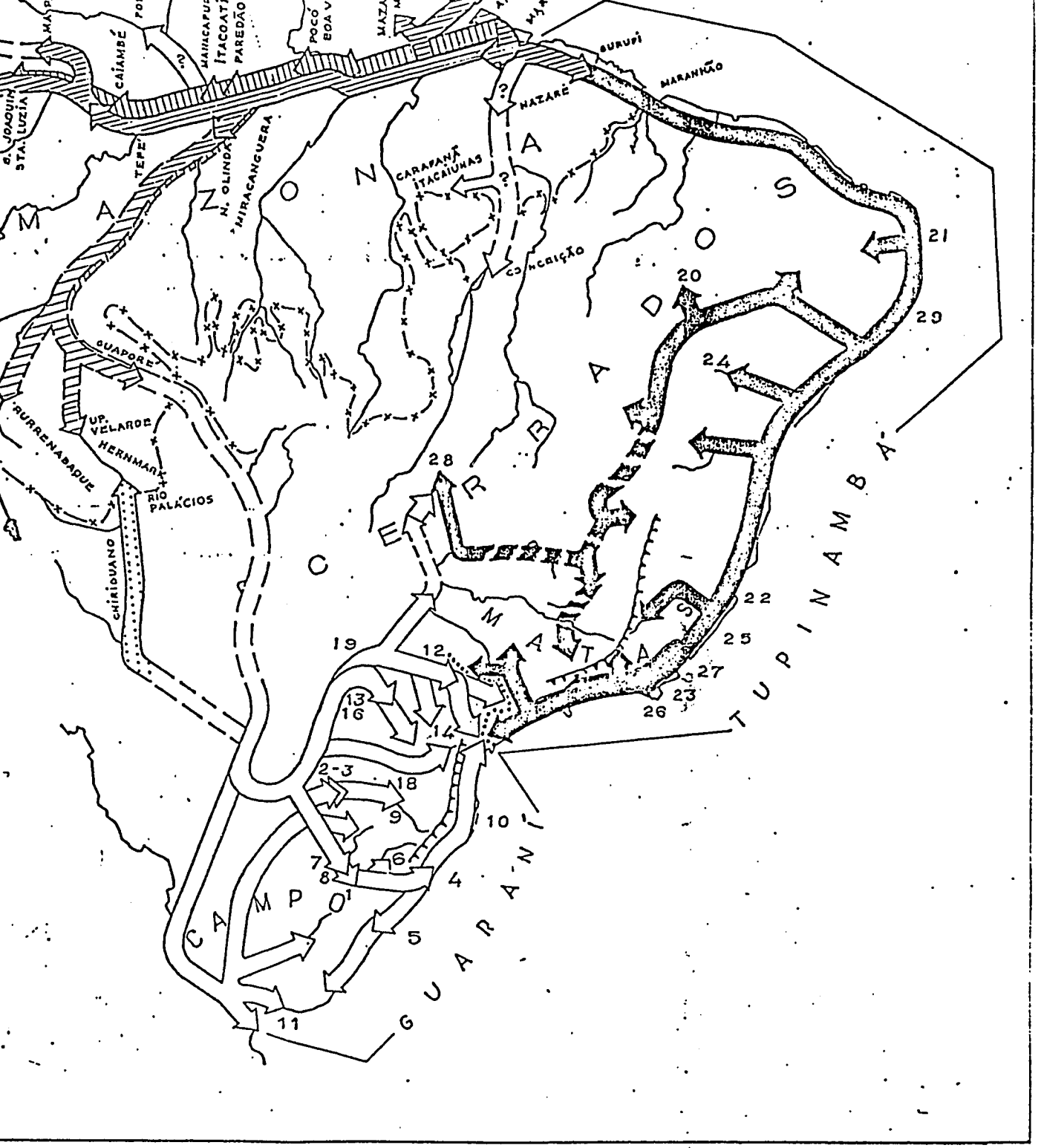

the spread of the subtraditions of the Amazonian Polychrome Tradition. ly hachured arrow = Guarita Subtradition, horizontally hachured arrows = guera Subtradition, untextured arrows = Guarani Subtradition, black arrows = á Subtradition, and stippled arrow = Chiriguano. Numbers relate to the data d in Figures 15 and 17. Sites or site clusters within Amazonia are labeled.

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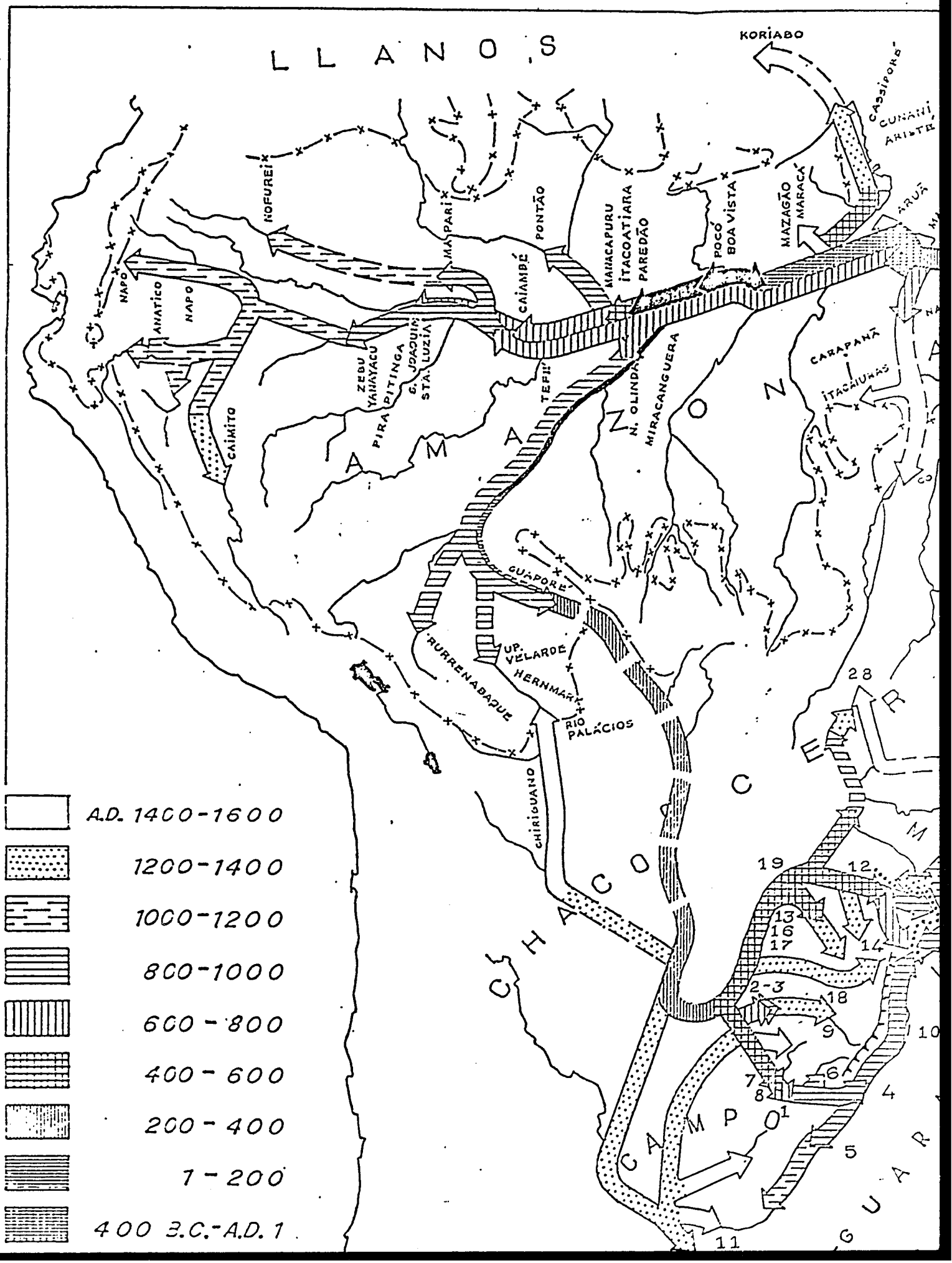

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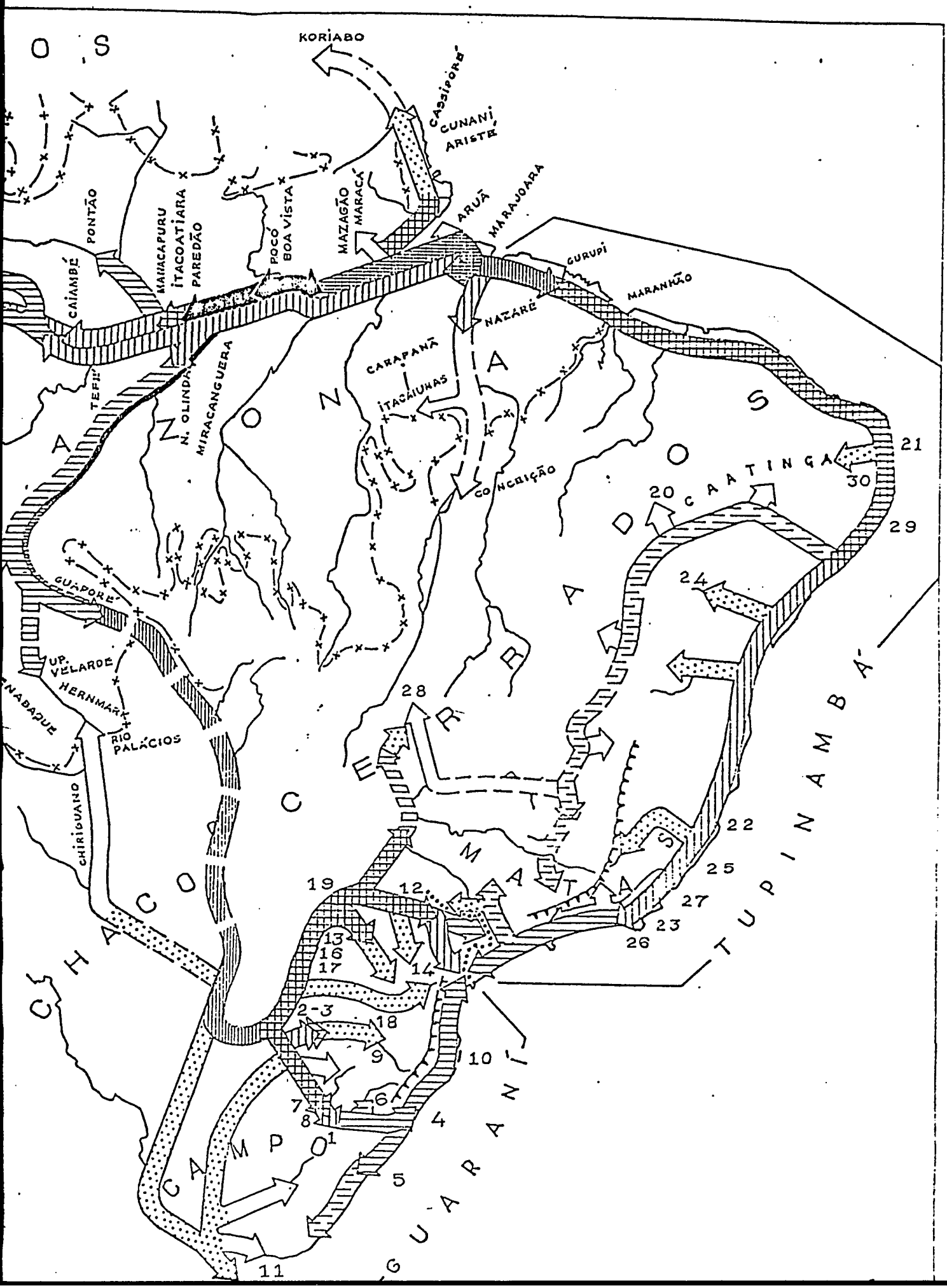

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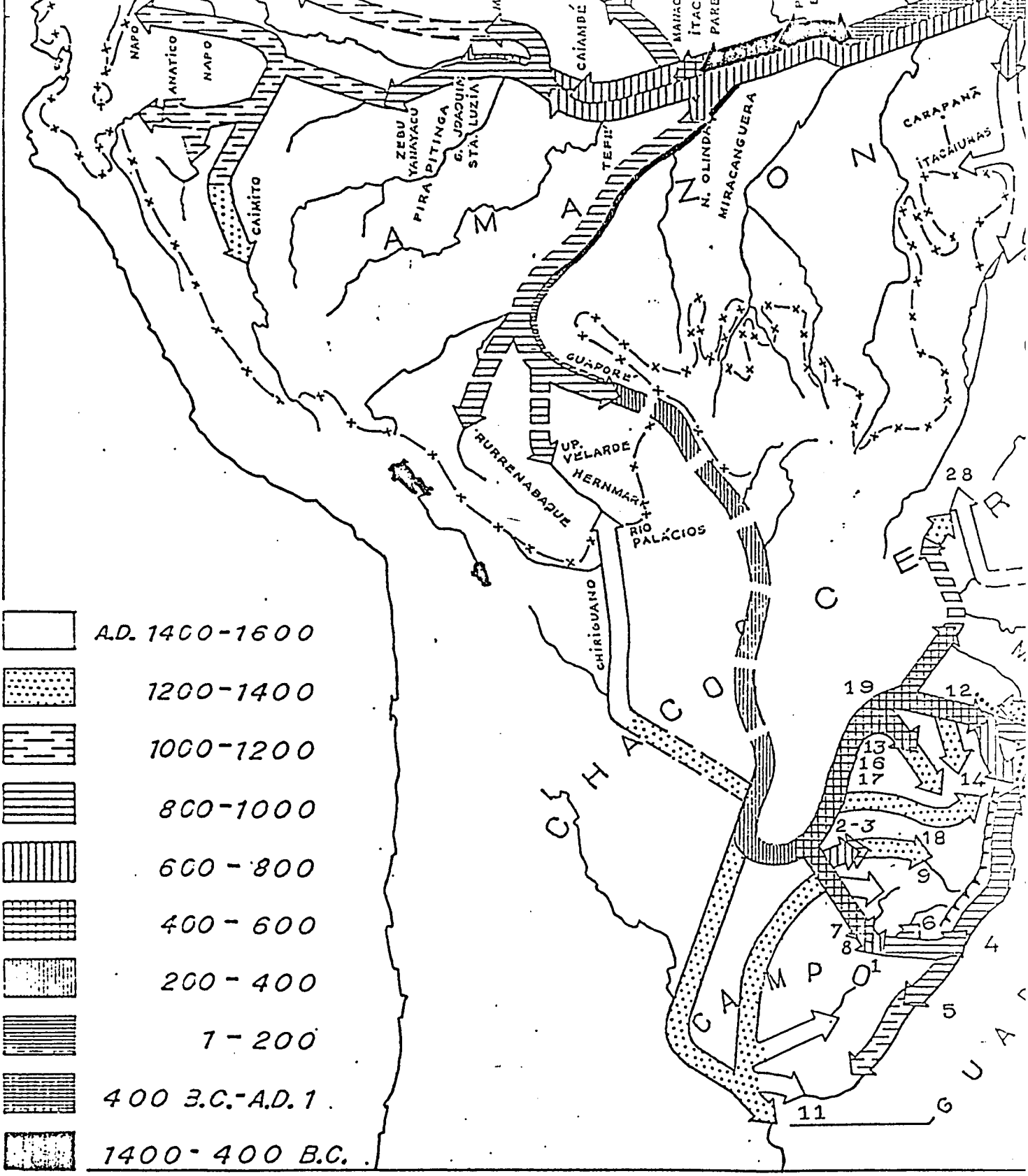

Figure 22. Compound map of the Tupinambá and Guarani (Stratum 2) colon
Amazonia. The numbers refer to dated sites or site clust
form in Figure 15 for the Guarani and in Figure 17 for the
sites or site clusters are mapped in Figure 13 and listed i

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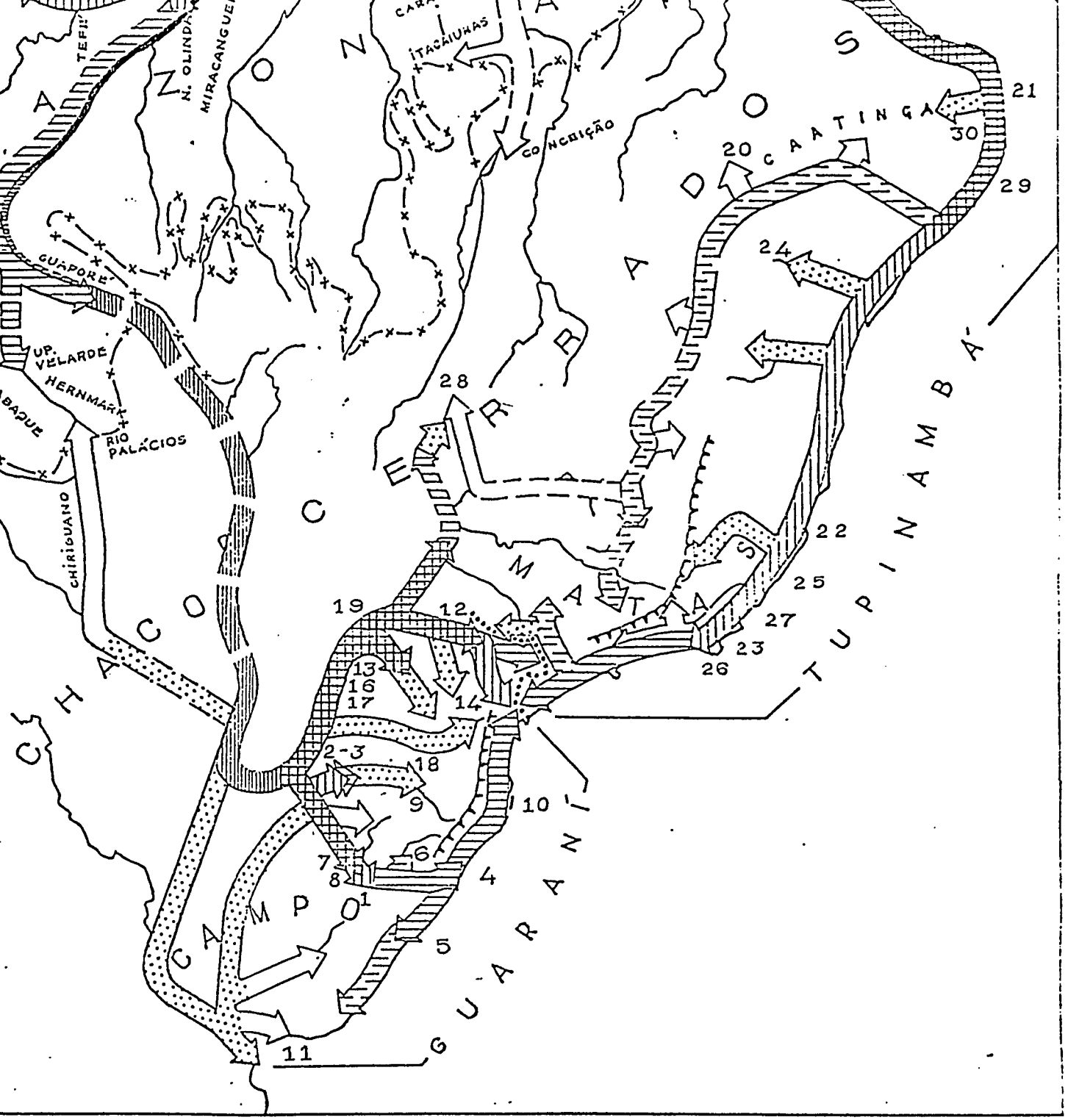

of the Tupinambá and Guarani (Stratum 2) colonization out of Central
he numbers refer to dated sites or site clusters presented in synoptic
e 15 for the Guarani and in Figure 17 for the Tupinambá. All known
clusters are mapped in Figure 13 and listed in Appendices 1 and 2.

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