SOCIAL CHANGE IN A REGION OF GRANADA, PACIFIC NICARAGUA (1000 B.C.-1522 A.D.)

by

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ABSTRACT

This is a study of sociopolitical change in a region of Granada in Pacific Nicaragua. Settlement patterns and their changes are reconstructed over a period of about 2500 years (1000-B.C.-1522 A.D). Systematic and opportunistic survey were carried on and a total of 37 sites were located. In addition, limited excavations were conducted at one of the principal centers of the region to outline the community pattern.

The sites belong to the four ceramic periods known in Pacific Nicaragua. During the Orosí (1000-500 B.C.) and Tempisque periods (500 B.C.-300 A.D.) the settlement system is composed by few small hamlets. There is no indication of sociopolitical centralization. In the Bagaces period (300-800 A.D.) the sites are larger and more numerous. The settlement pattern indicates the emergence of one central place and the intensification of the interaction with other Central American regions, especially with polities of eastern El Salvador and central Honduras.

Important changes are noted in the settlement pattern of the Sapoá (800-1350 A.D.) and Ometepel (1350-1522 A.D.) periods. These changes are associated to a series of migrations by Mesoamerican groups into Pacific Nicaragua.

The regional development in Granada is analyzed in terms of world-systems analysis. The local sociopolitical processes cannot be explained without taking into account

the impact of macreoregional dynamics.

ACKNOWLEDGMENTS

Most research endeavors are the result of the cooperation of many individuals. Certainly this dissertation is not an exception. I feel privileged for the support given by many colleagues and friends to this research. They contributed their energy and time, and were always willing to provide insights when required. To all of them I am deeply grateful. None of them, of course, is to blame for the shortcomings and limitations of this report, for which I take full responsibility.

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My colleagues of the Museo Nacional de Nicaragua Jorge Zambrana, Edgar Espinoza and Miriam Loaziga greatly contributed to the success of the research. Jorge and Edgar were always willing to share information about other archaeological projects carried on in Nicaragua, and provided insights on my own data. For Miriam a special thanks, not only was she a volunteer in the project, but at times other members of her family helped in laboratory work in Managua. Gerardo Berrios from the Museo Nacional was also part of the fieldwork team. Special recognition goes to Gerardo's father, don Gerardo, for adding some excitement in the last stages of the project. William Morales made the map of the Ayala site.

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It was difficult obtaining permission to conduct excavations at the Ayala site. I am very indebted to those land-owners that did not hesitate to let us conduct our research: Dr.Cesar Pérez Arevalo, don Ulises Ayala, Chico Reyes and his family, dona Marlene González y don William González muchas gracias. My workers Manuel Arguello, Carlos Gonzalez, Chico Reyes were very dedicated.

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This dissertation is dedicated to my family, especially to my father and my mother. Muchas gracias por su infinito cariño, apoyo y comprensión.

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Chapter 1

RESEARCH BACKGROUND

INTRODUCTION

During the past two decades archaeological research in Lower Central America has increased considerably (e.g. Lange and Abel-Vidor 1980a; Lange 1992a; Linares and Ranere 1980; Robinson 1987; Sheets and Mueller 1984; Urban and Schortman 1986; Joyce 1991; Vázquez 1994). Most of it has been regional in scope and directed at the resolution of problems that go beyond the construction of regional chronologies. Among other issues, the research has been guided by questions about the nature of sociopolitical change, the impact of interregional interaction in shaping sociopolitical processes; and the changing nature of the interaction between Mesoamerica and Lower Central America through time.

A growing concern among archaeologists is an understanding and explanation of the various forms and mechanism of change present in middle range societies. The descriptions of general formal similarities and universal evolutionary typologies are no longer satisfactory in the explanation of social change sought by most scholars (e.g. Blanton et al. 1981; Feinman and Neitzel 1984; McGuire 1983; Trinkaus 1987). The increasing body of archaeological and ethnohistorical data on Lower Central America has proven to be especially fruitful in the exploration of the variation of sociopolitical development in the area. It also has established differences in the development of complexity of Lower Central America, Mesoamerica, and other areas (Fowler 1991a, b, c; Haseman and Lara-Pinto 1993; Hoopes 1991; Lange et al. 1992; Lange 1992a).

This study is a diachronic reconstruction of changes in the sociopolitical structure taking place from approximately 1000 B.C. to A.D. 1522 in Granada, Pacific Nicaragua. It provides the first group of data collected specifically to address questions of sociopolitical organization in Pacific Nicaragua. It also explores the relation of sociopolitical changes with both internal and external factors, in order to determine to what extent the societies of this region were systematically linked to macroregional social systems.

RESEARCH PROBLEM

Nicaragua played a pivotal role in the routes of interaction between El Salvador, Honduras and Costa Rica at least from A.D. 500 to Contact. Nevertheless its archaeology remains largely unknown (Stone 1984; Lange et al. 1992). With some exception (e.g. Fletcher et al. 1994; Haberland 1992; Lange et al. 1992), previous research has been directed primarily towards the development of chronological sequences.

The main goal of the present study is to establish the chronology and mechanisms that propelled changes in the sociopolitical structure in Granada during the period under consideration. The way in which internal and external factors interacted and contributed to the emergence of social complexity, is of primary concern.

Specific objectives of this research include:

1. To refine the archaeological sequence of the region.

2. To determine the emergence and evolution of the settlement hierarchy of the region.

3. To determine the importance of long-distance trade between Granada and regions to the north and south, and to test the possible correlation between long-distance trade and increasing social complexity.

4. To establish the period of immigration of Mesoamerican groups into the region.

5. To evaluate the accuracy and usefulness of the ethnohistoric sources.

Although several scholars have previously dealt with the problem of reconstructing the sociopolitical structures of pre-Columbian Pacific Nicaragua (e.g. Chapman 1960; Fowler 1992; Lange et al. 1992; Stone 1966), they have relied heavily on the ethnohistorical sources of the sixteenth century.[1] These sources provide invaluable information, but they only describe the latter periods before Contact.

As already discussed, the ethnohistoric sources picture native societies organized as chiefdoms or even petty states (Abel-Vidor 1980a; Carmack 1992c; Fowler 1989; Newson 1987), but archaeologists disagree on whether or not archaeological data support such assessments (Healy 1980; Lange 1984; Lange et al. 1992; Salgado y Zambrana 1994). This disagreement is probably based on the limited archaeological research conducted in Pacific Nicaragua. This factor, evidently, has restricted or impeded the understanding of those societies.

The data presented here were obtained through a combined systematic and a purposive survey conducted to determine the changes in the settlement pattern and its relation to sociopolitical changes. Test excavations were carried out in different areas of the main settlement of the Bagaces period (A.D. 300-800), during which social complexity emerged. This excavations yielded data on production, long-distance trade and social organization.

This is the first archaeological study in Pacific Nicaragua designed to explain sociopolitical changes. It

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[1] Lange et al. (1992) use archaeological information to discuss the nature of pre-Columbian societies in Pacific Nicaragua. Nevertheless, their information comes from the very few stratigraphic excavations conducted at that point, as well as a rapid reconnaissance carried out by Lange, Sheets and Martinez (1984).

will add to the growing body of research directed to answer questions about issues such as: the nature of sociopolitical change in different regions of lower Central America; the impact of interregional interaction in the shaping of sociopolitical development; and the changing nature of the interaction between Mesoamerica and Lower Central America through time. It is my hope that this study contributes to promote the interest in a region of Central America that has largely been denied attention by archaeologists.

GEOGRAPHY OF THE REGION

Geology

Granada is located in the geological and physiographic province known as the Depression of Nicaragua (Valrey 1976). The Depression extends from the Cosigüina Peninsula in the north to the San Juan River in the south. The eastern and western boundaries run parallel to Lake Nicaragua and Lake Managua (Fig. 1.1).

Major geological structures mark the boundaries of the region. The Apoyo Lagoon is located in the west. The Mombacho volcano is situated in the southern boundary. Apoyo and Mombacho are part of the Alignment of the Maribios (Alineamiento de Los Maribios), that includes 14 other volcanic structures along Pacific Nicaragua. Minor volcanic structures such as the Posintepe, as well as the *calderas* of La Joya and La Granja are located to the south of the city

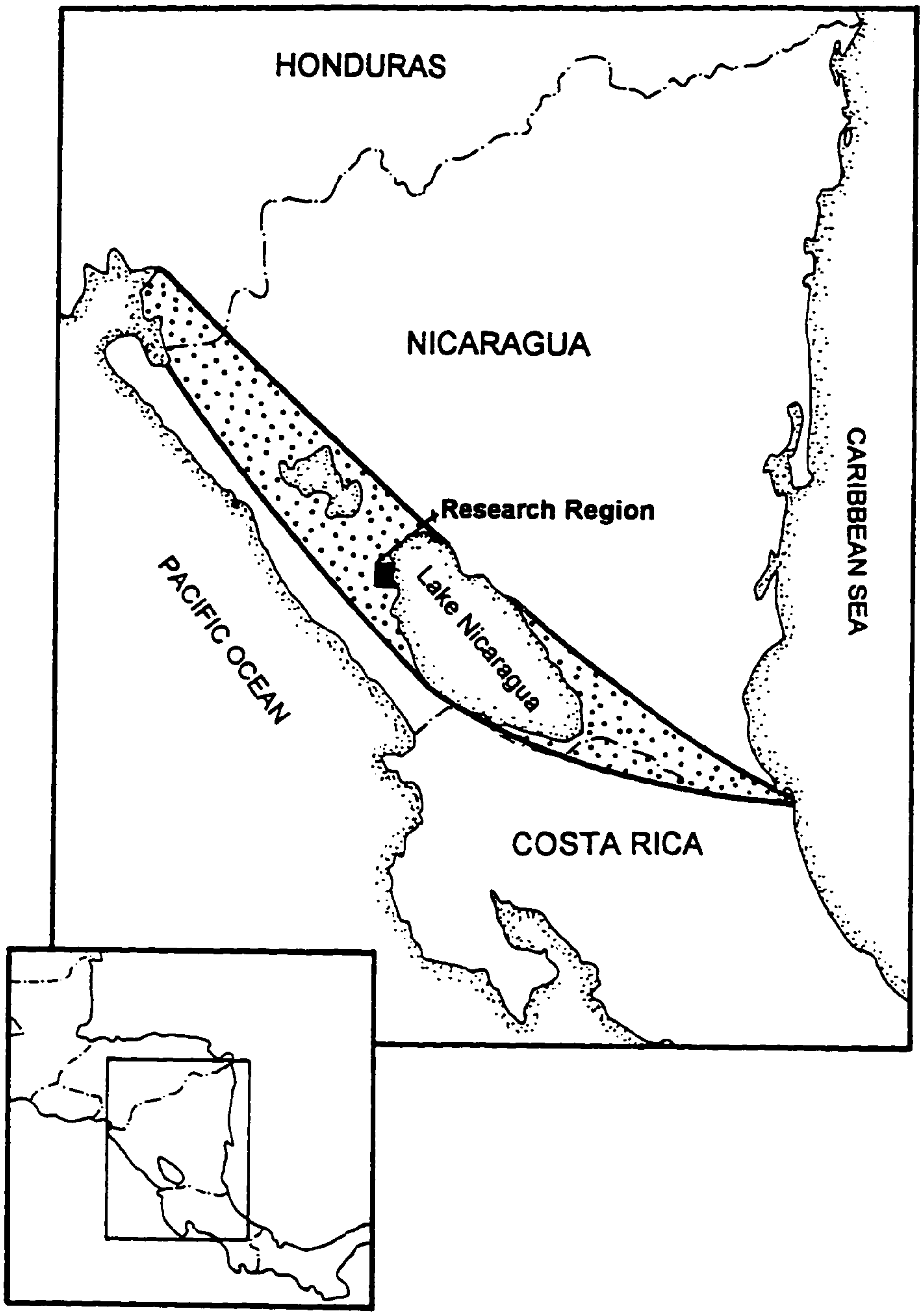

Figure 1.1 Geological province of the Depression of Nicaragua

of Granada (Fig. 1.2). The western coast of Lake Nicaragua serves as the eastern boundary.

The geology of the region is formed by pyroclastics and lava flows from the volcanic activity of the Mombacho, Apoyo and Posintepe during the Quaternary period (INMINE 1992) (Fig. 1.3). Basalts, andesites, dacites, and pumice rocks are common (Ferrey 1971). The former two were used in pre-Columbian times in the manufacture of most lithic artifacts. Although small obsidian nodules have reportedly been found in the Mombacho (Lic. Mario Zamora, personal communication 1992), their size makes them unsuitable for artifact manufacture (Fred Lange, personal communication 1994). Other resources are clay and kaolin deposits (INMINE 1992).

The soils in general are fertile, though there is some variation in their characteristics (Fig. 1.4). The volcanic soils surrounding Lake Nicaragua have a high content of clay, which facilitates retention of moisture and improves their agricultural potential (Lange 1984). From the survey, it is my impression that in the northeastern portion the soils show a high degree of erosion.[2]

No study has been conducted to document the tectonic and volcanic activity that could have impacted Granada in pre-Columbian times. Reportedly, eruptions from the Mombacho occurred in 1560 (Mooser et al. 1958) and 1850 (Crawford

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[2] In figure 1.4 the soils of the northern half are classified as TQ, MH, MC.

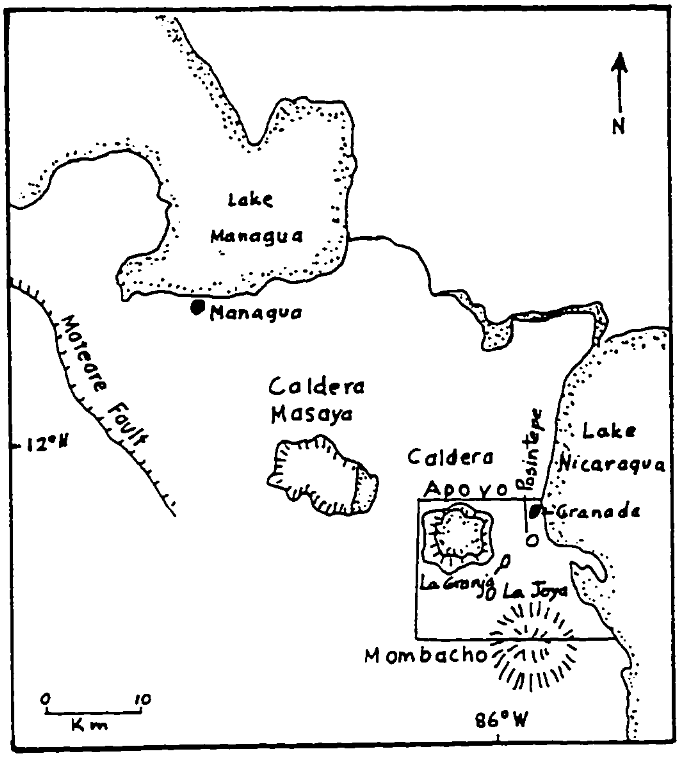
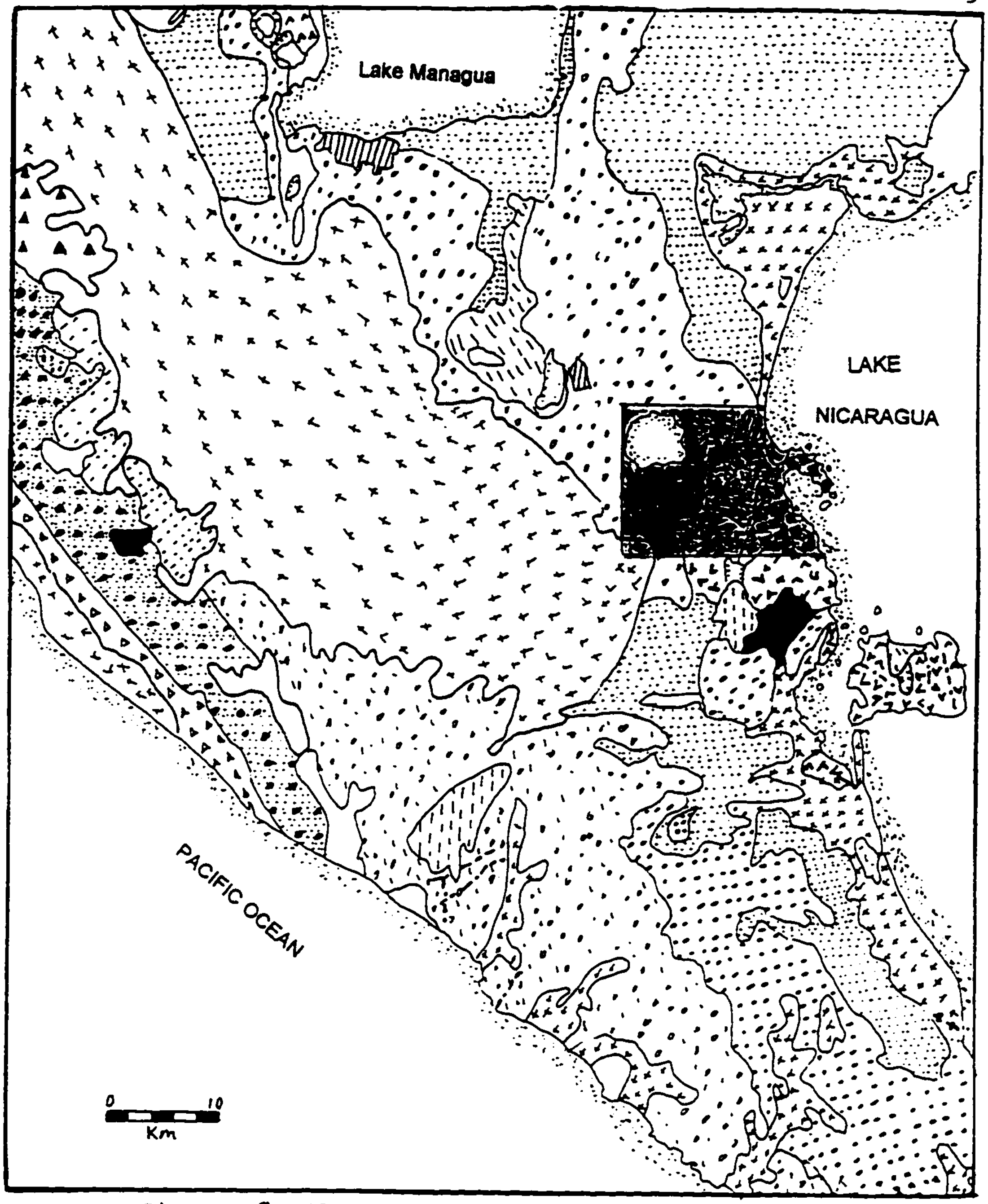


Figure 1.2 Geological structures of the research region



Las Sierras Group
Sedimentary rocks

Pyroclastic deposits

Volcanic avalanches

Pyroclastic deposits
and lava flows

Figure 1.3 Geological map of Pacific Nicaragua, shaded area indicates research region

Key

Entisols

EB Lithic Ustorthents

Vertisols

VA Typic Pellusterts

Inceptisols

IA Mollic Vitrandepts
IC Typic Durandepts
ID Typic Ustrandepts

Mollisols

MC Duria Argiustolls
ME Udic Haplustolls
MH Udic Argiustolls
MN Vertic Argiustolls
MA Lithic Argiudolls

Alfisols

A Uclic Argiustolls

Others

TQ Cliffs

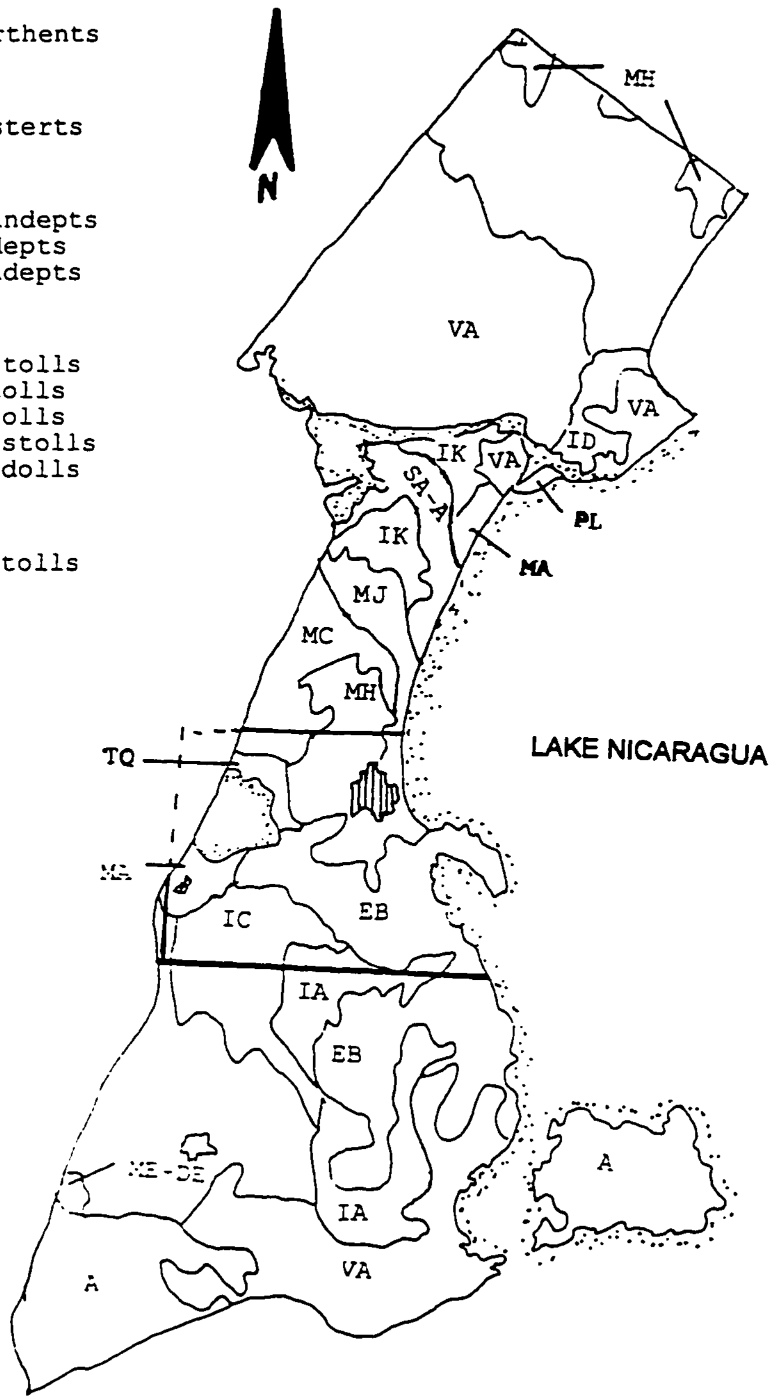


Figure 1.4 Map of soils in the research region

1902), though the accuracy of these reports has been questioned (Jaime Incer, cited by Atwood 1984:192; Atwood 1984). Incer (1991:139) mentions the collapse of the southern wall of the crater in 1570. This event triggered an avalanche that buried the Chorotega village of Mombacho.

A series of local active faults is known in the region (Fig. 1.3) (Incer 1973, INMINE 1992, Valrey 1976). In addition, the location of Granada within the geological Province of the Depression, exposes this region to major tectonic events happening in Pacific Nicaragua (Valrey 1976; Incer 1973; Lange et al. 1992).

Topography and Hydrology

In the Northeast the landscape is dominated by plains. To the south of the Apoyo Lagoon, the plains are broken by rolling hills less than 400 m in elevation. Apoyo has an approximate diameter of 5 km, and its sharp vertical walls reach 400 m over the water surface.

The southeastern landscape is defined by the Mombacho volcano and its slopes. The volcano has a maximum elevation of 1345 m, a basal diameter of about 7 km, and a crater rim of 1.5 km in diameter (Atwood 1984). The flanks of the crater rim are precipitous, frequently reaching a slope well over 100 percent.

Lake Nicaragua is a massive body of water with an area of 8,264 km^2 (Incer 1973). Alongside its coast, surrounding the Aseses Peninsula, there is an archipelago of around 350 islets, ranging from approximately 1 square kilometer to 1 hectare. The lake is connected to Lake Managua by the Tipitapa River, and drains to the Caribbean Sea via the San Juan River. Granada was one of the main ports of Nicaragua during the colonial period (Fonseca Corrales 1993). Trade items were imported and exported via Granada through the San Juan and the Atlantic. It is very likely the San Juan served as a route of travel and trade in pre-Columbian times (MacLeod 1973), as well.

The drainage system of the region is composed of seasonal streams that remain dry most of the year. Stream beds are filled when heavy precipitation occurs. The loose volcanic soil substrate quickly absorbs the water leaving little run off. It was noted during the course of the survey that a series of deep dry river beds were used as roads between communities. This was specially noticeable in the southwestern portion of the region. It is possible that in the past these beds were filled with permanent streams.

A small lagoon was located approximately 1 km south of Granada, in the caldera La Joya (Fig. 1.2). This lagoon, according to local informants, contained fish and other aquatic fauna thirty years ago. The lagoon dried up less than 5 years ago. Something similar could have happened in the past with the depression found in San Antonio (Fig. 1.2). The depression does not contain water on the surface, but is covered with evergreen vegetation. This seems to indicate the existence of an underground aquatic mantle.

Climate

The climate can be described, in general, as tropical dry (Incer 1973). There are, nevertheless, microregional differences due to variations in altitude, rainfall, relative humidity, and the influence of bodies of water like Lake Nicaragua.

A dry season unfolds from December to April, and a rainy season from May to November. Maximum periods of rainfall, in June and September, are separated by a short dry season or "veranillo" in July.

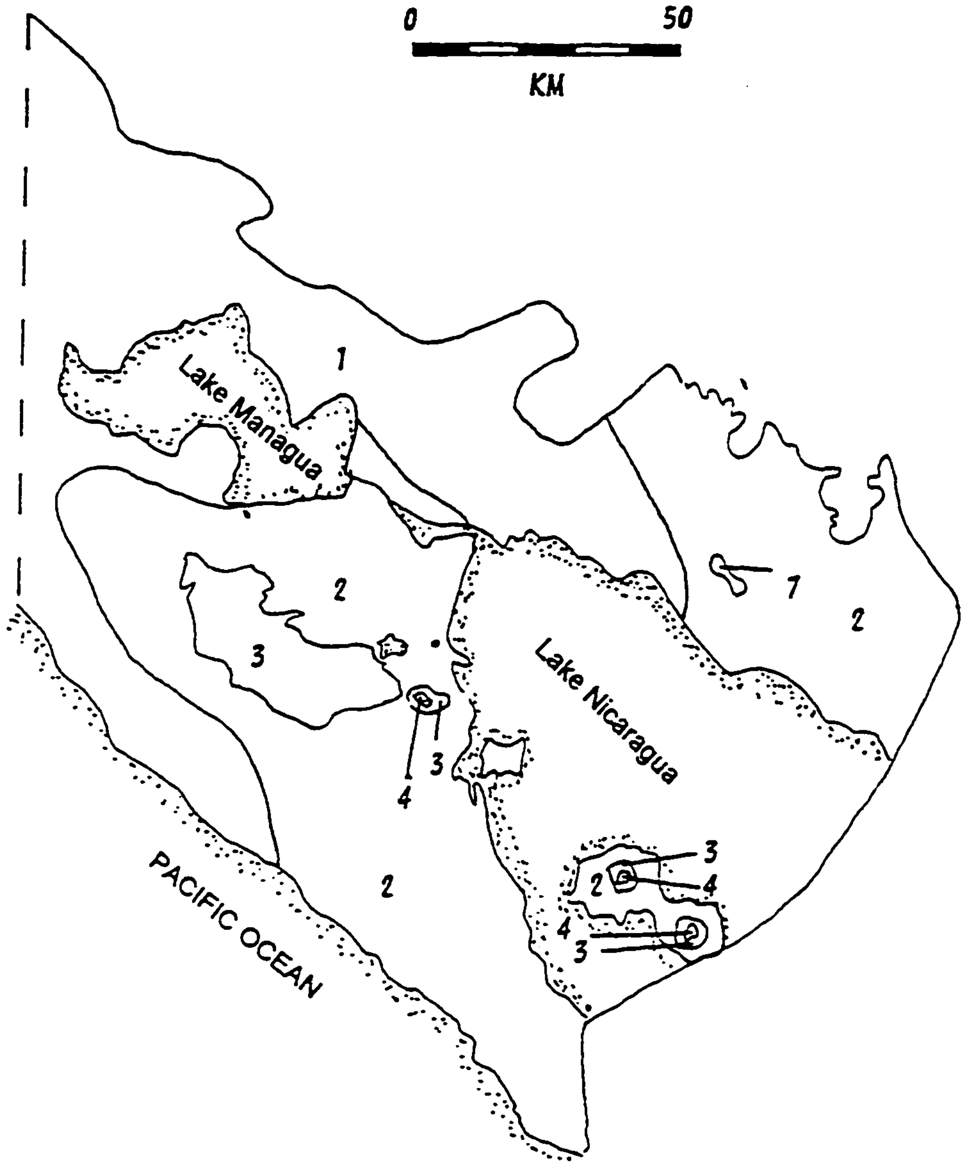
In the lower altitudinal zone, under 400-500 m, the temperature varies less than 5°C throughout the year (Marín Castillo 1990); the mean temperature ranges from 26 to 27°C. The vespertine breezes from the lake refresh the environment. Rainfall in this area is around 1,450mm (Marín Castillo 1990), and in the higher altitudinal zones it increases significantly, up to 2,000 mm (Incer 1973). From approximately 500 m to 1000 m the mean temperatures varies from 22 to 24°C. Higher than 1000 m the mean temperatures fall between 18 to 22°C. At the Mombacho's summit the temperature could drop to 7.5°C (Atwood 1984).

Vegetation and Fauna

Thousands of years of agricultural activity have badly damaged the natural vegetation. Only in the higher portion of the Mombacho can pristine vegetation be found, and this is already disturbed by coffee plantations (Artwood 1984). Reportedly (Ibarra 1994, 1995; Newson 1987), early ethnohistoric accounts picture Pacific Nicaragua with abundant game and heavier forestation than the present day (e.g. Fernández de Oviedo 1959:IV:423).

Three vegetation zones, corresponding to different altitudinal zones, are found in the region (Fig. 1.5). These zones vary according to differences in rainfall, temperature and relative humidity (Atwood 1984). Each zone poses constraints to the distribution of animals species, thus presenting an association of some unique forms of vegetation and fauna. The pre-Columbian population could have exploited all the zones to obtain diverse resources, including medicinal plants, materials for the manufacture of tools, for building dwellings, and food.

A "deciduous seasonal forest" which becomes leafless during the dry season is found under 400-500 m elevation. Only forested patches of the original vegetation are found in plains where savanna environment is dominant nowadays, though more extensive areas of forest are found in hilly terrains. It is in this zone where most of the agriculture is developed. Maize, beans, squash, and various vegetables



Key
1 Low- or medium-height decidious forest in warm, dry zones
2 Medium- or low-height semidecidious forest in warm, semihumid zones
3 Medium-height or tall evergreen forest in very cool, humid zones
4 Medium-height or tall evergreen forest in cool, humid zones
7 Medium- or tall-height semievergreen in cool, humid zones

Figure 1.5 Ecological zones in the research region are the major crops in small land-holdings. Ajonjolí, sorghum, coffee are planted mainly in large fincas. There is also some cattle ranching.

On the slopes of the Mombacho volcano, between 400-500 m and 900 m elevation, a cloud forest constitutes approximately 7% of the region's vegetation. Because of abundant precipitation this forest is evergreen, and generally has a lush vegetation with a complex aggregation of species that diminishes with altitude.

Over 900 m the elfin forest is characterized by an often beclouded dwarf forest, high winds, and canopy with few layers. Under this canopy there is a rich herbaceous stratum. The light intensity at the ground level is higher than that on the lower cloud forest. The elfin forest constitutes less than 2% of the vegetation.

Since both the pristine vegetation and fauna of the region has been badly decimated, it is possible that in pre-Columbian times a broader variation of species was found. Only paleobotanical and paleozoological studies will enable a better reconstruction of the past environment. Some of the most common species of the tropical dry forest are mentioned next.

Common trees of forested areas in Pacific Nicaragua include cortes amarillo (*Tabebuia chrysantha*), cenízaro (*Pithecellobium saman*), pochote (*Bombacopsis quinatum*), ceiba (*Ceiba pentandra*), laurel (*Cordia alliodora*), cedro

(*Cedrela mexicana*), roble (*Tabebuia pentaphylla*), quebracho (*Lysiloma Kellermani*) and guanacaste (*Enterolobium cyclocarpum*). Trees of avocado (*Persea americana*), jocote (*Spondias Purpurea*) and various members of the Sapotaceae family are also common.

Large mammals such as the white-tailed deer (*Odocoileus virginianus*) and the brocket deer (*Mazama americana*), the tapir (*Tapirus bairdii*), the peccary (*Tayassu tajacu*), the puma (*Felis concolor*), the jaguar (*Felis onca*) were also common. Arboreal mammals include the howler monkey (*Allouatta palliata*), the spider monkey (*Ateles geoffroyi*) and the two-toed sloth (*Choloepus hoffmanni*). Small mammals such as the rabbit (*Sylvilagus floridanus)*, the agouti (*Dasyprocta punctata*), the porcupine (*Coendu mexicana*), the paca (*Agouti paca*) "zorro cuatrojos" (*Philander opposum*), the armadillo (*Dasypus novemcintus*) were numerous. Reptiles like the "garrobo" (Tenosaura similis), a variety of small lizards, and serpents like the fer-de-lance (*Bothrops asper*), the "castellana" (*Bothrox ophryomegas*), the "cantil" (*Agkistrodon bilineatus*) and the coral (*Micrucus nigrocinctus*) are found in Pacific Nicaragua.

In Lake Nicaragua live numerous aquatic species (Incer 1973). Marine fish that reach the lake through the San Juan River include the sea bass (*Centropomus nigicens*), two species of sawfish (*Pristis perotteti* and *Pristis pectinatus*) and the "sábalo real" (*Tarpon atlanticus*). A shark species (*Carcharhinus leucas*) is well adapted to freshwater. Another large fish is the "gaspar" (*Lepisosteus tropicus*).

Several species of Cichlasoma inhabit the lake, including numerous types of "mojarra". Among the larger species of this family are the lake bass (*Cichlasoma managuensis*) and the "guapote lagunero" (*Cichlasoma dovii*). Other common fishes are sardines, and "barbudos" (*Rhamdis managuensis* and *Ramdis Barbata*). In the coast of the lake are found the mud turtle (*Kinosternon*), the pond turtle (*Chrysemys*) and the crocodile (*Crocodylus acutus*).

ETHNOHISTORY

Sources

The ethnohistoric sources of Pacific Nicaragua are limited, but provide clear evidence that, at time of the Contact, most groups had an historical linkage to the Mesoamerican world-system (Carmack 1993b, c; Ibarra 1994, 1995). The sources provide information on dense populations, the sociopolitical organization, the economy, ideology and ethnicity.

Especially relevant to archaeological studies are sixteenth century chronicles and administrative documents. They have been revised by Abel-Vidor (1980a, 1981, 1981, 1986, 1988), Arellana (1970), Ayon (1887), Bancroft (1882), Cuadra Cea (1953), Chapman (1960), Ferrero (1976), Fowler

(1989), Ibarra (1994, 1995), Incer (1990), Lehman (1920), León-Portilla (1972), Lothrop (1979 [1926]), Pérez Estrada (1970), Stone (1966), Werner (n.d.). My description of the ethnohistoric information derives from the work of these scholars.

Native Sources. Spanish chroniclers mention the existence of native pictorials in Pacific Nicaragua, which recorded important events, rites and land boundaries (Stone 1966:232-33; Fowler 1989:14-15). Unfortunately, if these books existed, they were lost or destroyed.

A carved wooden calendar board was reportedly given to the Creole historian Francisco de Fuentes y Guzmán by the Mercedarian friar Francisco Xiron (Fowler 1989:15). The board "allegedly had glyphs for ruler's names, tribute commodities, and aboriginal conquests." (Fowler 1989:16). The latter led W. Fowler to the conclusion that the board was manufactured in pre-Columbian times (Fowler 1989:16).

Spanish Sources. There are several primary sources for Nicaragua and only the principal ones are cited here. Gil González Dávila (1524a, b) and Andrés de Cereceda (1522, 1529) provided the first accounts on the people of Pacific Nicaragua. The former headed the first Spanish entrada in 1523, and the latter was the treasurer of the expedition. Gonzalo Fernández de Oviedo traveled in Nicaragua from 1527 to 1529. He made direct and very valuable ethnographic observations of the native populations and its environment, which were published in his "*Historia general y natural de la indias*."[3]

Oviedo published information collected by Fray Francisco de Bobadilla in 1528. The latter was commissioned by Pedrarias de Avila to investigate the religious beliefs of the natives, and produced an important source on Nicarao beliefs. This source that has been extensively analyzed by León-Portilla (1972).[4]

An important source are the "Tasaciones de los nacturales de las provincias de Guathemala y Nicaragua y Yucatan...",[5] of which the information on Nicaragua has been analyzed by Stanislawski (1983). This document is based on a

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[3] Abel-Vidor (1988) provides biographical data on Fernández de Oviedo, who in 1932 became official chronicler of the Indies. He lived in the Americas from 1514 to 1557, returning to Spain on several occasions for short periods of time. His *Historia General y Natural de las Indias* "encompasses the events of the Spanish involvement there [New World] from 1492 to 1549" (Abel Vidor 1988:263). Information contained in this work was obtained directly by Oviedo during his stay at Santa Marta, Cartagena, Nicaragua and Castilla del Oro. He also includes information on South America, New Spain and Florida, based on the accounts and documents of others who lived or traveled there (Abel-Vidor: 264). His work on Nicaragua has been published in Oviedo (1976).

[4] Bobadilla's information also covers burial practices, marriage customs, warfare, slavery, etc. (Abel-Vidor 1988: 284).

[5] The complete citation is "Tasaciones de los nacturales de las prouincias de Guathemala y Nicaragua y Yucatan; e pueblos de los enores presidentes e oidores del audencia y chancelleriadas de los confinnes." Archivo General de las Indias, Audiencia de Guatemala. Legajo 128. Cited in Stanislawski (1983:150). This is known in other sources as the Tasaciones de López de Cerrato (Fowler 1989).

tribute list made in 1548, and though the native economy had already been substantially affected by the colonization, it provides information about agricultural production, craft production, and possibilities of specialization among regions. This information could be useful to reconstruct some of these patterns in pre-Columbian times.

The works of Torquemada, Herrera, López de Gómara, y de Benavente (Motolinía) are important secondary sources[6] (Abel-Vidor 1988; Ibarra 1995; Fowler 1989; León-Portilla 1972).

Migrations

At Contact, three Mesoamerican groups inhabited Pacific Nicaragua. The Chorotega inhabited most of Northwestern Costa Rica and Pacific Nicaragua, as well as a zone of the province of Choluteca in southern Honduras (Fig. 1.6). The Nicarao settled both in the northernmost and southernmost regions of Pacific Nicaragua, the area between Chinandega and the Cosigüina Peninsula, and the Isthmus of Rivas respectively (Fowler 1989:67). The Maribios (or Subtiaba) settled in León, neighboring the Nicaraos in the north (Fig. 1.6).

Data on the migratory events of these Mesoamerican groups were recorded by Bobadilla, Fernández de Oviedo,

[6] Incer mentions that both Torquemada and Motolinia visited Nicaragua (Incer 1990:150).

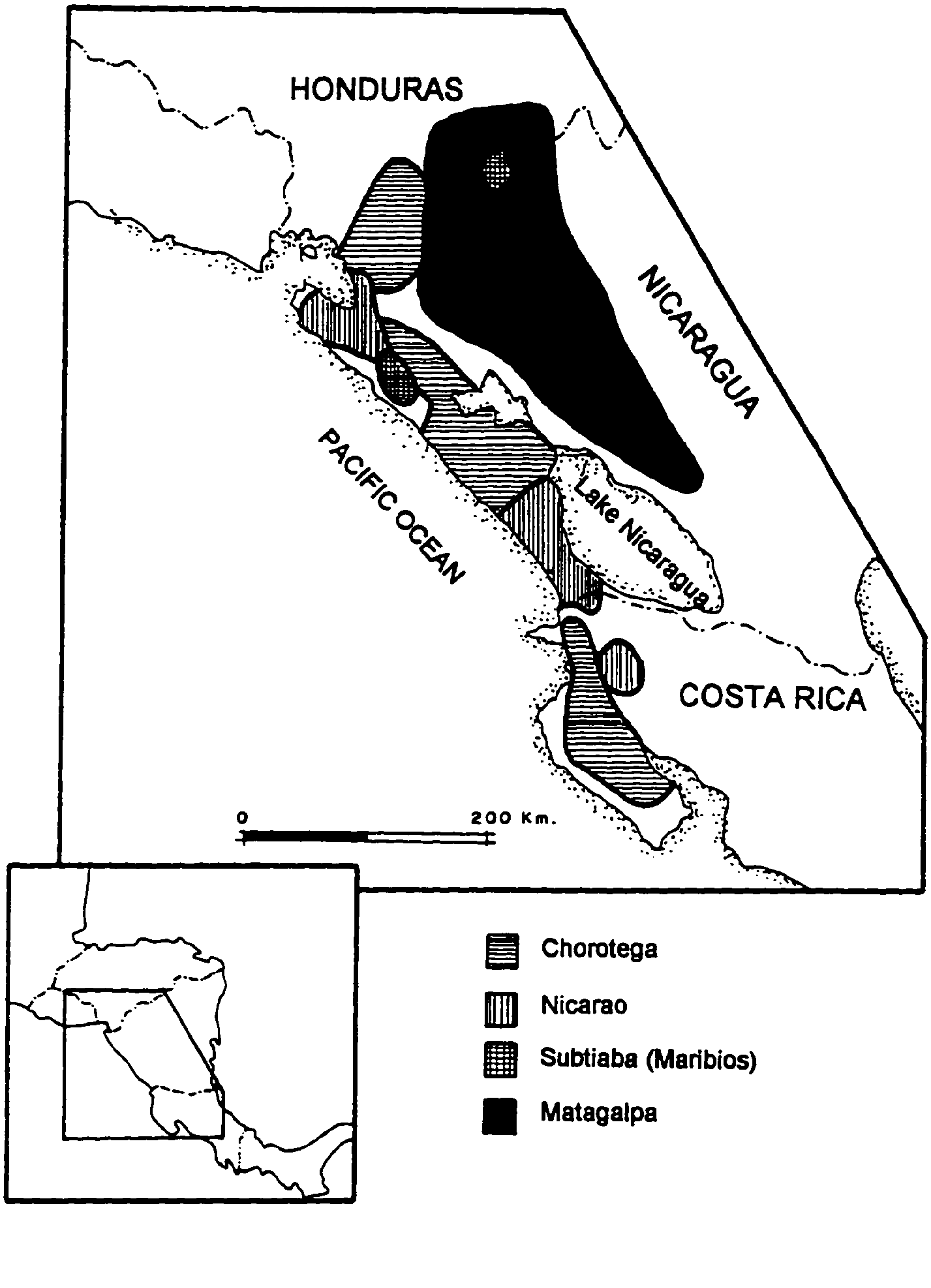

Figure 1.6 Ethnic groups in Pacific Nicaragua at Contact

Motolinía and Torquemada.[7] The accounts of these migrations are confusing and must be critically examined. But as argued by Abel-Vidor (1980:162), the most critical elements of these accounts persistently relate the presence of several ethnic groups in Nicaragua and Nicoya to migrations from Mexico.[8]

Bobadilla collected information on oral tradition about the migration of the Nicarao from their homeland from nobles, priests and elders. Bobadilla's account is the only material with a clear source that we have today. According to these Nicaraos, they were not native to Nicaragua, but had migrated from a homeland called Ticomega and Maguatega at a time which they did not remember (Fernández de Oviedo 1851-55:pt.3, bk. 4, ch. 2, p. 45; cited by Fowler 1989:32). Lehmann (1920) reportedly found information in a document about two towns near Cholula called Ticoman and Maguatega. He relates them to those mentioned by the Nicaraos.[9]

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[7] The information recorded by Motolínia in Nicaragua was included by Fernández de Oviedo in his "Historia General de las Indias, Islas y Tierra Firme del Mar Oceano."

[8] León-Portilla (1972:25) also points out about the variety of Spanish sources where it is stated that the inhabitants of Nicaragua spoke the same language of México, or nahua.

[9] Fowler (1989:32) states that Lehmann's "...identification seems linguistically weak." Nevertheless, León-Portilla (1972:32) points out that Lothrop found stylistic relationships between pottery of Pacific Nicaragua and Cholula. He also states that most accounts related to the Pipil-Nicarao migration contain information placing their homeland in Central Mexico.

The most detailed and frequently cited account of the Pipil-Nicarao migration was published by Torquemada. The source of the account cannot be determined, but most likely is derived from Motolinía's work (Abel-Vidor 1980a:162; Fowler 1989:24). Torquemada (1969 [1615], Vol. 1. pp. 331-333 cited by Campbell 1988:277-279) details the migration and its causes as follows:

> "...dicen, que los Indios de Nicaragua, y los de Nicoya (que por otro Nombre, se dicen Mangnes) [sic] antiguamente tuvieron su Habitacion en el Despoblado de Xoconochco [Soconusco], que es en la Governacion de Mexico. Los de Nicoya, descienden de los Chololtecas. Moraran àcia la Sierra, la Tierra adentro; y los Nicaraguas, que son de la Anahuac, Mexicanos, habitaban àcia la Costa del Mar del Sur. La vna, y la otra era mui gran multitud de Gente:decen que avrà siete, ù ocho edades, ùvidas de Viejos, y estos que vivian larga vida, hasta venir à ser mui Ancianos, que vivian tanto, que de Viejos los sacaban al Sol.
>
> En aquel tiempo vino sobre ellos, vn grande Exercito de Gente, se decian, Olmecas. Estos dicen, que viniron de àcia Mexico. y que antiguamente avian sido Capitales Enemigos de aquellos, que estabn poblados, en el Despoblado, que aora es entre Xoconohco [Soconusco], y Tehuantepec. Estos Olmecas, dieron Guerra, vencieron, y sujetaron a los Naturales, y pusieronles grandes Tributos,....
>
> ...demandaron Consejo á sus Alfaquies, que les dixesen, qué debian hacer, que yá no podian sufrir tan Tiranos Tributos...dixeron:Que se apercibiesen para que todos en vn dia, lo mas secreto, que pudiesen, levantasen sus mas secreto, que pudiesen, levantasen sus Mugeres, y Niños, y sus Haciendas, y se fuesen adelante, y dexasen aquella Tierra...salieron de aquella Tierra, que antes avian morado, con grande contetamiento, y gusto.
>
> ...Pasaron por la Tierra de Quautemallan, y anduvieron cerca de cien Leguas adelante. Allegaron à vna Provincia, que los Españoles llaman la Cholulteca, ò Choroteca.... Esta Generacion vino por la Costa del Mar del Sur, y pasaron por Tierra de Quahtemallan [Guatemala], entre los naturales de aquella Tierra. Estos adonde veian algun buen Asiento, para poblar, poblaban, y de esta Generacion, son los que en la Nacion de Guahtemallan, llaman Pipiles, que como los

Pueblos, que llaman los Ecalcos [Izalco], que es la maior, y mejor Huerta, y mas abundante, y rica de Cacao, y Algodon, que ai en toda la Nueva-España, aunque entre dentro, toda la Governacion de Quauhtemallan. El Pueblo de Mictlan [Mitla], y el de Yzcuintlan [Escuintla], y otros algunos, dexaron poblados aquellos Indios, que pasaron adelante.
Tambien Se dice, que de esta Generacion de Indios, fueron algunos de ellos atravesando, y aportaron à la Mar del Norte, y cerca del Desaguadero, está vn Pueblo de ellos, y hablan en Lenga [sic] Mexicana, no tan corruta, como estotra de los Pipiles...."[10]

Most scholars consider this account to be accurate (e.g. Jiménez Moreno 1966, Incer 1985; Fowler 1989, León-Portilla 1972).[11] Nevertheless, some think that it collapses data of a number of migrations (Incer 1985:366-367; Lehmann 1920:1006; Lothrop 1979 [1926]:7), and Fowler thinks it most likely refers to just one event that documents a "...late prehispanic migration that carried Nahua speakers into Guatemala, El Salvador, and Nicaragua." (Fowler 1989:36). Fowler clarifies that earlier migrations of Mesoamerican groups could have taken place. However the archaeological evidence from El Salvador suggests that no Nahua group was established there before the Early Postclassic (A.D. 900-

[10] This account has been translated to English by Fowler (1989:34-35).

[11] Contrary to other researchers, Abel-Vidor thinks that Torquemada's account "...reveals details that strongly suggest that it is a politicized version incorporating post-Conquest events as well as prehispanic legend." (Abel-Vidor 1980a:162). This author states that "...The number of migrations, their specific routes, and their placement in the prehistoric chronology remain highly problematic issues of major importance to the interpretation of the archaeological sequence in the area." (Abel-Vidor 1980a:162)

1200), when the "...Pipil gained control of a number of regions...that had been previously occupied and controlled by Chorti Maya or their allies"[12] (Fowler 1989:42). Other migration of Nahua groups could had taken place during the Late Postclassic (A.D. 1200-1524), though there is no strong archaeological evidence in El Salvador to support this (Fowler 1989:46-49).

Linguistic evidence supports Torquemada's assertion that the Chorotega left the region of Soconusco for Pacific Nicaragua before the Nahua (Chapman 1960:76). It is estimated that the homeland of the Chiapanec-Mangue was located in the valley of Puebla (Hopkins 1984:52; Kaufman 1990).[13] From there they migrated to highland Chiapas, the Chorotega Mangues extended their movement to Pacific Nicaragua (Hopkins 1984:52; Navarrete 1966:6).[14] The glottochronology of the Chiapanec-Mangue split is A.D. 600-700 (Campbell 1988:268; Constenla 1994:200; Kaufman

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[12] Among the regions where these migrations have been identified are the Chalchuapa valley, the Paraíso Basin, and the San Lorenzo region (Fowler 1989:42).

[13] Kaufman (1990:97) affirms that "...Given that the Mangues were also known as Chorotegas (Nahua /cholol-te:ka-h/ 'people from /cholol-la:n/ is Cholula) it seems feasible to locate the Manguean homeland in the valley of Puebla, whose main center was Cholula."

[14] Hopkins states "...that pre-Chiapanec Mangue occupied the valley of Puebla, but with increasing pressure from Central Mexico at the end of the Classic the Chiapanec-Mangue population moved in southward migration to Chiapas and Central America. Any remnant Chiapanec-Mangue population which stayed behind in the Puebla area was later absorbed or eliminated by intrusive Nahuatl speakers" (Hopkins 1984:52).

1974:49). The Pipil-Nicarao presumably inhabited Veracruz before migrating to coastal Soconusco and later on to Central America (Campbell 1988:280, Jiménez Moreno 1966:65). The date of the Pipil split from other Nahua is about A.D. 800-900. Jiménez Moreno (1966) provides a lengthy discussion of the disintegration and expansion of a series of Mesoamerican states during the Classic and Postclassic, events that he links to Nahua migrations to Central America.

Constenla (1994) sustains that important linguistic differences exist between the Pipil of El Salvador and the Nicarao[15]. Contrary to Fowler's thinking, these differences suggest that the Nicarao migration took place around A.D. 1200, and that it was independent from the pipil migration to El Salvador. The Nicarao, according to Constenla, have closer proximity to nuclear varieties of Nahua than the Pipil (Constenla 1994:204). He offers two hypotheses to explain linguistic differences between the Pipil and the Nicarao: 1) the Nicarao derived from the Nonohualco Pipiles and maintained their linguistic characteristics, while the Nonohualco Pipiles linguistically assimilated after arrival to El Salvador to an earlier established Nahua population, or 2) the Nicarao arrived later by sea to Nicaragua, as suggested by an account of a migration recorded by Motolinía

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[15] A full discussion of these differences is found in Constenla (1984:203-204).

(1917).[16] Fowler (1989:33) thinks that this account probably refers to the migration of the Subtiaba from the tlapanec region in México around A.D. 1200 (Swadesh 1967:97; Kaufman 1974:49).[17]

Published archaeological data from Nicaragua sheds little light on the arrival of Mesoamerican groups. Some authors relate the emergence of certain ceramic types after A.D. 800 to the arrival of the Chorotega and Nicarao (e.g. Day 1984; Healy 1980; Stone 1982). The development of an obsidian core-blade technology has also been associated with these events (Lange et al. 1992). I will discuss in Chapter 7 the information recovered in my study that could be related to the Mesoamericans' arrival.

It is not clear which groups settled Pacific Nicaragua before the Mesoamericans. Some scholars think that they were

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[16] According to Motolínia "...en tiempos de una grande esterilidad, de necesidad compelidos, salió mucha gente de esta Nueva España y barrunto que fue en tiempo de aquella esterilidad de cuatro años de sequedad que no llovió, según paresce en la primera parte, capítulo veinte. En este tiempo por la mar del sur fue una gran flota de acales o barcas, y aportó y desembarcaron en Nicaragua, que dista de México más de trescientas y cincuentas leguas, y dieron guerra a los naturales que allí estaban poblados, y desbaratándolos, echáronlos de su señorio , y poblaron allí aquellos naturales descendientes de aquel viejo Iztacmixcóatl" (Motolinía 1903:12). Fowler (1989:33) offers a translation of this account. Abel-Vidor (1980a:162) states that "...none of these migration [those of the Mesoamerican people] took place by sea...because the artifactual evidence for such a dramatic event is entirely lacking."

[17] The Subtiaba is a Oto-manguean language (Rensh 1966, 1977; Suárez 1977; Kaufman 1990). In the account of Motolínia is stated that the people who migrated was of mexican language (nahua).

speakers of Matagalpa (Constenla 1994; Ibarra 1994), a language of the "misumalpense" stock (Constenla 1991, 1994; Lehmann 1910). Matagalpa toponimies are present in northern Pacific Nicaragua (Constenla 1994:195, 197). It is likely that the Indians called Chontales[18] by the sixteenth century's chroniclers were Matagalpas (Constenla 1994:195).

At Contact the Matagalpa occupied present day departments of Chontales, Boaco, Matagalpa, Jinotega, Esteli, the southwestern section of Nueva Segovia and the region of Honduras neighboring the latter (Ibarra 1994:229) (Fig. 1.6). All these departments are located in Central Nicaragua, bordering the Pacific region. The Matagalpa, who were organized as chiefdoms, reportedly fought with the Nicarao (Pérez Valle 1976:58, cited by Ibarra 1994:236), but also traded with them. Ibarra (1994:242), suggest that the Chorotega and the Nicarao obtained their goldwork by trade with the Matagalpa, and/or by having craftsmen from that ethnic group living in their main towns (Ibarra 1994:242).[19]

Incer (1985:163, 1990:291) proposes that the "Misquitos" and the Sumus, people who also speak languages of the Misumulpan family, were the aboriginal inhabitants of

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[18] Chontal or chondal is one of the nahua terms use to refer to the "foreigners" or "barbarians" (Constela 1994:195).

[19] Ibarra argues that Nicarao and Chorotegas could have followed a tradition among some Mesoamerican groups of having craftsmen of other ethnic groups living in the main political and economic centers (Ibarra 1994:239).

southern Pacific Nicaragua. Oral tradition of the Sumus mentions that, along with the Misquitos, they were expelled by other ethnic groups from the Pacific region in the ninth century. They reportedly resettled in Chontales, east of Lake Nicaragua and latter on moved to the Caribbean region (Incer 1990:291).

A great deal of archaeological and ethnohistorical research will be needed to determine, if possible, the ethnic affiliation of the inhabitants of Pacific Nicaragua before the arrival of the Mesoamericans. This also applies to the arrival and settlement of the latter.

The Population of Pacific Nicaragua at Contact

Ethnohistoric information shows that the size and relative wealth of the Nicaraguan population on the Pacific side were impressive to the Spaniards. Abel-Vidor (1986) argues that this factor explains why the lakes region was directly colonized by the Spaniards.[20]

Population estimates for Pacific Nicaragua range from a minimum of 500,000 to over 2,000,000 (e.g. Newson 1987, Radell 1969, Stanislawski 1983). From 1528 to 1940 (MacLeod 1973:52; Radell 1967:68), massive numbers of Nicaraguan Indians were captured and sent as slaves to other provinces (particularly Peru) where mining was an important

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[20] Eugenia Ibarra (personal communication 1994) thinks that a main reason for the early colonization of the lakes region was the interest by the Spaniards finding an access route to the "Mar del Sur".

activity.[21] Bartolomé de Las Casas estimated that more than 500,000 native people were enslaved (Radell 1969, Abel-Vidor 1980a:165), while Fernández de Oviedo mentions more than 400,000 (Radell 1969, Abel-Vidor 1980a:166). Several scholars (MacLeod 1973; Radell 1976; Stanislawski 1983; Newson 1987) studying documentary sources of the early colonial period, estimate that from 200,000 to 500,000 native Nicaraguans were enslaved and exported in a period of about twenty years. The magnitude of this trade confirms the large size of the native population (Abel-Vidor 1986:67).

Sociopolitical Structure

The social structure of the Nicarao was described in more detail than that of the Chorotega. Nevertheless, it is clear that both groups were divided, at least, in three social strata: slaves, commoners, and nobles (Chapman 1960; Fowler 1989; Stone 1966). Though nobles generally inherited their status, commoners could achieve nobility by distinguishing themselves in the military field. Nobility was composed of rulers, priests, and military captains. Goldsmiths could have been part of the nobility among the Nicarao (Chapman 1960:40). Slaves were impoverished

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[21] This slave trade involved most Central America colonies with the exception of Costa Rica and Chiapas. Nicaragua was the main center of the slave trade (MacLeod 1973:50-51), which had a disastrous impact in the decline of native population. As early as 1535 reports to the Crown mention that one third of native Nicaraguan population had been slaved (MacLeod 1973:52).

commoners who had to sell themselves and/or their children to pay debts, consequently their status was not hereditary.[22]

The Nicarao had a highly stratified social systems headed by an hereditary chief called *teyte*, under whose authority were a number of *principales*. The cacique met with a council of noble elders (monexico) to consult and make decisions on matters of his domain. All politico-administrative positions were filled by nobles (Fowler 1989:201). Fowler (1989:202) states that the Nicaraos' social structure could be similar to that of the Quiche Maya, where segmentary patrilineal noble lineages were ranked in relation to each other.[23] Fowler states that a similar type of organization was characteristic of the Puebla-Tlaxcala region, from where the origin of the Nicaraos can be partially traced.

Chorotega chiefs did not hold a hereditary position. They were temporarily elected by a council of elders considered principales, who at the same time had been elected by their communities. Though one cannot establish a direct historical relation between the political organization of the Chorotega and the Chiapanecs at Contact, it is interesting to note that in the case of the latter,

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[22] Fowler (1989:198) argues that the majority of slaves among the Nicarao were prisoners of war.

[23] Carmack (1981) reconstruted in great detail the social organization of the Quiche Maya.

chiefs neither held absolute power nor had an hereditary position (Navarrete 1966:21-22). Priests were the most powerful among the Chiapanecs and every year they elected two captains to act as governors (Navarrete 1966:21-22).

The sociopolitical territories were defined as provinces. The provinces at the same time were divided into smaller jurisdictions. A province was headed by the chief and the smaller jurisdictions by the principales (Chapman 1960). Ibarra (1995) points out how in different regions of Lower Central America the Spanish system "encomienda" shows continuity with the territorial organization of native populations, therefore, reflecting somehow the political and economic organization of these groups. The continuities of certain aspects of the pre-Columbian sociopolitical organization, into the colonial and even republican sociopolitical institutions, has been also documented in other regions such as Central Mexico (Carrasco 1961; Gibson 1964; Lockhart 1991) and the Guatemala Highlands (Carmack 1995).

In Costa Rica the "cédulas de encomienda" of 1569 cite the following units: "provincia, pueblo, barrio, estancia." In some regions of Honduras, between 1547 and 1560, the "cédulas" mention the "provincia, pueblo, asiento y barrio." In Nicaragua, according to documents of 1537, the "encomienda" system, was defined by "provincia, pueblo, galpón, plaza and plazeta".[24] "Galpones, plazas and plazuelas" were units characteristic of the Mesoamerican people in Nicaragua, since these terms are not mentioned in other regions of Lower Central America, with the exception of the isles of the Gulf of Fonseca (Ibarra 1995:43-47).

Main native villages were characterized by a central area where nobles' dwellings and public buildings, including temples, made of perishable materials, were located around a plaza. Larger villages had more than one plaza. Noble dwellings and temples were built on mounds. From the center dwellings were scattered over kilometers. The population ranged from hundreds in small villages to up to 26,000 in larger settlements formed by a string of villages (Chapman 1960; Fowler 1989:133). The settlements were located 15-30 kilometers from each other (Chapman 1960).

Economy

The economic base was founded in agricultural production, and some scholars think that the carrying capacity of the land in Pacific Nicaragua was never fully exploited (Abel-Vidor 1980a, 1986; Stanilawski 1983:11). Maize agriculture in Nicaragua yielded two crops a year. Other important crops were several types of beans, manioc,

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[24] Ibarra mentions that in the Spanish documents "provincia" is written in two manners. When it is a sociopolitical territory defined by the Spaniars it is capitalized, and when it is a native unit it is not capitalized.

sweet potatoes, cotton, maguey, cabuya and different types of vegetables like calabashes and peppers. Fruit trees such as jocote, zapote, guava, anona and avocado were common. Nísperos (*Sapota Zapotilla Coville*) were grown only by the Chorotega, while cacao was grown by the Nicarao (Stone 1966:218-219). Turkeys and mute dogs were the only domesticated animals (Newson 1987:54).

Among the Chorotega, individuals could own land but not sell it; they could only give it or will it to relatives (Newson 1987:50; Stone 1966). Control over land was exercised by the cacique among the Nicarao; he assigned land to the heads of lineages who gave land rights to the members of the lineage (Fowler 1989:201). Commoners paid tribute to nobles both in labor, military service and products (Fowler 1989:190). There were at least part-time specialists in the production of woven textiles, pottery, goldwork, and other items (Abel-Vidor 1986; Fowler 1989:152; Stanilawski 1983).

The institution of the market was important in Pacific Nicaragua. Every major town had a market plaza regulated by a supreme authority named by the rulers. Currency, in the form of cacao beans, was common in the transactions. These were made by women, and only local virgin males and male allies were allowed to enter the market. Slaves, gold, cloth, fish, game and agricultural products were sold.

There is some indication of regional production differences in the Tasaciones of 1948 analized by

Stalinawski (1983). Relative higher quantities of cacao, alpargatas, henequen, fruit, dried fish, beeswax, salt, hammocks and skirts were paid in tribute in the juridistion of Granada. In León, agricultural products like maize, beans, cotton, as well as woven clothes, were paid in a higher average to encomenderos. These differences may be related to higher soil fertility in the region of León, while soils of a lesser quality could explain the greater importance of gathered items and crafts in Granada. These differences, which very likely have their roots in pre-Columbian times, could have had an impact on the functioning of markets.

Though there are only few references to long-distance trade activities in the ethnohistoric accounts, Ibarra (1995) argues that the Mesoamerican people in Nicaragua settled in regions that facilitated the control of native long-distance trade routes. Obsidian was imported to Pacific Nicaragua from northern sources during the last periods of the pre-Columbian sequence.

Other Cultural Aspects

There is a series of cultural customs and beliefs mentioned in ethnohistorical sources. Among these are descriptions of rituals associated with harvest, marriage, death; descriptions of personal adornment and clothes, games, crime and justice, warfare practices, medical practices, and religious beliefs. The latter, in the case of the Nicarao, shows a close proximity to those of Nahua groups of Central Mexico.

Indeed, the principal deities of the Nicarao pantheon have their parallel among the pantheon of Nahua from Central Mexico. The same can be said of a number of minor deities (León-Portilla 1973). The calendric system, defined by 18 months of 20 days each was also shared, including the names of the days. The Chorotega probably used the same calendric system (Stone 1966:233). The existence of human sacrifice and the beliefs related to life's aftermath were also comparable between people of Nicaragua and Central Mexico.

Institutions related to the sociopolitical organization, to economics, to religion, as well as to the languages spoken in Pacific Nicaragua clearly show the maintenance of Mesoamerican practices among these people at Contact.

Granada in the Ethnohistoric Sources

Gil González visited the indigenous province of Denocherri (Radell 1969:57) (Fig. 1.7), considered Chorotega by several scholars (Lothrop 1979 [1926]:26; Chapman 1960:90; Incer 1990:52-53). The main town was Xalteva, located where the city of Granada lies today. Diria and Diriomo were other important towns of Denocherri (Incer 1990).

In Denocherri the Spaniards were visited by several neighboring "caciques"; among them a cacique called

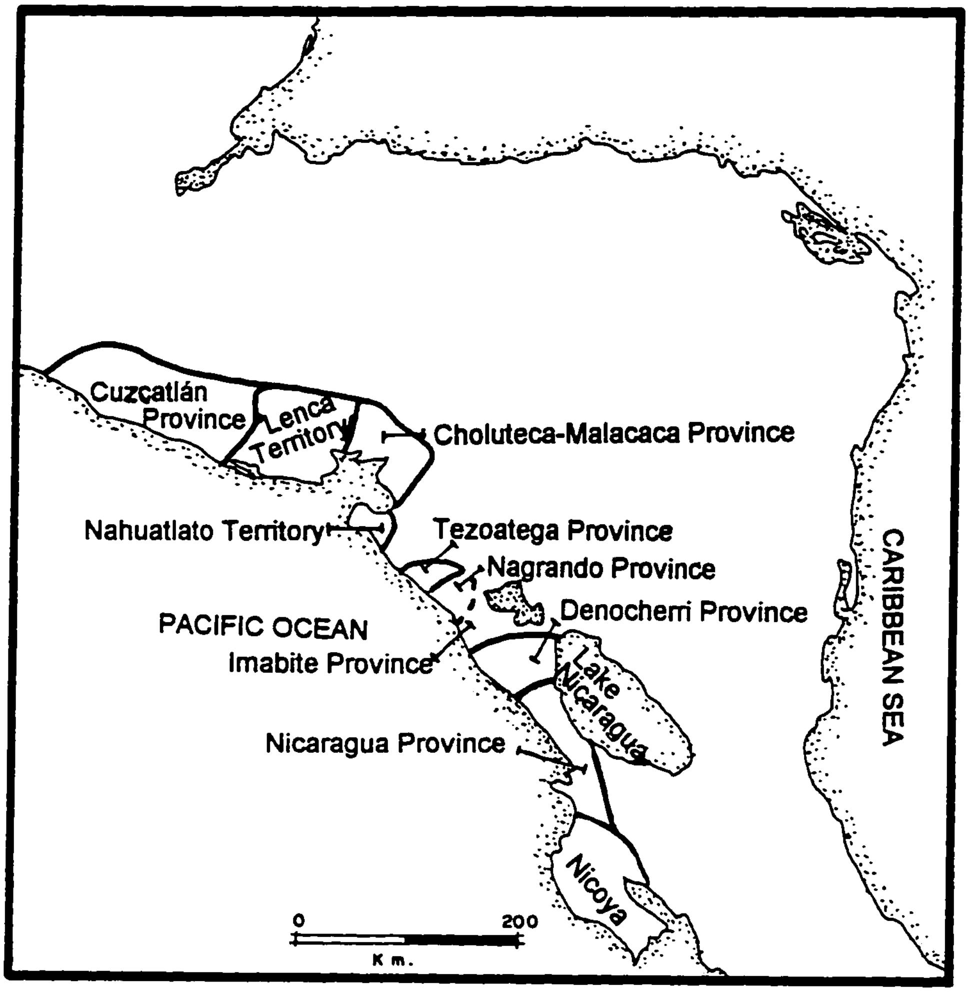

Figure 1.7 Native provinces in Pacific Nicaragua at Contact

Diriangen was the most prominent. Diriangen arrived in procession "...led by 500 men, each carrying one or two turkeys, followed by ten pendones, banner carriers. Next came seventeen women, all of whom were covered with gold medallions. They in turn were followed by 200 more Indians, many of whom carried golden hatchets. At the rear of the procession marched Diriangen and his lieutenants announced by five trumpeters" (Radell 1969:57). After a conversation with Gil González, Diriangen promised to return in three days with his people for baptism. Instead, he returned and attacked the Spaniards with an army of 4,000 warriors (Radell 1969). After the attack the Spaniards withrew to the Gulf of Nicoya in Costa Rica, being attacked again in Rivas by the Nicarao.

This information suggests a complex sociopolitical organization in Granada at Contact. First, a hierarchy apparently existed among the "caciques" who visited Gil González in Denocherri, Dirianguen being the most important. Second, there was a political alliance between the groups these caciques represented. Third, the rapid organization of an army of several thousand warriors indicates the existence of a centralized political structure.

In 1524 a second Spanish expedition led by Francisco Hernández de Cordoba founded the cities of Granada and León. Granada was founded not only because it was centrally located in relation to Indian populations (Abel-Vidor 1986), but also due to its strategic setting in the northwestern shore of Lake Nicaragua. Abel-Vidor (1986:397) thinks that "...the presence in the immediate vicinity of the sites of León Viejo and Granada of large numbers of Indians and their agricultural lands was a critical factor in the selection of these locations for settlement". Ibarra (1995) thinks that an important reason for the foundation of Granada was its strategic position for the exploration of the "Mar Dulce".

Pedrarias Dávila (1525) stated that the city of Granada had a population of about 8,000 Indians. Abel-Vidor (1986:396), who considers the latter a tributary figure, applied to it Borah and Cook's 3.3 factor, and concludes that at least 26,400 Indians lived in Granada at that time.

PREVIOUS ARCHAEOLOGICAL RESEARCH

Occasional archaeological research has been conducted in Nicaragua since the mid-nineteenth century and during the 20th century. Most of this research has concentrated on Pacific Nicaragua (Arellano 1980a, b; Baker and Smith 1987; Bovallius 1886; Boyle 1868; Brandsford 1881, 1884; Castillo 1989; Flint 1884; Flodin and Johanson 1992; Goodstein 1989; Haberland 1963a, 1963b, 1966, 1983, 1986, 1992; Healy 1974, 1980; Lange et al. 1983, 1986, 1992; Lothrop 1979 [1926]; Matiló Vila 1965, 1974; Norweb 1961, 1964; Piedra et al. 1984; Richardson 1940, 1941, 1944; Salgado 1992, 1994; Schmidt 1966, 1968; Squier 1850, 1852, 1853, 1856;

Thornquist 1981; Wilson and Martínez 1981; Wyckoff 1974, 1976; Wyss 1983).

Limited research in other regions of Nicaragua provides a framework to examine the nature of their interaction with Pacific Nicaragua. Richard Magnus conducted research in the Pearl Lagoon and the Bluefield Bay in the Atlantic coast (Magnus 1974, 1975, 1976, 1977). A recent project in Chontales, in the eastern region of Lake Nicaragua (Gorin 1990; Rigat 1992; Rigat and Gorin 1989), expanded previous work by Magnus (Magnus 1975). In northern Nicaragua an ongoing project is providing the first data on this region (Fletcher and Salgado 1990; Fletcher et al. 1994; Fletcher 1994). Also in the area east of Lake Managua as well as around the city of Managua, the Lake Managua Basin project provided general information on the chronology of occupation as well as in the settlement pattern (Espinoza et al. 1994).

Descriptive Archaeology

The research conducted in Nicaragua before the late 1950's was mainly exploratory and descriptive in nature. The first archaeological descriptions in Pacific Nicaragua were written by Ephraim G. Squier. He visited archaeological sites in one islet of Granada's archipelago, the isles of Zapatera and Ometepe in Lake Nicaragua, the Isle of Momotombito in Lake Managua, and nearby the Cerro Santiago southwest of León (Squier 1852). Squier left descriptions and drawings of paintings found on the walls of the Asososca

Lagoon, near Managua. Drawings of petroglyphs found at nearby Masaya and in Zapatera were also published by Squier (1952). In Zapatera, Squier described the site of Punta de Las Figuras as having a series of stone-faced mounds without a clear pattern in their arrangement (Squier 1852). He uncovered and described sixteen statues, publishing drawings of them all, as well as a map of the site (Squier 1989:303). According to Squier some of the statues were placed in the perimeter of the mounds. He mentioned that fragments of several others were observed in the site.

Squier found and described statues located in an island of Granada, in Momotombito, and nearby Cerro Santiago. In Momotombito, he visited a site were he saw numerous badly eroded statues, as well as several fragments. According to his informants, these statues had been originally facing a plaza. Reportedly there were originally up to fifty of these statues, many of them already removed by the time of his visit.

Carl Bovallius (1886, 1970) visited Ometepe and Zapatera. He reports two pre-Columbian statues in the entrance of the church of the village of Los Angeles, Ometepe. He also excavated and uncovered some ceramic vessels and recorded sites on a map of the isle (Bovallius 1977:234). In Zapatera Bovallius described and drew petroglyphs found in "Isla del Muerto". He visited Punta de las Figuras, dug in some mounds, and found out that some statues described by Squier had been removed from the site. Bovallius located and described three statues not reported by Squier, and redrew the statues recorded by himself and by Squier.

Bovallius also visited the site of Punta del Zapote in the northeast of Zapatera. The site had six stone-faced oval mounds. One of them, measuring 50 meters in length and 30 meters in width, had six statues representing human figures in its perimeter. They were placed with their front section facing outward; their back section was roughly carved. Four of them had a wide protuberance on top, which in addition to the aspects mentioned before, led Bovallius to hypothesize that they served as columns for a building whose walls had collapsed or perished. Excavations around the statues yielded some badly preserved ceramic urns, vessels with plastic decoration, and figurines apparently of the Papagayo Polychrome type (Bovallius 1977:276, Fig. 1.7). Bovallius also noted that numerous stones in the mounds showed one or more edges cut. He thought that this was evidence that some stones were used to build the walls of a structure on the mound. Finally, he mentions the existence of a structure made of stones near the beach (Bovallius 1970:273) from where it can be noted. It had a base of 40 meters and a height of 30-40 meters. Its walls were vertical and on top there was a flat area of about 6 to 8 meters.

Several archaeologists, building on the pioneer work of Squier and Bovallius, have expanded our knowledge of Zapatera's archaeology (Baker and Smith 1987; Bruhns 1974, 1992; Castillo 1989; Flodin and Johannson 1993; Piedra et al. 1993; Reynolds 1984). Their work is still limited to the description of the layout of the sites, the stylistic study of their statuary, and cross-dating of sites based on surface collections. The sites with statuary have been dated to the last part of the archaeological sequence (A.D. 800 to 1524) in Zapatera (Bruhns 1992, Norweb 1964, Reynolds 1984) and Ometepe (Haberland 1992).

Bransford (1881) carried out the first excavations in the Isle of Ometepe, Lake Nicaragua. He dug funerary mounds, cemeteries and isolated funerary features in the mainland as well as in Ometepe. In the Isthmus of Rivas, Bransford dug burials of the earliest ceramic phase of the sequence of that region (Bransford 1881:69-70). In Ometepe he excavated cemeteries and isolated funerary features that can be cross-dated to the last three centuries before Contact. Funerary urns contained flexed human skeletons, botanical remains such as beans, corn, and some shells. Other artifacts associated with these burials include a gold figurine and numerous ceramic beads.

Brandsford also dug a cemetery of the earliest part of the Sapoa period, where interments were found under a lava flow. He visited several sites with mounds, describing their characteristics and dimensions, while giving details of their excavation. Slab-stone walled and topped tombs were found in one site that unfortunately cannot be cross-dated, because the artifacts recovered were not illustrated. In Ometepe he also reported on statues similar to those of Zapatera.

The descriptions of artifacts and features made by Bransford are still useful for archaeologists. The artifacts that he recovered are part of the collections of the Smithsonian Institution (Lange et al.:1992) and have recently been studied by María Anzoategui (personal communication 1994).

An extensive study of artifacts from private and museum collections from Nicaragua and Costa Rica was performed by Samuel K. Lothrop (1979 [1926]). Though he did not have a chronological sequence in which to place the artifacts studied, he established relationships of certain motifs and iconography with different regions of Central America. Lothrop's analysis is still extremely useful to archaeologists (e.g. Bonilla et al. 1990).

In 1942 Karl Ruppert excavated the site of El Cauce (Goodstein 1989), or Acahualinca as it is better known. They uncovered a preceramic occupation defined by footprints of human and animals. Over this preceramic occupation they found ceramic components extending from 600 B.C to A.D. 1530 (Goodstein 1989, Lange et al. 1992). Ruppert and Richardson excavated a series of pits and trenches in mounds and other areas of the later occupations. The remains recovered from middens and funerary features have been partially studied by Goodstein (1989). During the period of main occupation (A.D. 300-800), Goodstein noted the numerous examples of Ulua Polychrome and Sulaco Bichrome sherds. The presence of Ulua Polychrome has been noticed in several other sites of Pacific and northcentral Nicaragua (e.g. Lange et al. 1992; Salgado 1991, 1992, Salgado y Fletcher 1994; Wyckoff 1976), and indicates an important interaction with regions of northwestern and central Honduras.

Defining Cultural Areas and Chronological Sequences

The Greater Nicoya Subarea. Samuel Lothrop (1979 [1926]) and Albert Norweb (1961a [cited by Lange 1994], 1964) included Pacific Nicaragua and northwestern Costa Rica within a culture area. Their definitions were based on the ethnohistoric information previously discussed, as well as the distribution of stylistic similarities of ceramic and lithic artifacts (Coe 1962a; Lothrop 1979 [1926]; Norweb 1961a, 1964; Willey 1971). Neither Lothrop nor Norweb conceived their areas as having rigidly defined boundaries, but having characteristics of cultural frontiers they presented a mixture of local features with those of other areas (Lange 1994:3). After Lothrop and Norweb most archaeologists have looked for sets of "cultural features" that will enable them to determine if Pacific Nicaragua could be included as part of Mesoamerica[25] (Willey 1966), or whether it was part of the Intermediate Area (Willey 1971).

Norweb created the concept of Greater Nicoya, which has been commonly used by archaeologists during the last 35 years (Norweb 1961a, 1964). Norweb considered it as encompassing a geographical and cultural subarea of Mesoamerica (Fig. 1.8). The subarea had been influenced also by societies located in southern Central America, since its geographical position made it a corridor through which cultural elements of northern and southern origin passed (Norweb 1964).

Lange (e.g. 1984, 1986, 1988, 1993, 1994) argues that Greater Nicoya should be considered a "buffer zone" between two sources of external influences: Mesoamerica and South America. He emphasizes that the cultural developments of the area can be explained mainly by endogenous factors. Interaction with external regions was marginal to the social configurations of this zone. The major contact with Mesoamerica occurred after A.D. 1000; long after the bases for regional cultural patterns were established. For Lange the Greater Nicoya cultural tradition starts at 300 B.C. and continues until the Contact period (Lange 1994:7). The subarea is culturally bounded by the distribution of a

[25] Kirchoff (1943) included Pacific Nicaragua and northwestern Costa Rica in his definition of Mesoamerica.

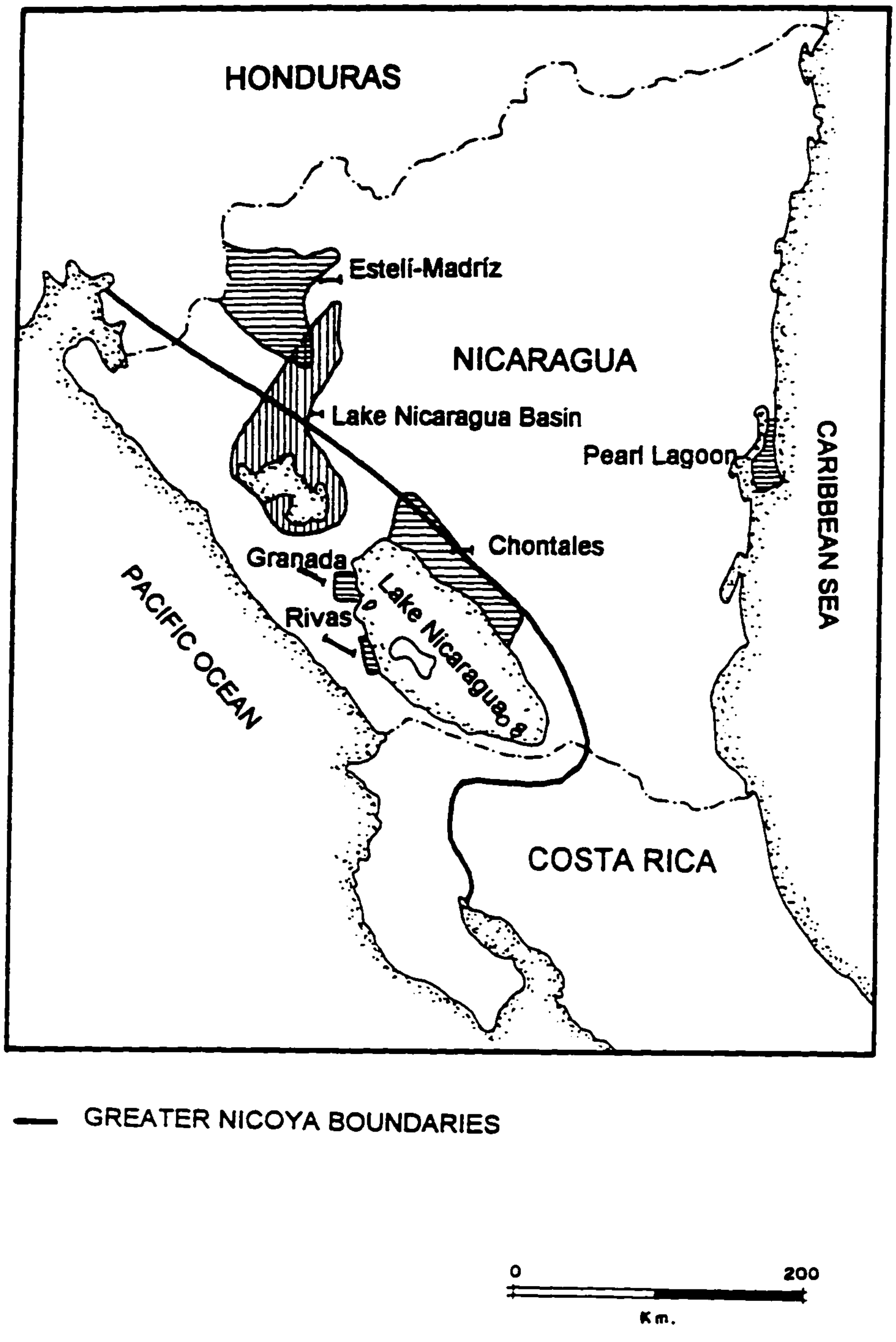

Figure 1.8 Greater Nicoya boundaries,
location of archaeological projects mentioned in the text

series of ceramic types, contrasting with those of adjacent areas (Lange 1994:7). Geographically it is united by a landscape dominated by low plains and rolling hills, a tropical dry climate and an environment characterized by savanna vegetation.

The boundaries of this buffer zone at the time of Contact include the Gulf of Fonseca in the north to the Peninsula of Nicoya in the south.[26] The east boundary is traced around the lakes region (Lange 1994) (Fig. 1.8). Linguistic evidence supports this definition, though a large portion of the Department of Choluteca in Honduras should be included (Constenla 1994, Fig. 1.1).

Lange (1984), noting a differential distribution of ceramic types, obsidian and jade artifacts, and settlement patterns, divided Greater Nicoya into a northern (Pacific Nicaragua) and southern sector (Northwestern Costa Rica). He considers Greater Nicoya to be still a useful concept if used in a flexible way (Lange 1994). This means that attention should be payed to possible diachronic boundary changes and the factors that affected these changes.

Recently, Fonseca (1994) has coined the concept of the "Area de Tradición Chibchoide" (Area of Chichoidean Tradition) to define a geographical space wherein a cultural tradition unfolded. This development started about

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[26] These boundaries closely resemble those defined by Lothrop. Norweb´s did not include all Pacific Nicaragua in its definition.

12,000/10,0000 B.C. and continued throughout the pre-Columbian period. This area is considered part of the Intermediate Area, and Greater Nicoya is seen as part of it until approximately A.D. 800, when its affiliation shifts to Mesoamerica (Fonseca 1994:226).

To a large extent, Fonseca (1994:212-213) builds his concept on the linguistic work of Constenla (1991) and the genetic research of Barrantes (Barrantes et al. 1990). Constenla (1991:126-131) defined the Colombian-Central American linguistic area (Area Colombiano-Centroamericana) as encompassing most of the territory of Honduras and El Salvador, all Nicaragua, Costa Rica, Panama and northern Colombia (Fig. 1.9).

Constenla subdivides the area into a central and a northern subarea. The former (Subárea Central) includes the Chibchan languages of Panama, southern Costa Rica and those of the Choco family of Panama and Colombia (Constenla 1994:130). Most likely Proto-Chichan speakers inhabited southwest Costa Rica and western Panama. Around 3000 B.C. the Proto-Chichan speakers started a process of differentiation (Constenla 1994:45). Some migrated to the north, settling in the northern plains of Costa Rica, the Atlantic region of Nicaragua and eastern Honduras, all regions included in the northern subarea.

Barrantes and colleagues (1990) have shown how the genetic characteristics of the Chichan people clearly

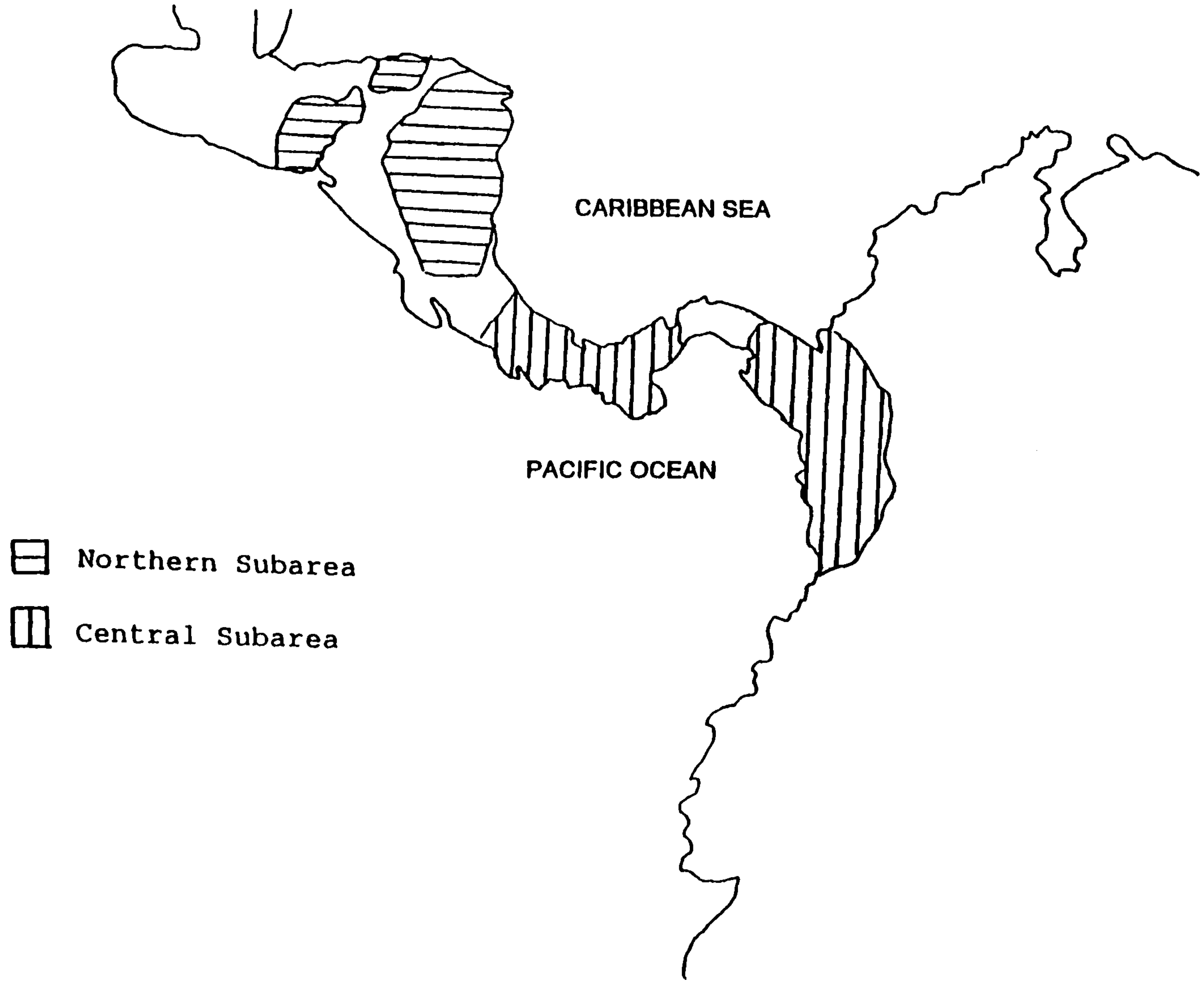

Figure 1.9 Colombian-Central American linguistic area

differentiates them from Mesoamerican and northern South American people. Backed by linguistic and archaeological data[27] (e.g. Bray 1984; Cooke and Ranere 1984, 1992; Linares and Ranere 1980), they reconstruct the development of the Chibchan people from a relatively small founding population in southern Central America during the Paleoindian period. Differentiation among this population started around 5,000 B.C, probably related to the development of agriculture. The spread of the population followed an east-to-west trend.

The northern subarea (Subárea Septentrional) includes northern Costa Rica, Nicaragua, Honduras and El Salvador (Constenla 1994:130). The only three Chichan languages spoken in this subarea are the Guatuso in Costa Rica, the Rama in southeastern Nicaragua and the Paya in eastern Honduras. The Lenca, Misumalpan, and Jicaque linguistic families are distributed in this subarea. The genetic relation between Misumalpan and the Chichan families, even if probable, remains to be proven (Constenla 1994:29). This could be difficult due to the temporal remoteness of the probable relation[28]. The Lenca family may not be part of the

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[27] The archaeological evidence is mainly from Panama and Colombia.

[28] The languages of the Misumalpan family split approximately 4,500 years ago (Moreira González 1986, cited by Constenla 1991:27). The languages of the Chichan family split around 5,000 years ago (Constenla 1991:45). If a genetic relationhip exists between these two families, their separation from their common ancestor ocurred before the above mentioned dates.

proposed linguistic subarea (Constenla 1994:130), and if a genetic relationship exists, the Lenca separated from the common ancestor of the languages of the "Area Colombiana-Centroamericana" sometime during the Paleoindian period (Constenla personal communication, May 1993). The recollection of genetic information conducted by Barrantes is very limited in the northern subarea, and he does not extend his reconstruction to include the non-Chichan groups of the subarea.

As Cooke and Ranere (1992:247) have correctly pointed out: "Drawing maps of cultural regions and frontiers without specifying time-frames is patently of limited value." The concept of Area de Tradición Chibchoide has this as one of its conceptual problems. I will elaborate a more detailed evaluation of the different concepts of culture area and subarea discussed in this section in the last chapter of this work. Here I will just mention some general comments regarding Greater Nicoya.

Even if one accepts a culture area approach as valid,[29] it is difficult to envision a strong cultural unity between Pacific Nicaragua and northwestern Costa Rica before A.D. 800-900. Indeed, only the distribution of some ceramic types seems to unify these territories during most periods (Lange et al. 1992:276). Recent archaeological research in northwestern Costa Rica shows a very different display of material culture and settlement patterns from A.D. 300-800 (Guerrero et al. 1994, Salgado y Zambrana 1994). There is little data from previous periods in Nicaragua, but it seems there is a differential pattern of ceramic type and greenstone artifact distribution with respect to northwestern Costa Rica (Lange 1984; Lange and Bishop 1992; Salgado 1992; Vázquez et al. 1994).

Wolf (1982), among others, critiques the assumption that societies, cultures, nations are, or were in the past,

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[29] The concept of culture area was created by ethnologists to classify tribal groups in the Americas, and explain their similarities and differences. Culture areas are "relatively small geographical units based on the contiguous distribution of cultural elements" (Harris 1978:373). Some problems associated with the use of this concept are that: 1) it does not explain how center-boundary relationships change through time, 2) it does not explain why in some cases cultures that share numerous features within an area may differ radically in fundamental aspects of their structure (Harris 1978:375). In spite of the critiques to the concept raised by ethnologists, New World archaeologists continue its use as a classificatory device to pattern material culture (Demarest and Sharer 1986). At the same time, most of them recognize that "archaeologists must..seek to discover the specific economic, political, and social factors which actually generate these patterns of artifactual homogeneity" (Demarest and Sharer 1986:218).

bounded systems. Concepts like these, as well as the culture area, quite often just serve to partition off societies or social phenomena that are systematically connected. The presence of certain traits, and the absence of others; are constantly used by archeaologists to define boundaries among sociocultural systems, as is the case in the definition of cultural areas. But that societies display different traits with respect to others, does not imply that those differences are the product of the isolation from each other. The definition of "boundaries" between societies can very often be the product of the interaction and competition among them (e.g. Hodder 1979; Rowlands 1989; Wolf 1983).

To delimit or explain the spatial or chronological processes that took place in Granada, I will not use the culture area concept. I will look at the patterns of trade and the exchange of ideas, manifested in the material culture, in order to attempt a reconstruction of the networks of interaction that molded the sociopolitical development of the region. These networks could have extended beyond the traditional boundaries of Greater Nicoya, or could even have excluded regions of the subarea.

Building Sequences. Gordon Willey and Albert Norweb conducted reconnaissance and excavations in sites of Managua, Masaya, Granada and Rivas, including the Ometepe Island in Lake Nicaragua. Norweb defined the first cultural sequence of Pacific Nicaragua, fitting it into the four major periods defined in northwestern Costa Rica by Coe and Baudez (1961). Paul Healy (1974, 1980) refined the sequence of Rivas (Fig. 1.8) with a detailed classification of Norweb's collections. He cross-dated and fitted his sequence in the periodization established by Coe and Baudez, establishing a chronology that extends from 500 B.C. until Contact (Table 1.1). Salgado (1990, 1992) studied the collections from Granada, defining three phases that represent only part (A.D. 300-800/900) of the total chronological occupation of the region (Table 1.1).

Wolfgang Haberland (1963a, 1963b, 1966, 1983, 1986, 1992) and Peter Smith (1966, 1968) carried out research in 1962-63 on the Ometepe Island of Lake Nicaragua (Fig. 1.8). Haberland (1992) defined a sequence of occupation divided into nine phases, starting around 2000 B.C and finishing at Contact (Table 1.1). He fits these phases into the four major periods defined in the Greater Nicoya sub-area.

In 1974, Lydia L. Wyckoff (1974, 1976) surveyed and excavated sites in an extensive area in the Province of León, northwestern Pacific Nicaragua (Fig. 1.8). She defined five archaeological phases, covering a span of time from 300 B.C to Contact (Table 1.1). Based on the distribution of ceramic types, Wyckoff concludes that the relationship of the northern Pacific region with southern Nicaragua and northwestern Costa Rica changed through time. Only during the phases El Cortesal B (A.D. 300- 600), Pulpería La Cruz B

DATE	LCA*	GREATER NICOYA		LEON	GRANADA	RIVAS	OMETEPE	CHONTALES	BAY OF SALINAS	BAY OF CULEBRA	MATAPALO TAMARINDO	TEMPISQUE	ARENAL
1500		LATE POLYCHROME	OMETEPE			Alta	Santa Ana	Cuapa	La Cruz B				Tilarán
1400				El		Gracia				Ruiz		Bebedero	
1300	PERIODO VI			Diamante	Xalteva	Las Lajas	San Lázaro	Monota	La Cruz A				
1200							La Paloma			Iguanita			
1100		MIDDLE POLYCHROME	SAPOÁ	Pulperia La Cruz B		La Virgen	Gato			Monte del Barco		Palo Blanco B	
1000					Cocibolca			Potrero	Doscien-tos		Tamarindo		Silencio
900				Pulperia La Cruz A		Apompua						Palo Blanco A	
800					Ayala		San Roque			Panamá			
700	PERIODO V	EARLY POLYCHROME		Santa Rosa		Palos Negros			Santa Elena		Matapalo	San Bosco	
600			BAGACES					Cuisalá		Culebra			
500					San Antonio								
400				El Cortezal B		San Roque			Murcié-lago	Mata de Uva	Las Minas	Ciruelas	
300							Manantial						Arenal
200								Mayales					Tardío
100				El Cortezal A	Siu	San Jorge							
0		ZONED BICHROME						II	Chombo	Orso	Monte	Catalina	
100			TEMPISQUE				Sinacapa				Fresco		
200					?	Aviles							Arenal
300	PERIOD IV						?	Mayales					Temprano
400								I					
500										Loma B			
600							Dinarte						
700													Tronadora
800													Tardío
900			OROSÍ										
1000													
• •	III												Tronadora
2000													Temprano
	Lange and Stone 1984			Wyckoff 1974	Salgado 1992 this work	Healy 1974 1980	Haberland 1992	Gorin 1990 Espinoza and Rigat 1990	Baudez and Coe 1962 Lange 1971 Sweeney 1975	Accola 1978 Lange 1980 a, b	Baudez and Coe 1962 Sweeney 1975	Baudez 1967	Hoopes 1986 1987 1994

* LOWER CENTRAL AMERICA

Table 1.1 Regional Sequences of Pacific Nicaragua/Northwestern Costa Rica

(A.D. 1000-1200) and El Diamante (A.D. 1200-1522) does she see this region having a strong interaction with the previously mentioned regions. Her conclusions are supported by recent work of Lange and colleagues (Lange et al. 1992).

Wyckoff sees a stronger relationship between northwestern Nicaragua and southern and central Honduras before A.D. 800, when the influence of the Ulua Polychromes style is clearly present in northwestern Nicaragua.

In 1983, Lange and associates (Lange et al. 1992) conducted reconnaissance along Pacific Nicaragua. They visited 26 sites and examined collections of the National Museum of Nicaragua and five regional museums. The main objective of their research was to determine the extent to which artifactual assemblages and site layout showed a relationship of Nicaragua with Mesoamerica, or with the Intermediate Area, or proved the prevalence of local cultural developments (Lange et al. 1992:53).

Lange and colleagues defined four zones with distinctive artifact assemblages, but found no clear association of any zone with Mesoamerican traditions. They conclude that there are no clear site hierarchies, and consequently no indication that complex societies dominated Pacific Nicaragua at any point during the pre-Columbian sequence (Lange et al. 265-266). They also argue that the obsidian industry was characterized by non-Mesoamerican technologies, and core-blade technologies were a minor feature of obsidian artifact manufacture. In addition to this, the compositional analysis of obsidian artifacts showed that the exploitation of non-Mesoamerican sources located in Honduras, provided most raw material for the Nicaraguans. Finally, they argue that the ceramic complexes of the last seven or eight centuries before Contact have an iconography with mixed local and Mesoamerican elements. These researchers conclude that the iconography does not prove a dominant or pervasive presence of Mesoamerican religious beliefs and proves, on the contrary, the weak connection of any Mesoamerican people in Nicaragua with their heartland (Lange et al. 1992:272).

Lange and colleagues have pioneered the use of physico-chemical methods in Nicaragua and Costa Rica to discern patterns of production and trade of artifacts made of jade, obsidian and ceramics (e.g. Lange et. al 1988, Lange et al. 1992, Bishop 1994).

Research in Regions Adjacent to Pacific Nicaragua

In Chontales (Table 1.1), located on the eastern side of the Lake of Nicaragua, Gorin (1990) established a cultural sequence divided into six cultural phases (Table 1.1), starting around 500 B.C. and finishing around A.D. 1600. From 500 B.C. until A.D. 800, Chontales maintained some kind of interaction with Pacific Nicaragua, manifested in the presence of few ceramic artifacts of the latter region in Chontales. In addition, there are some stylistic and formal attributes shared by the ceramic complexes of both areas before A.D. 800. From A.D. 800 to 1400, Chontales shares the same ceramic complexes of the Pacific Region. In the Cuapa Phase (A.D. 1400-1600), Chontales experienced an independent development. The reasons for the shifts in the relationship between both areas are not explained by Gorin. More research in that region is necessary to understand the processes underlying these differences.

A recent project around Lake Managua (Fig. 1.8) shows a continuous occupation of that region from 500 B.C. until Contact (Espinoza et al. 1994). Fifty sites were located during survey and stratigraphic excavations were carried out at the site El Tamarindo, in the northeastern section of the project's region. The sites in general are small, less than 5 hectares in area. Few of them have earthmounds, though it is possible that continuous agricultural activity has leveled mounds in many sites, creating a distorted impression of the layout and area of sites (Espinoza et al. 1994).

The sites located to the west of the Lake show in their ceramic assemblages close relationships with the ceramic complexes of Rivas and Granada. The sites located to the east show an abundant presence of orange-slipped ceramics, that seem related to the Preclassic and Early Classic

Usulutan-related traditions of Honduras.[30] Some Ulua Polychrome sherds were also recovered there. In the sites located to the west the orange-slipped ceramics are not common. After A.D. 800 both regions share the principal ceramic types with those of the ceramic complexes of southern Pacific Nicaragua and Chontales.

In northern Nicaragua an ongoing project (Fig. 1.8) (Fletcher et al. 1994; Salgado and Fletcher 1994) has located a total of 90 sites, almost half of them containing up to 130 mounds. The chronology of occupation has not been precisely defined. Cross-dating is complicated by the fact that the ceramic complexes are different from those of Pacific Nicaragua, and no radiocarbon dates are available. Nevertheless, it seems possible that the region was occupied sometime after 500 B.C. and remained occupied until Contact. Strong linkages are seen in the ceramic complexes of this region and Preclassic and Classic regions of Honduras.

The region also presents an abundance of obsidian debitage and artifacts, comparable only to the northwestern-most region of Pacific Nicaragua (Lange et al. 1992). Apparently after A.D. 1000 the density of occupation dropped dramatically, and the region remained isolated from the social processes taking place in Pacific Nicaragua.

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[30] It is important to note that most of these sherds do not have negative decoration, but their forms, paste and other aspects of surface finish ressemble the orange-slipped types of Honduras such as Bolo-Orange and Muerdalo Orange.

The data from the projects here discussed, suggest that Pacific Nicaragua went through important changes during the last three millenia of pre-Columbian occupation. Its social structures changed and participated in different interaction networks at various points of the chronological sequence. These interaction networks extended beyond the present boundaries of Nicaragua. These dynamics need to be explained in a macroregional framework.

Chapter 2

THEORY ON SOCIAL CHANGE

The study of change and continuity in social systems is a major topic of research in anthropology. It is in the study of long-term processes of social change where archaeology might contribute significantly to social theory (Gledhill 1994; Miller et al. 1989; Rowlands 1982; Shanks and Tilley 1988; Trigger 1989).

Historical and evolutionary studies have focused on explaining how and why social change takes place. Of special interest to archaeologists is understanding how certain societies change from asymmetrical forms of social organization based on age and gender to those based on rank or class distinctions. Common questions are directed to clarify the mechanisms which propel changes in social complexity, and to elucidate how social inequality is expressed in different components of social life (economic, political and ideological). A renewed interest in understanding how intersocietal processes affected these changes has grown in anthropologists and social scientists in general (Champion 1989; Chase-Dunn and Hall 1991; Rowlands et al. 1987; Urban and Schortman 1992).

Anthropologists commonly characterized social systems as simple or as complex. Simple societies, usually classified as bands or tribes, are conceptualized as basically egalitarian in nature with ephemeral social hierarchies based on age, gender and personal prestige. Complex societies--chiefdoms, middle-range societies, states--are characterized by their institutionalized social inequality. Complex societies show higher structural and functional differentiation, including political centralization (Bender 1989:83; Blanton et al. 1981:21; Rowlands 1989:29).

The assumptions underlying the concepts of simple and of complex societies are questioned by some scholars (Bender 1989, 1990; Gledhill 1994; Miller et al. 1989; Rowlands 1989; Saitta and Keene 1990; Worsley 1984). They argue that social differentiation, though on a smaller scale, also exists in societies traditionally considered egalitarian, including hunter-gatherer societies. In these societies every member has access to the means of production, but the "...differences of age, gender and ritual status are converted into social divisions even more rigid than those of class society--which at last permits some degree of social mobility" (Worsley 1984:37). Therefore the concept of social complexity in this study does not refer to societies that for the first time display social differentiation, but, as mentioned before, it refer to societies with institutionalized forms of social inequality and political centralization.

Social complexity does not emerge from an "inherent" tendency in all societies to develop into more complex forms. Since contradictory interests are present in simple societies, under certain historical circumstances they could lead to societies with pervasive inequality and higher structural differentiation (Meillassoux 1972; Terray 1975; Bender 1989).

The tendencies toward social differentiation are counteracted by strong leveling mechanisms in societies with ephemeral hierarchies[1] (Cobb 1993; Gledhill 1994; Lee 1990; E. Smith 1991; Trigger 1990). Among these mechanisms are the constraints posed by kinship relations, practices of reciprocity as well as mechanisms for the redistribution of wealth.

In stateless societies, kinship relations structure the reproduction of the society, dominating and organizing social relations from domestic units to the broader political order (e.g. Sahlins 1976:6, 216). Symbolic constructs of kinship such as filiation, marriage,

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[1] Trigger, using the Iroquois case, shows how chiefs did not have absolute power to impose their will among their followers. Their authority depended more on prestige built upon their ability to show wisdom, fairness and generosity. Chiefs "...also had to work hard in order to be able to give away more than they received by others" (Trigger 1990:143). This was a deterrent to a more permanent accumulation of wealth and consequently to building more centralized forms of social power. Resistance to hierarchical forms of social organization seems to be the norm rather than the exeption in human history, and the emergence of highly centralized forms of political power, such as the state, have been commonly resisted by kin-based societies (Gledhill 1994).

consanguinity and affinity define social relations and access to resources among kin, and between them and the rest of the social group (Wolf 1982:91). Kinship poses constraints to the emergence of differential access to wealth and power, but it also offers the potential, in particular situations, to the unfolding of these forms. It does so by defining the rules of who has or is denied access to the appropriation of social labor, to surplus and to the control of power institutions.

Most scholars agree that the transition to hierarchical forms of social organization is accompanied by both surplus production and its restricted appropriation by a sector of the society, a kin group (Brumfiel and Earle 1987b; Earle 1977; Friedman and Rowlands 1977; Smith 1991; Wolf 1982).[2] Some authors contend that at the onset of political centralization, political inequality and wealth inequality do not necessarily correlate (Goldman 1993, Hastford 1991). It is argued that then "leaders are more concerned with symbols of power, opinion changing, and their negotiation of their social position" (Hastorf 1990:48). I will contend that, even at that stage, emergent elites would have needed a surplus base, even when weak and unstable, to negotiate

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[2] Surplus production generally takes place in agricultural societies, though some cases have been documented in hunter-gatherer groups (Bender 1989, 1990). Bender (1989) argues that assuming that only agricultural societies are able to achieved complexity, reduces the process of emergence of social complexity to a technological determinism.

their social position and power. This does not mean that sociopolitical positioning depends solely on economic factors. Social status, as discussed by Weber, is a significant component of social power, and it is not neccesarily based on strictly economic factors, though wealth could be important to become part of a status group (Giddens 1971:166-168, Gledhill 1984).

Social groups and/or individuals could utilize diverse mechanisms of surplus appropriation to built social distance and a base of power. Each specific trajectory of social change can be triggered by one or a combination of several mechanisms. Among the probable mechanisms utilized and manipulated by social groups to build power some of the most common are: 1) to provide loans to and to feast other members of the community; 2) to improve and control the productive infrastructure, and with it quite often comes the appropriation and control of the production and the distribution of the internal and/or the external wealth and expansion of the external ties not only at the economic but also at the political level; 3) to expand the population base of the polity and to promote its nucleation; 4) to appropriate the existing principles of legitimacy and/or to create new ones (Earle 1991b:5).

Friedman and Rowlands (1977) modeled one process of social differentiation and political centralization. They discuss how social complexity can emerge when a local lineage produces a large enough surplus and increases its prestige by feasting the entire community. Since the control of nature, of which production is a process, is linked to supernatural forces, those who are able to produce more could be seen as closer to the supernatural and, therefore, closer to the ancestor-spirit-founder of the whole group. The lineage can enhance its economic and political power by expanding the support base. This is achieved not only by feasting, but also by giving women to lower ranking lineages for a bride-price. The lower ranking lineages positioned themselves close to the supernatural forces incorporating people from the higher-ranking lineage. On the other hand, the latter accumulates wealth, but at the same time expands the kin alliances and strengthens its base of power.

The above described process exemplifies how economic and ideological factors are intertwined in the construction of social power. The transition to institutionalized hierarchical social forms ought to be explained in the diverse social configurations and ideologies of the societies from which these new social forms emerge. Economic, political, and ideological factors dynamically contribute to these processes.

EVOLUTION AND HISTORY IN APPROACHES TO SOCIAL CHANGE

Neoevolutionism and its Shortcomings in Explaining Social Change

During the last four decades studies of social change have been dominated by the neoevolutionist theories derived from the work of Leslie White and Julien Steward.[3] Societies are conceptualized as clearly bounded systems which function as the adaptative mechanism of human populations. Processes of social change are seen as functional or adaptative responses to changes in the ecological setting, often attributed to an imbalance between a human population and the available resources.

Some neoevolutionists have attempted to incorporate social dimensions in their explanations of change (e.g. Flannery 1972; Plog 1990), but they have failed to explain

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[3] Some differences exist in neoevolutionary theory. In Mexico and Central America the most influential approaches are the cultural materialism applied by Sanders and colleagues (e.g. Sanders 1984; Sanders and Price 1969; Sanders and Webster 1978), and the cultural ecology applied by Flannery and colleagues (e.g. Flannery 1976a, Flannery and Marcus 1983; Blanton et al. 1981). The differences are explained by Flannery when he states that the former "...takes as its goal the definition of covering laws of human behavior, uses statistical correlations in an attempt to discover linear causality, and argues for relevance in the modern world", while cultural ecology "...disbelieves in linear causality and specifically human covering laws, tries to discover the way human populations obey the general principles of systems by simulation instead of by correlation, and hopes that its work will be relevant in a future world" (Flannery 1973: 53). In Lower Central America one of the better studies following the cultural ecology approach has been produced by Linares and Ranere (1980).

how the social structure itself contributes to this process (e.g. Block 1983; Friedman and Rowland 1977; Gandara 1982a, b; Humpheys 1977; Roscoe 1993; Trigger 1989). The role of institutions, social groups, and social actors in the last analysis, is a function of the system itself. They facilitate the autoregulation and reproduction of the system. It is the system itself which imposes the dynamic of institutions and social groups, and not the contrary.

Even when recognizing the important contribution of neoevolutionists to the reconstruction of past social processes, their theories have come under strong attack both from insiders and outsiders. I only mention what I consider the most relevant points of these critiques.[4] Ecological or environmental factors could place constraints on human societies, but they are neither the main causal factor nor the only factor of social change (e.g. Claessen and Skalnik 1981:471, Claessen and van de Velde 1985:250-251; Friedman and Rowlands 1978:203-204; Saitta and Keene 1990:209). For

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[4] Dunnell (1980), Gandara (1982 a, b) and Wencke (1981) provide detailed critiques of neoevolutionary theories from different perspectives. In addition to the critiques that I point out in the text, other problematic aspects of neoevolutionary theory are the definition of populations, the orthogenetic explication of social change, the assumption that changes in the complexity of social systems have a positive directionality. In the theory of biological evolution the mechanism of genetic mutation and natural selection underlie the processes of change and variation in living systems. Neoevolutionary theory has not demonstrated similar mechanism to explain the processes of social change and variation. This is especially problematic, since neoevolutionists consider adaptation as the core process by which change takes place in social systems.

example, differential access to environmental niches could contribute to the development of extensive trade networks, but only under certain historical circumstances. These networks had great impact in the emergence and/or reproduction of complex societies, and the conscious control of the networks frequently enabled emergent elites to legitimize and expand their power (Blanton et al. 1981; Blanton and Feinman 1984; Chase-Dunn and Hall 1991; Claessen and Skalnik 1981:471; Rathje 1972; Schortman and Urban 1992).

Neoevolutionists are accused of offering functional descriptions but no explanations of the dynamics of social systems (Fowler 1989:262-264; Gandara 1983b:122-123; Kristiansen 1984:76; Leach 1973:102; Trigger 1989; Wenke 1981:262-264), and of placing the emphasis of their analysis in the mechanism of stability rather than the causes of instability.[5] Giddens (1979:198-199, see also Gledhill and Rowlands 1982) maintains that functionalists create a false dichotomy between synchrony and diachrony, associating the former with stability and the latter with change. For him "social stability *cannot* involve abstracting from time, since 'stability' means continuity over time" (Giddens 1979:

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[5] This point is well explained by Shanks and Tilley (1988:35) as follows: "In that subsystems and interactions are defined independently, the synchronic is separated from the diachronic, static analysis from the explanation of change. This relates to society being conceived as naturally conservative, denying change, being naturally timeless, and change being problematic, that which is to be explained."

199). The dichotomy synchrony/diachrony has led to the conceptualization of change as characterized by a discontinuous scale of development, divided in societal types of increasing complexity, as exemplified in the social typology of band, tribe, chiefdom and state (Service 1962). This typology, with its static and descriptive categories, often obscures the variation in the mechanism of change and the structural characteristics that result from the historical trajectories of concrete societies (Blanton et al. 1981; Feinman and Neitzel 1984; Kohl 1984; Kristiansen 1984; Rowlands and Gledhill 1992; Legros 1977; Upham 1987; Wenke 1981).

Neoevolutionists assume that social systems and living systems operate under the same principles (e.g. Flannery 1972, Rappaport 1979a, b), but they have not proven this assumption to hold up (Gandara 1983b:122-123; Giddens 1984:236; Gilman 1989:65-66; Humphreys 1977:343; Wenke 1984:111-112). The analogy of social systems with living systems where intentionality is absent is problematic. It downplays the impact that intentional human actions have in social change, denying social actors their role as active creators of social reality (e.g. Brumfiel 1994; Hodder 1986; Humphreys 1977; Giddens 1979; Gilman 1989; Trigger 1989)[6].

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[6] I fully agree with Giddens when he strongly opposes functionalist explanations, like those proposed by neoevolutionists, by sustaining that "social systems have no purposes, reasons or needs whatsoever; only human individuals do so. *Any explanation of social reproduction*

In doing so, the importance of politics as the arena in which individuals and social groups confront and resolve their conflicts is diminished or eliminated. History, therefore, becomes marginal to the explanation of social change.[7]

An Historical Approach to Social Change

The theoretical approach applied here is historical and materialist. It sees human societies not as a simple product of the adaptation to the natural environment, but as a product of the dynamic and often contradictory relation of human beings to nature. Although human beings are part of nature, in the historical process they created a "second nature" of their own (Giddens 1979:161). This second nature is regulated not by natural laws but by social relations and dynamics.[8].

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which imputes teleology to social systems must be declared invalid" (Giddens 1979:7).

[7] This point is clearly illustrated by Binford when he states that "...Intentional actions were never denied; it was only suggested that human actions could be explained as manifestations of other causal forces, and it was maintained that intentional acts were not the causal force standing behind history" (Binford 1989:58). Although from a slightly different approach, Flannery (1973:51) also insists that what is relevant to archaeologists is the explanation of regularities in the way social systems function and change. There are general processes and mechanisms that explain social change (Flannery 1972), none of which are the product of intentional human actions. Price (1982) and Hill (1977) also discuss the futility that intentional actions play in evolutionary theory.

[8] Marx sustained that nature was the object and humankind the subject of history. In his words "Man is in

Materialism here does not imply a form of economic determinism. It refers rather to a conception that sees the social world as rooted in the material conditions of human existence. The social world emerges, in the first place, as a product of the collective interaction of human beings with nature. In this process, human beings create a whole set of conceptual devices to explain, and bring meaning and order both to their relation to nature and to their relation to each other. But these ideas, or systems of ideas, do not form a separated realm from the material world, since they are the intellectual means to act upon nature (Bender 1987; Godelier 1978; Roseberry 1989). So, materialism here implies a dynamic relation between nature and culture, an understanding that if ideas and concepts are formed and transformed through human social activity, they become material when they guide the transformation of the material world.

The approach applied here is historical. Taking into account the limitation of the data of the research discussed here, I focus my reconstruction of change and continuity of the regional social structures on the temporal processes and

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the most literal sense of the word a *zoon politikon*, not only a social animal, but an animal which can develop into an individual only in society" (Marx 1971 [1817]:17). In that sense, the conditions that determine the production and reproduction of human beings and their institutions are fundamentally social, and therefore historical.

their contexts. Social and cultural linkages and differences are of special interest in this historical reconstruction.

History is first and foremost a socially determined process, often characterized by economic and political inequality and domination. Historical change is the "result of the resolution of continuous antagonisms existing between social subjects" (Rowlands 1982:167). In this process transformations occur not only on the relations among cultural terms but of entire social orders (Roseberry 1989:11).

Social change, in its historicity, is constrained by the social structure and executed by the social actors (Giddens 1984). The social structure is constituted by the rules and resources that articulate the institutions of a social system and its reproduction (Giddens 1979:59-65, 1984:16-25). These rules and resources orient the practices of social actors when perpetuating and/or transforming the social systems (Giddens 1984:17; 1991:204). Social actors are both creators of the social system and created by it.

Politics permeates and articulates the totality of social relations, and therefore is at the core of the social world and its transformations. Through politics, social actors provide the direction, intended or not, of social change (Giddens 1979:59). Power, the object of political action, is defined as the capacity of social agents to intervene in events and reach definitive outcomes, whether or not intended (Giddens 1979:88). At this general level, power has no locality because any individual could become an agent and consequently hold some degree of power.[9]

Archaeologists have traditionally center their analysis on the institutionalized forms of power (e.g. the state and its institutions). Here power is dominated and manipulated by a restricted group of individuals, the ruling elite. Obviously this type of power is contested by elite factions (Brumfiel 1994), and by other groups that could potentially displace the elite or become part of it. Power is never absolute, it is constituted by relation of domination--consensual or coercive--and resistance. Power then is dynamic, and it is executed, contested and quite often reconstituted by social agents.

In this study I center my analysis on the social relations (economics, politics, religion, kinship) and the contradictions generated by their historic articulation. These contradictions are expressed in the diverse interests and historical project that different social groups pursued.

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[9] Regarding this point I share Gidden's view that: "Those in subordinate positions in social systems are frequently adept at converting whatever resources they possess into some degree of control over the conditions of reproduction of social systems" (Giddens 1979:6).

THE SCALE OF SOCIAL PROCESSES

Societal interaction is being increasingly recognized as an important mechanism in social change (e.g. Blanton and Feinman 1984; Champion 1987; Chase-Dunn and Hall 1991; Ekholm and Friedman 1979; Mathien and McGuire 1986; Peregrine 1992; Renfrew and Cherry 1986; Rowlands et al. 1987; Schortman and Urban 1992).

World-systems theory (Wallerstein 1974, 1979a, b) has had a significant impact on the analysis of societal interaction and social change.[10] This theory states that practically no society exists in isolation, and consequently the development of most societies should be understood in terms of their interdependent nature. The unit of analysis is the social system which is integrated by economic processes affecting the reproduction of both local and macroregional structures.

According to Immanuel Wallerstein there have been two types of social systems in human history: mini-systems and world-systems. Mini-systems are defined by a complete division of labor and a single cultural framework (1979a:5). World-systems are defined by processes of unequal

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[10] Another influential model is Renfrew's peer polity. The emphasis in Renfrew's model is not on the economic mechanisms of interaction but on the communication of ideas that led to the mutual influence of emergent states and complex societies. Nevertheless, he recognizes that "an increased flow in the exchange of goods can itself further structural transformation" (Renfrew 1986:10).

development among its component units, where a core emerges through the control and mobilization of surpluses produced by peripheral societies. Pre-capitalist world-systems, or world-empires as Wallerstein calls them, are characterized by a redistributive economy, a common political system and multiple cultural entities. So the economic and political boundaries of world-empires correspond. Although world-economies emerged prior to capitalism, they were unstable and short-lived transforming into world-empires or simply disappearing (Wallerstein 1979:5-6, 1984:14-15). Only with the advent of capitalism has a world-economy developed for a long period of time, with cycles of expansion that incorporate far larger areas in the dynamics of its economy. A world-economy is defined by a common economy and multiple political and cultural entities (Wallertein 1974).

Wallerstein's initial formulation (1974) was aimed to explain the historical emergence of the capitalist world-system, and some authors consider the theory of none or of limited utility when applied to pre-capitalists systems (McGuire 1986, 1992; Renfrew 1986, see note 7). Critics point to the lack of consideration of the relations between culture and economy in the dynamics of world-systems (Ragin and Chirot 1984). They also reject Wallerstein's neglect of the possible role played by the periphery in the transformational dynamics of world systems (McGuire 1992; Wolf 1992). Nevertheless, world-systems theory has been useful to explain also past social change when critically applied (Blanton and Feinman 1984; Carmack 1993a; Friedman 1978; Ekholm and Friedman 1979; Kohl 1989; Schneider 1977; Whitecotton 1992; Whitecotton and Payles 1986; Wolf 1982).

I follow Schneider's (1977) critique of Wallerstein's conceptualization of pre-capitalist worlds. She states that a flaw in Wallerstein's theory is its denial of the "pre-capitalist world as systematically integrated through the operation of world economic forces" (Schneider 1977:20). While Wallerstein insists that trade in luxuries or preciosities has no systemic impact on social change (Wallerstein 1974:41-42), Schneider maintains that quite the contrary is true. She argues that before the emergence of capitalism most exchanges between distant places was in the form of preciosities. The latter were "high in value per unit of weight and therefore relatively easy to transport" (Schneider 1977:21). Trade in the form of preciosities serves important social and economic functions.[11]

Schneider's arguments are backed by the research conducted by archaeologists and ethnologists both in the New and Old World (Adams 1974; Blanton and Feinman 1984;

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[11] Schneider maintains that "The relation of trade [in preciosities] to social stratification was not just a matter of an elevated group distinguishing itself through the careful application of sumptuary laws and a monopoly of symbols of status; it further involved the direct and self-conscious manipulation of various semiperipheral and middle level groups through patronage, bestowals, and the calculated distribution of valued goods" (Scheneider, 1977:23).

Brumfiel and Earle 1987b; Ekholm and Friedman 1979; Friedman and Rowlands 1977; Peregrine 1992). These studies highlight the role that long-distance trade has had in the emergence, consolidation and change of ranked and stratified societies.

Helms's (1979, 1988, 1992, 1993) work illuminates not only the economic, but also the political and ideological dimensions of long-distance relationships. She maintains that in the cosmologies of pre-capitalists societies, including those of known Lower Central American societies (Helms 1992), there is a widespread association of geographical distance with supernatural distance.[12] People, material goods, and knowledge that originate in distant places, and these places themselves, are attributed important political and ideological symbolism in most societies. Native people who have access to the foreign and distant are associated with the esoteric realm. They are considered as having the knowledge and skills to mediate between society and the supernatural. They usually occupied higher ranks of the hierarchy of social power. Members of the political and religious elite, traders, skilled crafters are associated with geographical distance and esoteric knowledge.

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[12] Helms explains this association as follows "...just as the sky (heavens) above may seem to curve around and touch, even merge with, the land or sea at the far horizon, so geographically distant places and peoples may be included with celestially distant 'locales' and beings in the overall cosmology of a traditional society" (Helms 1988:4-5).

So relevant is the association to the "foreign" in the construction and legitimation of social hierarchies, that often members of the elite are the first "to receive representatives of new foreign faiths and customs, to accept new charms and protective amulets, to adopt foreign modes of personal deportment, official dress and regalia, and to accept foreign advisers, or even new political ideologies and models of rule" (Helms 1988:264).

Archaeologists have stressed the importance of long-distance relations in the political legitimation of elites. Emergent elites could intervene in certain areas of the economy to support specialization and exchange, in order to control wealth accumulation and distribution (Brumfiel and Earle 1987b). Flannery (1968) attributes the spread of Olmec iconography outside the heartland, as a way in which emergent elites of other regions emulate the symbols of the more powerful Olmec elite to legitimize and strengthen their own power. Blanton and colleagues (Blanton and Feinman 1984; Blanton et al. 1992) have also highlighted the importance of long-distance relationships for political purposes in Mesoamerica. In Lower Central America, ethnohistoric studies demonstrated the importance of the control of the access exotic goods for the legitimation of elites (Helms 1979, 1992; Ibarra 1984, 1995).

Chase-Dunn and Hall (1991:7) define world-systems as "intersocietal networks in which the interaction (trade, warfare, marriage, etc.) is an important condition of the reproduction of the internal structures of the composite units and importantly affects changes which occur in these local structures." This definition is very general and enables the inclusion of a variety of societal interaction. It does not establish that the "internal" social development was primarily determined by "external" factors, but that these factors, often, are a significant part of the elements that mold the sociopolitical development of social systems. It does not include the existence of core-periphery structures in all world-systems. Moreover, in these systems the integration of different regions in a common dynamic could be attributed not exclusively to economy, but also to cultural or geopolitical factors (Collins 1992; Schortman and Urban 1994; Whitecotton 1992; Wilkinson 1991).

SOCIAL TYPOLOGIES AND THE STUDY OF SOCIAL CHANGE

Social typologies are widely used by archaeologists in Lower Central America. The concept of chiefdom, particularly, is accepted by most of them as an appropriate one to describe and explain the first forms of political centralization (e.g. Carmack 1993a; Drennan 1991; Fonseca 1992; Fowler 1991a, Lange 1992; Lange and Stone 1984).

Recently, critical points have been raised against the long term accepted sociocultural typologies--particularly Service´s (1962). Not only archaeologists, but ethnologists and ethnohistorians have found difficult the application of these typologies to their study cases.[13] Some authors point out how these typologies impose discrete, static categories on a phenomenon that is dynamic and continuous in nature (Feinman and Neitzel 1984, Spencer 1987:381; Upham 1987). It is proposed that instead of focusing on classification, anthropologists should study the "causal processses and sequences that are responsible for societal variability" (Feinman and Neitzel 1984:78).

Although recognizing the validity of these critiques, the use of typologies could be useful to establish general comparisons among concrete trajectories of social change (Earle 1987:280-81). In this sense I will make references to chiefdoms and states to compare my research with previous studies of social change in Lower Central America.

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[13] Robert Carmack (1981:394-401) discusses the problem of applying the model chiefdom-state to his reconstruction of the Quiche polity. This in spite of the richness of the ethnographic, documentary and archaeological information available. The fact is that in many empirical cases there are not clear cut boundaries between one form of organization and the other. Rather, there is often a continuum, where one polity has features that could be assign to either type. Carneiro (1981:75, note 46) refers to this when he considers the problem of drawing the line between a complex chiefdom and a state, since "all the qualitative aspects of the state were already present to some degree among advanced chiefdoms." In Mesoamerica, the Olmec case--classified by some authors as chiefdoms and by others as states (e.g. Coe 1981; Coe and Diehl 1980; Drucker 1981; Tolstoy 1969; Grove and Gillespie 1992)--is a good example of the problems associated to application of societal typologies.

The use of these concepts here requires some clarification. First, categories such as chiefdoms and states are seen only as ideal types, they do not exist in historical developments as conceptualized by the researchers at the general level (Kohl 1984).[14] Second, these categories are not seen as societal types--a la Service (1962)--but just as specific forms of political organization (Carneiro 1981; Earle 1991b; Sanders 1992:279). Third, they are not assigned an evolutionary meaning, since chiefdoms are not seen as universal precursors of the state. Chiefdoms sometimes could be the result of the disintegration of states (Friedman and Rowlands 1977; Gledhill 1994).

Chiefdoms are defined as regional polities, showing some degree of hereditary social ranking and economic differentiation (Carneiro 1981; Earle 1991a). Due to the weak base of power that characterize numerous chiefdoms, quite often they followed cyclical processes of formation and collapse (Earle 1991b, Friedman and Rowlands 1977).

Wolf differentiates two types of chiefdoms, one in which the chiefly elite is "...still embedded in kinship arrangements and bound by them", and a second were "...the

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[14] Ideal types are understood here, as discussed by Weber, as formed by "the one-sided accentuation of one or more points of view and by synthesis of a great many diffuse, discrete, more or less present and occasionally absent concrete, individual phenomena, which are arranged according to one-sidedly emphasised viewpoints into a unified analytical construct" (Weber 1949:90). Ideal types are not to be though as representing concrete historical realities in its empirical complexity.

form and idiom of kinship may be maintained even as a dominant group transforms divisions of rank into divisions of class--in fact, using kinship mechanisms to strengthen its own position" (Wolf 1982:97). The second type, I contend, corresponds to the some of the organizational forms described in the ethnohistorical sources of Pacific Nicaragua, and has elements both of a chiefdom and of a state.

The state is defined by a strong political centralization where the ruling elite has the power to "draft men to war or work, levy and collect taxes, and decree and enforce law" (Carneiro 1981:61). Social stratification is associated with the emergence of the state. Features associated with the consolidation of the state in Central America and Mexico are urbanization, strong economic specialization, and the development of a writing system.

IDENTIFYING COMPLEXITY IN ARCHAEOLOGICAL CONTEXT

Settlement hierarchies, occupational specialization, long-distance trade, differences in residential architecture, as well as in burial structure and paraphernalia are commonly used by archaeologists as parameters to reconstruct the sociopolitical organization (e.g. Chase and Chase 1992; Creamer and Hass 1985; Earle 1991b). Higher levels of social complexity should be associated with sharper distinctions in the intersite and intrasite distribution of these elements (Henderson 1992:160).

Hierarchy of Settlements

A hierarchy of settlements reflects the differences between central or regional places and local communities, as well as differences at the intercommunity level. An increase in sociopolitical complexity can be measured by the number of hierarchical levels in a society (McGuire 1979) that should at least partially be reflected in the regional settlement hierarchy. In complex societies the settlement pattern should display at least two hierarchical levels (Carneiro 1981; Spencer 1987; Wright 1977, 1984).

Nucleation is an important element of the hierarchy of settlements. The emergence of nucleated centers facilitates the political control of material resources, including human labor. The hierarchy of the regional settlement pattern provides the main source to reconstruct sociopolitical changes in Granada. We do not have extensive and detailed data at the community level due to the limited excavations carried on during the project reported here.

Architecture

Architecture is one of the strongest indicators of inequality (Abrams 1989; Carneiro 1981; Creamer and Haas 1985; McGuire 1983; Smith 1987). Variation in the dimensions of residential structures and materials used in their construction reflect diferential access to economic resources. Unequal distribution of artifacts among residential units is also important to reconstruct social differentiation.

Since the members of residential units, or households, perform their activity not only within the confines of buildings, other remains of these activity are also important to reconstruct social inequality. This is the case of refuse middens associated with a groups of structures occupied by a household. As stated by Santley and Hirth (1993:5), artifact distribution "provides information on domestic structure, craft specialization, status, and linkages with external social and economic groups." Much of this information accumulates in refuse middens.

Public architecture is frequently related with the emergence of political centralization, and has been frequently used by archaeologists to determine the degree of political complexity of a given society.

Long-distance Interaction

As has been discussed earlier, the importance of these relations for the legitimization of political elites is significant. In the archaeological record, the appereance of exchange or/and trade items is commonly associated with long-distance interaction. Locally made artifacts that display forms or iconography originated in distant places, as well as non-locally developed technologies relate also to long-distance relations.

Wealth Accumulation

The acquisition, distribution and accumulation of wealth is an important component of the political economy of non-capitalist societies (Brumfiel and Earle 1987b).

This aspect is reflected in the differential distribution of artifacts and other products both at the inter- and intrasite level. It can be measured archaeologically by the distribution of artifacts and other remains in households and burials (McGuire 1983; O'Shea 1984; Smith 1991).

Occupational specialization is also an indicator of wealth accumulation. Surplus production is necessary for the emergence of specialization. Elites quite often promote and control specialization in non-capitalist societies, since it permits wealth accumulation and control over long-distance trade (Brumfiel and Earle 1987b).

Burials

Differential status of individuals can be determined from the parameters of sex and age and their association with funerary goods. Differences in quantity and quality of grave goods as well as osteological evidence on nutrition are measures of social differentiation (O'Shea 1984).[15]

Symbols of Power

To distinguish themselves from the subordinate population, elite members display exclusive paraphernalia and symbols. Elite also have other symbolic forms to establish social distance from the population, such as a different code of behavior and specialized knowledge in diverse matters.

Some of those elements are not preserved in the archaeological record of the region under study, among them special attire, body decoration, and objects--portable or not--made of perishable matter. In Lower Central America artifacts considered to have functioned both as bearer of symbolic information and as a mean to define social boundaries include effigy heads (Leibsohn 1988), mace heads (De la Cruz 1988), gold artifacts (Benson 1981; Day 1988), green-stone artifacts--especially jadeite--(Chenault 1988; Easby 1981; Lange and Bishop 1988), and other lapidary work (Graham 1981). Imported artifacts are thought to have also a restricted distribution among the population, and commonly are associated with elite consumption.

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[15] It is important to mention how in some cases a lack of differentiation in funerary features does not necessarily preclude the absence of ranking or stratification in a social group (Pearson 1982; Ucko 1969).

The association of the previously mentioned types of artifacts--though assumed to be associated with elites--requires a detailed study of the contexts in which they are found. Unfortunately, in the region of study and in the adjacent areas, most of these artifacts have been uncovered by looters and their context is unknown. Studies to access the relative costs of production of these artifacts are also necessary to demonstrate their association with occupational specialists and members of a restricted sector of the society (Henderson 1992:160).

MIGRATION PROCESSES AND SOCIAL CHANGE

Migration frequently had an impact on social change both in the New and Old World (e.g. Carmack 1981; Fowler 1991; Fox 1987; Hammond 1976; Renfrew 1986; Rouse 1986; Smith 1984; Snow 1995). In the case of the region of Granada, it is presumed that sometime around A.D. 800-1000, Mesoamerican groups arrived to the region, and at least partially displaced the native population.

The theoretical prevalence of neoevolutionism in archaeology has led to a negative attitude towards explanations that include population movements as a significant cause of change. The sudden emergence of a complex of traits with no antecedent in local traditions has often been explained as a product of economic and political interaction (trade or other related phenomena), rather as the product of the intrusion of a new population in the region.[16]

It must be noted that not only theoretical problems contribute to the lack of recognizition of migration processes. Archaeologists have found it difficult to determine what represents evidence of migration in the archaeological record. The diversity of causes that motivated migration, and the different patterns they generated make the task difficult.

Anthony (1990) states that archaeologists find problems identifying migration, because they wrongly conceptualize the structure of migration. Usually archaeologists see the outcome of migration as the movement of a whole culture from the homeland to another area. But this rarely occurs, because quite frequently it is just one particular subgroup that migrates and not the whole sociocultural group from the homeland (Anthony 1990:908). Migrants would carry only those sociocultural elements related to their sociocultural experience and knowledge. They do not bear the totality of the sociocultural experience and traditions of the entire society. In addition, the sociocultural background of the

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[16] The divergent interpretation of Fox (1987) and Brown (1985) of the Postclassic Quiche population in Highland Guatemala illustrates this point. Fox (1987), using the direct historical approach, discusses the historic migration the migration of the Quiche from their homeland in Chontalpa to the highlands of Guatemala. Kenneth L. Brown (1985), denies the migration of the Quiche and uses a trade model to explain the emergence of "mexicanized" features among the Quiche, who are considered native to the highlands.

migrants is transformed by the experiences of the migration itself, including the interaction with new sociocultural groups.

Anthony (1990) argues that in the absence of historical information is almost impossible to reconstruct the motifs of migration, but he maintains that the structure of migration is quite predictable. Migration is defined as "a behavior that is typically performed by defined subgroups (often kin-recruited) with specific goals, targeted on known destinations and likely to use familiar routes" (Anthony 1990: 895-896). It is common for at least a sector of the migrants to move back to the homeland, temporarily or permanently. This type of movement could be significant, and it has been suggested that some of the examples of long-distance trade could be attributed to return migration (Fulford 1985, cited by Anthony 1990:904).

Among the factors that could trigger migration are catastrophic natural events, population pressure over resources, political conflict (including military conflict), or even religious and other ideological aspects (Anthony 1990, Rouse 1986, Wolf 1982: 362).[17] The information on

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[17] Anthony (1990) argues that in the past ideological factors could have been as important as economic factors in the motivation of migration. He argues that in societies were the hierarchy of male statuses are largely determined by achievements in armed conflict, males could have sought sustained glory-seeking raidings that could have led to migration. He cites the case of the Helvet people, that destroyed their own towns and defied Julius Caesar's Roman army to migrate from their homeland. The reasons for the

better conditions in the destination area is always an important motivation to migrate.

The patterns of migration vary depending on the social structure of the migrant group, its economic organization, the constraints of transportation technology, the available information of possible destinations. Finally, the social organization of the groups already settled in the destination area or along the migration route and the nature of the interaction between migrants and natives are relevant in understanding patterns of migration.

There are important differences in the patterns of short-distance and long-distance migration, and these differences are greatly influenced by the productive base of the potential migrant society (Anthony 1990:901).

Short-distance vs. Long-distance Migration

Short-distance migration reportedly has been more common than long-distance migration (Lewis 1982:44-45 cited by Anthony 1990:901). The former is typical of societies whose economic organization is based on the exploitation of a broad array of resources spread over a variety of environments. These social groups usually move within a restricted area. Among them are hunter-gatherers, pastoral herders, and some incipient gardeners (Anthony 1990:901). Short-distance migration is more difficult to detect in the

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migration were at least partially ideologically motivated (Anthony 1990:898-899).

archaeological record, since it usually does not produce sharp changes.

Long-distance migration occurs more frequency among societies whose economic activity is centered on the exploitation of a "narrow range of highly productive but relatively inelastic and localized resources" (Anthony 1990: 901). Farmers and some pastoralists are examples of this type of social group.

Leapfrogging and stream migration are among the most common patterns of long-distance population movements. In the former, scouts are sent first to collect information on the potential area of migration. Anthony (1990:903) states that the archaeological pattern produced by this type of migration should resemble islands defined by large extensions of unsettled territory. During the course of the migration, and based on the information provided by scouts, certain areas could be bypassed.

Stream migration often originates from a highly restricted point, follows a well defined route to a well defined destination (Anthony 1990:903-904). The first migrants establish a route followed by subsequent streams of migration. In stream migrations, the migrants would bring a highly restricted group of artifact attributes. This factor and the innovations produced in the place of destination would produce a rapid formal and stylistic change, a kind of "founder´s effect" (Anthony 1990:903).

Archaeological Correlates of Migration

To infer the intrusion of a new population into a previously settled area archaeologists need to pay attention to a series of parameters and their interrelation. A certain degree of continuity in the material culture of previous periods could be expected due to the interaction of new and the native populations. Even if the latter is totally displaced geographically, it is logical to expect patterns of assimilation of elements of the native culture by the migrants (Rouse 1986:175-180).

Rouse (1986:13-16, 176-177) differentiates between two types of migration. Inmigration is defined as the movement of individuals or small groups into an already populated area, resulting in the assimilation of the migrant population into the native one. Population movement refers either to the original settlement of an area or to a migrant population entering an already settled area and displacing or absorbing the native population. The second type of movement is what I am dealing with in this study, since the Mesoamerican groups that settled Pacific Nicaragua perpetuated a series of sociocultural patterns brought from the homeland, as was discussed in chapter 1. The parameters discussed here are selected according to the changes expected when a population movement occurs.

Settlement Patterns. These changes could be manifested in the foundation of new settlements and possible the abandonment of at least some earlier sites. At the micro level changes in the layout of settlements will take place, including the characteristics of dwellings and their associated remains.

Emergence of New Technologies. Migrations can also produce changes in the technologies of production of ceramics, lithics and other types of artifacts. These changes can be manifested in the use of new materials, styles and iconography.

Burials. Changes in the placement of cemeteries and in the funerary patterns in general might be expected. Physical and genetic changes might be detected from osteological remains, and these could be associated with a new population.

Chapter 3

METHODS

The methodology applied is based on the recording and reconstruction of the settlement pattern and its changes through time. A combined strategy, which included systematic and purposive surveys as well as excavations, was conducted to study the changes in the sociopolitical organization of the region over a period of 2,500 years before the Contact Period.

SETTLEMENT PATTERNS

Settlement pattern studies enable archaeologists to show how economic, political and ideological factors were integrated and expressed through the spatial distribution of activities developed by a specific society through time. This methodology has been widely applied in the Americas (e.g. Blanton 1972; Bove 1989; Drolet 1988; Flannery 1976; Flannery and Marcus 1982; Hirth 1989; Mueller 1992; Lange and Norr 1986; Linares and Ranere 1980; Parson 1971; Parsons et al. 1982; Sheets 1986; Wilson 1988). The basic assumption is a positive correlation between increasing extension, density and complexity (domestic and public architecture) of sites and the development of sociopolitical complexity. Changes in scale, integration and complexity of the regional settlement structure can be associated with a changing sociopolitical structure (e.g. Blanton et al. 1981; Kowalewski 1990a).

Various levels of analysis are dealt with in settlement studies: the individual structure, the community layout, and the intercommunity or regional patterning (Parsons 1972, Ashmore 1981, Ashmore and Wilks 1988). These different levels require the application of two different yet complementary archaeological techniques: regional survey and excavation (Kowalewski and Fish 1990). Regional survey permits reconstruction of the intercommunity patterning but lack the fine-grained resolution to address detailed questions of intracommunity (site) variability (Kowalewski 1990b).

A combined strategy of regional survey and excavation allows for the diverse levels of the settlement pattern system to be dealt with. It also facilitates addressing the different dimensions of the sociopolitical organization.

Fieldmethods

Survey. The boundaries of the research area encompass a total of 204 sq. km. As mentioned before, the region extends from the shore of Lake Nicaragua in the east to the shore of the Apoyo Lagoon in the west, and from 2.5 km north of the city of Granada to the slopes of the Mombacho volcano in the South (Fig. 3.1). The region includes all archaeological sites previously reported in Granada, as well as the main

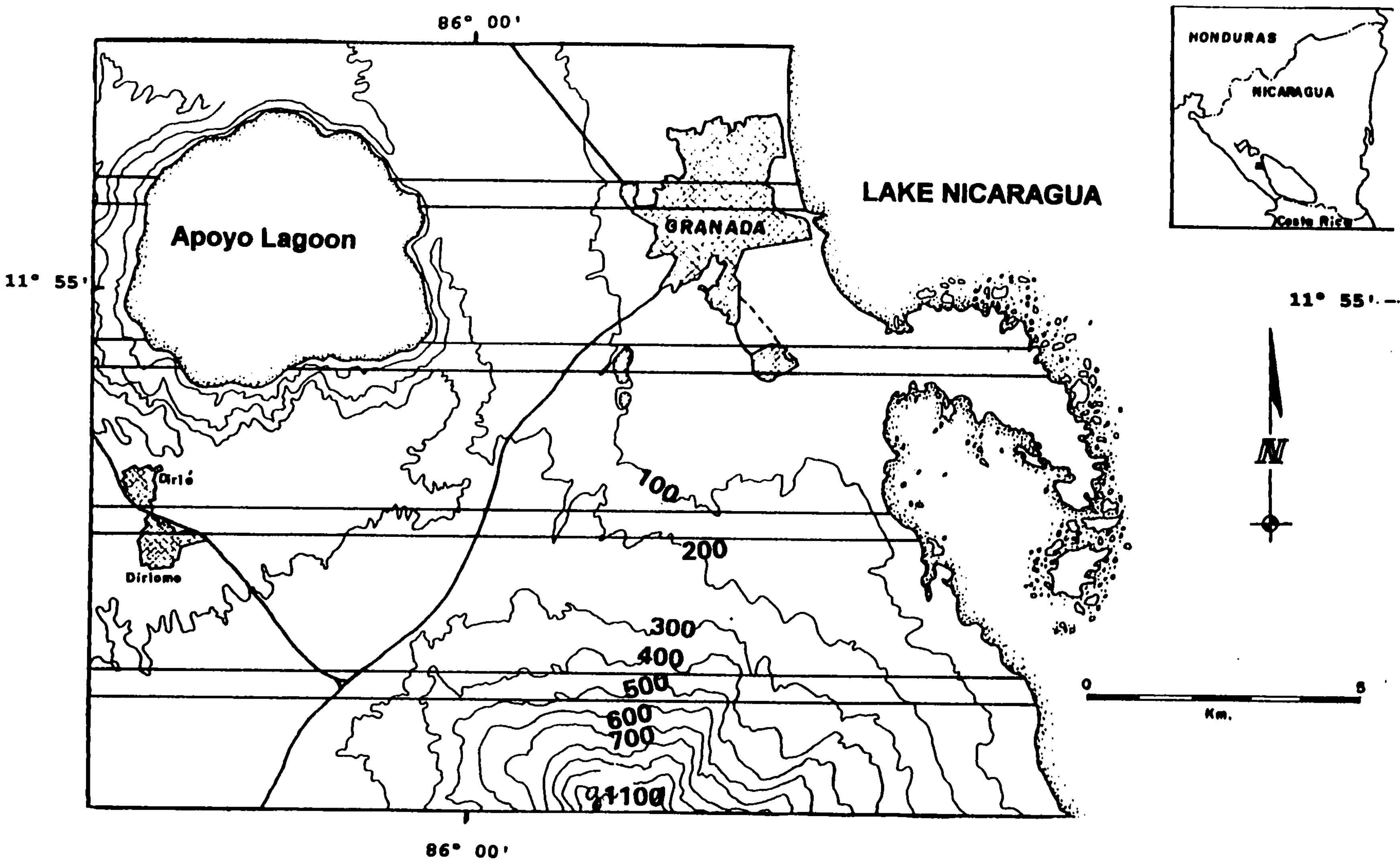

Figure 3.1 Research region with location of transects

pre-Columbian towns Diriá, Diriomo and Xalteva (Incer 1990: 92).

Full-coverage survey is the ideal strategy to reconstruct a regional settlement pattern (Kowaleski and Fish 1990). Nevertheless, it requires a high investment of time and resources. I designed an alternative strategy, combining both systematic and purposive surveys, to cover as much terrain as possible and to collect the information needed to achieve the research goals.

A systematic survey of 28 sq. km, representing roughly 14% of the total area, was conducted using transects. These were .5 km wide and varying in length, oriented E-W and spaced every 2.5 km (Fig. 3.1). Transects are easy to follow in the field, and have been applied increasingly in archaeological surveys in Lower Central America (e.g. Cooke and Ranere 1984, Robinson 1986). Parallel systematic transects have proven to be a very efficient design for archaeological survey (Judge et al. 1975).

Transects were traversed by a team that varied from 3 to 8 members, spaced 20-50 m apart, depending on the characteristics of the terrain and the density of artifacts. Crew members walked parallel to each other, and usually zigzagged to cover more terrain. Maps (scale 1:50,000) and aerial photographs (scale 1:50,000) were used as field guides, as well as to establish the location of each site. If a site extended beyond the transect, the survey continued until boundaries were defined. These were traced when surface remains disappeared.

Dense vegetation sometimes impeded the total coverage of a portion of the transect. In this case, road cuts and river cuts were utilized to look for cultural deposits in exposed profiles. Test-pitting was considered as an alternative for areas with poor visibility. Nevertheless, the idea was abandoned when I realized how difficult and time consuming it would be to get permission from the property owners. The problem was partly caused by the disputes over land-tenure related to the sociopolitical changes ocurring after the fall of the Sandinista government. In cases where the surface was covered by urban construction, we tried to collect information from people concerning occasional finds within the town. Sondages in house yards were not conducted, but it will be useful to do so especially in the towns of Granada, Diriá and Diriomo.

Once a site was located, it was divided in sectors, depending on its extention. These were arbitrarily defined often using fences, paved-roads, or natural features. Therefore, the sectors were not uniform in size. Surface collections were made in each sector to determine the approximate extension of different components. Material collected included diagnostic sherds and lithic artifacts. The method of collection chosen was not systematic. The crew members walked the sector spaced 10 to 25 meters from each other, depending on surface density and visibility. The collection method was an opportunistic, grab-bag method, that enabled us to recover information on the distribution of different components, presence of different type of artifacts--including foreign artifacts--, and other general aspects of the site. Again this method was chosen over a systematic method due to limited time and resources.[1]

Although an effort was made to identify areas with unusual concentrations of specific types of material, none was found; and specialized productive activities could not be detected on the surface. Once the information of a site was collected, it was recorded on a standarized form (Appendix A).

Purposive survey was carried out to complement the information of transect survey. The methodology applied, in general terms, was the same as that described for systematic survey. Information given by inhabitants of the region or the adjacent areas, and general knowledge of the region acquired during transect survey guided the purposive survey.

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[1] Blanton and associates (Blanton et al. 1982) explain why they chose opportunistic over systematic methods of collection in their study of the Valley of Oaxaca. They found that systematic collections, in comparison with opportunistic collections, consume "much greater time and energy costs... not only in the field" but also in the laboratory processing the materials (Blanton et al. 1982:9). They argue that their opportunistic collection methods were efficient in determining general surface characteristics of the sites located. For them systematic methods of collection "are more suited to the resolution of specific problems, involving the study of selected sites, once the total sample of sites is known" (Blanton et al. 1982:10).

With the aide of the geologist Mario Zamora, a set of aereal photographs (scale 1:50,000) were interpreted to determine areas suitable for human settlement based on the physiographic conditions of the terrain. Even areas that did not show potential for human settlement were partially surveyed, yielding a very poor result in terms of location of sites. The few sites located in the latter areas were among the smallest of all recorded (hamlets).

A purposive survey helped to locate the largest sites, that quite often occupied the upper levels of the sociopolitical hierarchy of each period; the site N-Gr-15 was not covered by systematic survey. The inhabitants of the region even know the forested areas well, since they hunt and extract certain products from them. Given the combination of systematic and purposive surveys, it is highly unlikely that we missed any of the largest sites. If any site were missed, I would expect it to be a small site, or perhaps a non-looted cemetery. The latter type is not easily detectable on the surface.

At least one site of petroglyphs located on the Apoyo lagoon was not recorded. I was informed of this site while surveying near the east coast of the lagoon, but I could not visit the site which had to be accessed by boat. Reportedly, it consists of a series of engraved rocks on the exposed walls of the lagoon, a type of site commonly found in lagoons throughout Pacific Nicaragua and also in the isles of Lake Nicaragua.

Sketches were made in some of the sites that presented visible features on surface. Transit maps were made at the main site of the Bagaces period (A.D. 300-800), the Ayala site (N-Gr-2).

Classification of Sites

To define the site typology I took into account both ethnohistorical information and some typologies applied in previous archaeological research in Nuclear America (e.g. Black 1983; Blanton 1972, Blanton et al. 1982; Drolet 1988; Flannery 1976; Hirth 1987; Linares and Ranere 1980; Parsons 1971).

The classification of sites was done in two stages. First the sites were classified according to settlement types based on size, density of artifacts and layout of sites (Table 3.1). These aspects are assumed to represent a privileged access to scarce goods. Surface density was determined using an ordinal scale. One to 5 sherds per square meter represented a low density, medium density was determined by the presence of 6 to 50 sherds per square meter and high density by 51 or more sherds. In some cases, sherds were scattered over an area in a very low density, approximately one sherd every two/three square meters. These areas were defined as isolated findings.

Table 3.1 Site typology

Density	Area (hectares)	Surface features	Site type
Low	.1 to 5	None	Hamlet
Low to Medium	More than 5	Could have mounds or knolls where residential structures were built	Dispersed village
Medium to High	More than 50	Three or more mounds or knolls where residential structures were built	Nucleated village
Medium to High	More than 100	More than 10 mounds whose distribution shows some spatial pattern (e.g. located around a plaza)	Town
Low	Any	Funerary features exclusively	Cemetery
Very low	Any	None	Isolated findings

Based on the first typology a second stage of classification involved the definition of a sociopolitical hierarchy for each period. In this stage, the presence or absence of statuary[2] and foreign artifacts was taken into account. It was assumed that both aspects reflect accumulation of wealth, and at least some control over labor and surplus. These factors and the complexity of the layout are considered strong indicators of the development of a hierarchy.

Population Estimates. These were made only at the regional level. The reconstructed population should be considered only as an approximation. I based my reconstruction on the estimates made by Werner (n.d.) for the Contact period. Including the villages of Xalteva, Diriá and Diriomo the estimated population for the region at Contact is 17,200 people.[3] This represents a density of 84

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[2] Karen Olsen Bruhns has argumented that sites with statuary in the so called Intermediate Area--including those in Nicaragua--occupied higher levels in the regional hierarchies. The presence of statuary in these sites, especially in those where it is numerous, quite likely means that these sites had a privileged access to labor and general wealth (Bruhns 1992:342). She states that "the mere habit of carving and erecting these statues can be taken, in itself, as evidence of economic surplus and craft specialization, and sheer numbers must reflect wealth or other specialized hierarchies among the sites" (Bruhns 1992:340).

[3] Abel-Vidor (1986:396) discusses how Pedrarias Dávila mentioned that Granada had "8,000 vecinos naturales in its inmediate environs." Examining the document she thinks that this figure refers just to male heads of households. Abel-Vidor applies to what she considers a tributar figure a factor of 3.3 to estimate the overall population. She

inhabitants per square kilometer, well under present-day 139 inhabitants per square kilometer (Instituto Nicaragüense de Estadística y Censos).[4]

To estimate the population of the pre-Columbian periods, I divided the 17,200 figure by total the number of hectares occupied during Sapoa, that is to say 1,480 hectares. These figures produce a density of 12 inhabitants per hectare. The choice of Sapoa's occupation area to produce this figure needs clarification. As will be discussed in chapter 4, surface components from Sapoa and Ometepe cannot be easily distinguished. It could be the case that I am underestimating the number of occupied hectares during Ometepe, and that instead this should roughly

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concludes that this "would give Granada region a population of at least 26,400." This figure is over the estimation based on Werner's work. In both cases, as mentioned in the text, a serious problem is that the boundaries of the research area do not necessarily correspond to the administrative-territorial units of Granada, Diriá or Diriomo.

[4] In 1975, the municipality of Diriá's population was 4,438, with a density of 148 inhabitants per square kilometer. The boundaries of the municipality of Diriá probably correspond roughly to those of a pre-Columbian political-territorial unit (Jaime Incer, personal communication 1992). If this is true, the pre-Columbian population at Contact in Diriá was probably denser. Using Werner's (n.d.) figures, the population of Diriá could have been 8,973 inhabitants in 1522, representing a density of 299 inhabitants per square kilometer. It seems to me that the present distribution of the population is not radically different from the distribution at Contact. There is a nucleated center, the town of Diriá, and the rest of the population is distributed in a similar fashion to our pre-Columbian dispersed villages. The pre-Columbian town of Diriá is, at least, partially covered by the present-day town.

correspond to the same area occupied during Sapoa. Since I lack the data to solve the problem at this point, I took the data from Sapoa as the most reliable figure for the latter periods of the pre-Columbian sequence. To reconstruct the population for each period I multiplied the area occupied by the figure of 12 inhabitants for hectare. Population figures are presented in chapter 4.

As previously stated, the population per period should be considered an approximation. Very likely one of the problems is that not all the territories under control of Xalteva, Diriá and Diriomo are included in our research region. Another main problem is that I did not introduce the density of occupation as a factor in the calculations. In other words, a high surface density in a site very likely represents a higher density of population per area than a low surface density. The population figures represent a rough approximation of the population for each period, assuming that the first figure, that of the Contact, is not totally misleading.

Excavations. In the initial design of the project test excavations were planned at each site-type of the period in which a settlement hierarchy emerged. At the end, excavations were conducted only at the main settlement of the Bagaces Period (N-Gr-2). This decision was related to both time constraints and difficulties obtaining permission to carry on excavations. As mentioned before, the sociopolitical conditions of Nicaragua during our fieldwork sometimes made it difficult to obtain permission from land-owners to enter their land, not to mention to conduct excavations. Even in the only site excavated I was unable to obtain permission for those terrains where we initially wanted to carry out our research.

The excavations were conducted at the Ayala site (N-Gr-2). The excavations had three main goals: 1) to refine the regional sequence established in a previous study (Salgado 1992); 2) to improve our understanding about the nature of the different components; and 3) to establish comparisons among domestic structures and their associated artifact distribution, in order to refine the inferences about sociopolitical organization obtained with the survey data.

Units of excavation generally varied from test pits to small trenches. Only one horizontal excavation was conducted to uncover a domestic structure (Appendix B). Excavation levels were generally arbitrary and 10 cm in depth. In cases where clearly defined strata were found, these were excavated dividing them in levels of 10 cm. Materials were recovered using a 1/8" mesh screen. In some cases the matrix of certain strata or of an entire stratigraphic pit, were screened through a 1 mm mesh screen. The latter was done in strata with a high content of ecofacts, in order to attempt a reconstruction of patterns of subsistence and production.

Laboratory Analyses

The classification of ceramic and lithic artifacts was conducted, foremost, to establish artifact complexes that enable to examine both chronological and spatial variation. The latter specially provides good parameters for inferences regarding social heterogeneity and inequality (e.g. Joyce 1991, Smith 1987).

We performed a preliminary sorting of different types of artifacts in the field. Most materials were cleaned and washed while we were in the field laboratory. The final sorting of all materials was conducted in the laboratory in Managua.

Ceramic Classification. To refine and expand the regional sequence and establish cross-regional comparisons, I applied a type-variety system to the classification of ceramics (Gifford 1960, 1976, Smith, Willey, and Gifford 1960; Wheat, Gifford and Wasley 1958).

Since any classificatory system has its shortcomings, the specific system utilized should be selected according to the research goals. The type-variety system serves the purpose well of describing the variation among complexes. The criticisms[5] raised against the type-variety "are related

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[5] Archaelogists working in Nicaragua and Costa Rica have pointed out some of the limitations of the system as normally used there. The types and varieties are defined mainly in terms of surface treatment and decoration giving less importance to paste characteristics. Therefore questions relating to certain aspects of the technological process are not properly address (Lange et al. 1992:176).

to claims to its utility beyond the temporal-spatial genesis of the system, and as such are not critiques of the system, but of its extended use" (Dunnell 1986:174). This system is commonly applied in the area of study to describe chronological and geographical variation among ceramic complexes (e.g. Bonilla et al. 1990; Lange et al. 1984).[6]

Initially, I intended to use a modal system in addition to the type-variety.[7] The idea was to evaluate if specific vessel forms were more commonly found in certain areas and derive a functionalreconstruction from these patterns. Time constraints impeded the realization of the modal analysis, that would be necessary to carry out in the future.[8]

Hoopes (1987:171) maintains that the type-variety system has the problem of assuming that a type defines a entire class of vessels, and that this system "tends to impose a pre-determined structure upon the data. It favors broad groupings and is relatively intolerant of unique variations."

[6] Hoopes (1987:171) points out that the type-variety as applied in Pacific Nicaragua and Costa Rica differs from its application in Mesoamerica. In the latter area the "group" is the principal unit of classification, while in the former regions it is the "type".

[7] Both in Greater Nicoya and in Mesoamerica archaeologists have combined modal and taxonomic analyses to take advantage of the virtues of both systems (e.g. Accola 1978; Beaudry 1984; Demarest 1986).

[8] To the best of my knowledge specific studies to understand the function of ceramic artifacts have not yet been carried out in Greater Nicoya. This is partly due to the emphasis on using ceramic variation to define chronological sequences and to establish regional comparisons.

Two stratigraphic pits were chosen for a detailed type-variety classification: operation 7 (S 1-2.5 E2.5-4) and operation 8. With the results of this analysis, and my previous work (Salgado 1992) I refined and expanded the regional sequence (Table 1.1).

Except for the above mentioned stratigraphic pits, ceramic artifacts from the remaining units of excavation were only briefly examined. The goal was to determine the chronological assignment of each stratum dug at N-Gr-2 (Ayala site). Approximately 150,000 sherds were recovered in the excavations.

Seriation: I seriated the strata from operation 7, 8 and those from a excavation unit analyzed in a previous study (Salgado 1992). The seriation technique utilized has been described by Ford (1962) and Meggers and Evans (1969). The technique allows the establishment of a sequential order among the strata of independent stratigraphic units of excavation. This is achieved by converting the relative percentages of each level excavated to graphic bars. The bars are sequentially arranged to display an order that shows the emergence, maximum popularity, the decline, and sometimes disappearence, of each type. Ideally, each type of seriated frequencies should display battleship-shaped curves.

The seriation was complemented with a careful examination of the stratigraphy and absolute dates of the excavation units involved.

Radiometric dates: Nine charcoal samples obtained in clear stratigraphic context were submitted for radiocarbon dating analysis at Beta Analytic Inc. The samples came from the two stratigraphic pits used to built the regional sequence (Operations 7 and 8), and an additional unit of excavation that corresponds to a domestic structure (Operation 13). Samples were calibrated using a C13/C12 correction method (Appendix D).

The absolute dates were used to corroborate and/or refine the relative dates obtained in the ceramic sequence.

Lithic Classification

The classification was conducted following taxonomic criteria based on technological considerations. The first level of the taxonomy involved separation of artifacts into the raw materials from which they were made. The second level involved the definition of categories of artifacts according to morphological features as well as manufacturing techniques (Braswell 1994, Valerio 1994).

Compositional Analysis of Ceramic and Lithic Artifacts

Samples of possible local and non-local ceramics were submitted for neutron activation compositional analysis. Following the criteria established by Bishop, Rands and

Holley (1982), a sample of sherds of each relevant type was selected for analysis. The samples have clear archaeological context relating to chronology, good preservation and a size that clearly shows their typological characteristics. The analysis is ongoing, and was conducted by Dr. Ronald Bishop under the auspices of the Greater Nicoya Ceramic Project at CAL/Smithsonian Institution. He already had analyzed a sample from a ceramic collections of the Ayala site (N-Gr-2) (Bishop 1994, Salgado 1992).

A total of 50 obsidian artifacts (10.3% of the total collection), all from excavated contexts, were submitted to neutron activation analysis (NAA) at the Missouri University Research Reactor, under the supervision of Dr. Michael Glascock. The NAA included measurements of 27 elements, and the parameters used in the analysis are those described by Glascock and associates (Glascock et al. 1988). All but one of the 50 artifacts were selected at random. The one artifact selected purposively was a green obsidian artifact, the only one with this characteristic in the whole collection (Braswell 1994).

These analyses were designed to test the correlation between increasing intraregional and interregional trade and the development of complexity. They will improve our understanding of patterns of trade and production in Granada, and between this area and other regions of Lower Central America and Southeastern Mesoamerica.

Chapter 4

THE REGIONAL SETTLEMENT PATTERN

The regional survey yielded 37 sites. Fifteen of them (40%) fall totally or partially within the transects (Fig. 4.1). The transect survey was effective to the extent that it enabled the recording of the whole range of site-types for each period. Nevertheless, the purposive survey was important to achieve a more detailed picture of the settlement system of each period.

Seventy-eight square kilometers were surveyed, an area that corresponds to 38% of the research region (Fig. 4.2). The transect survey covered 28 square kilometers (36% of the surveyed area), while the purposive survey covered the remaining 50 (64% of the surveyed area). In addition, the area between 400 and 700 meters of altitude was partially examined following road cuts. For over 700 meters no survey was conducted. Due to the characteristics of the terrain, it would be highly unlikely to find large settlements there. Four sites were recorded in areas adjacent to the region (Fig. 4.1), yielding 41 sites located within and outside the region.

The general characteristics of each site are summarized in table 4.1. Descriptions of each site are provided in Appendix B. Some relevant aspects of the relation of sites and the natural environment are indicated in table 4.2.

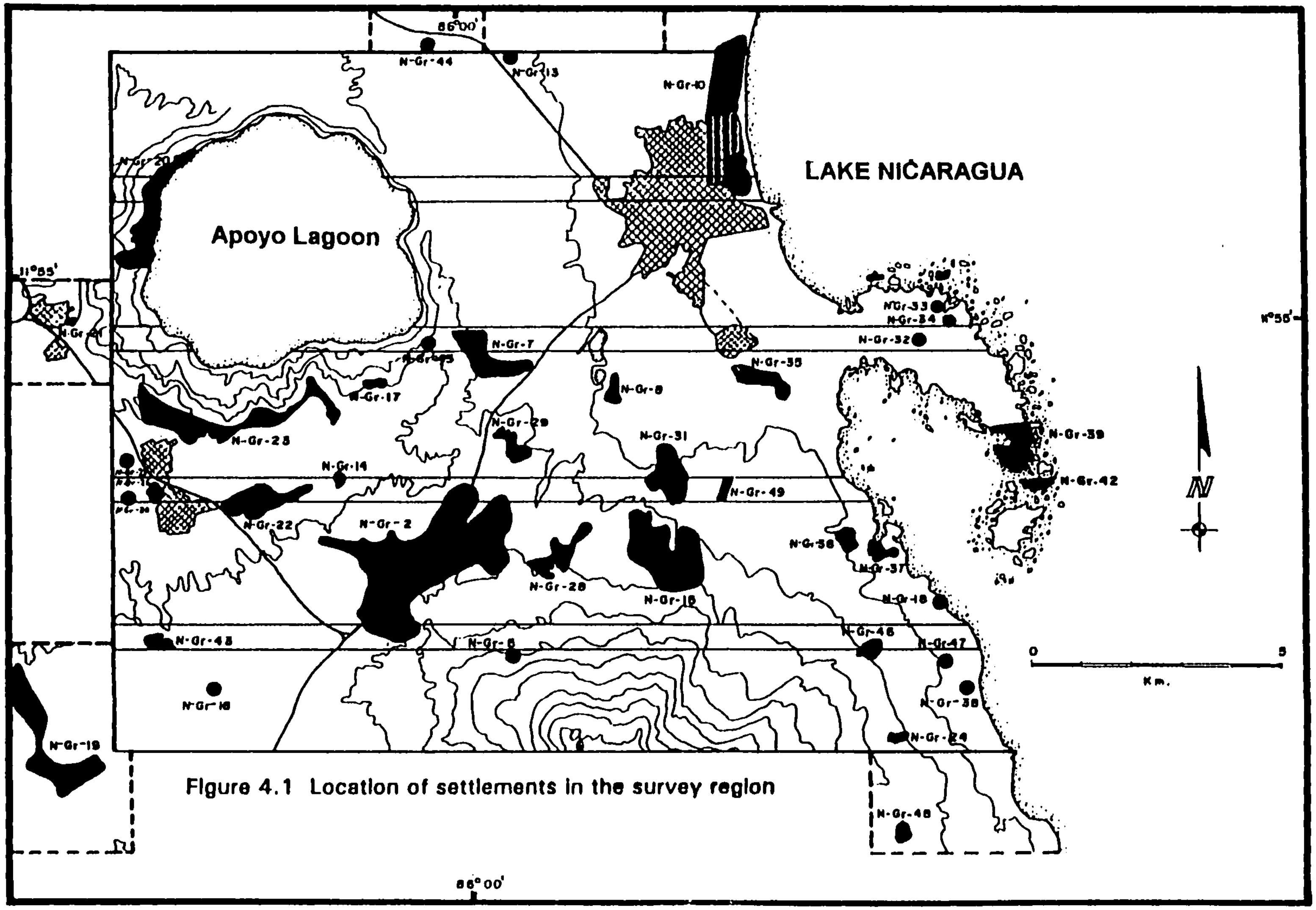

Figure 4.1 Location of settlements in the survey region

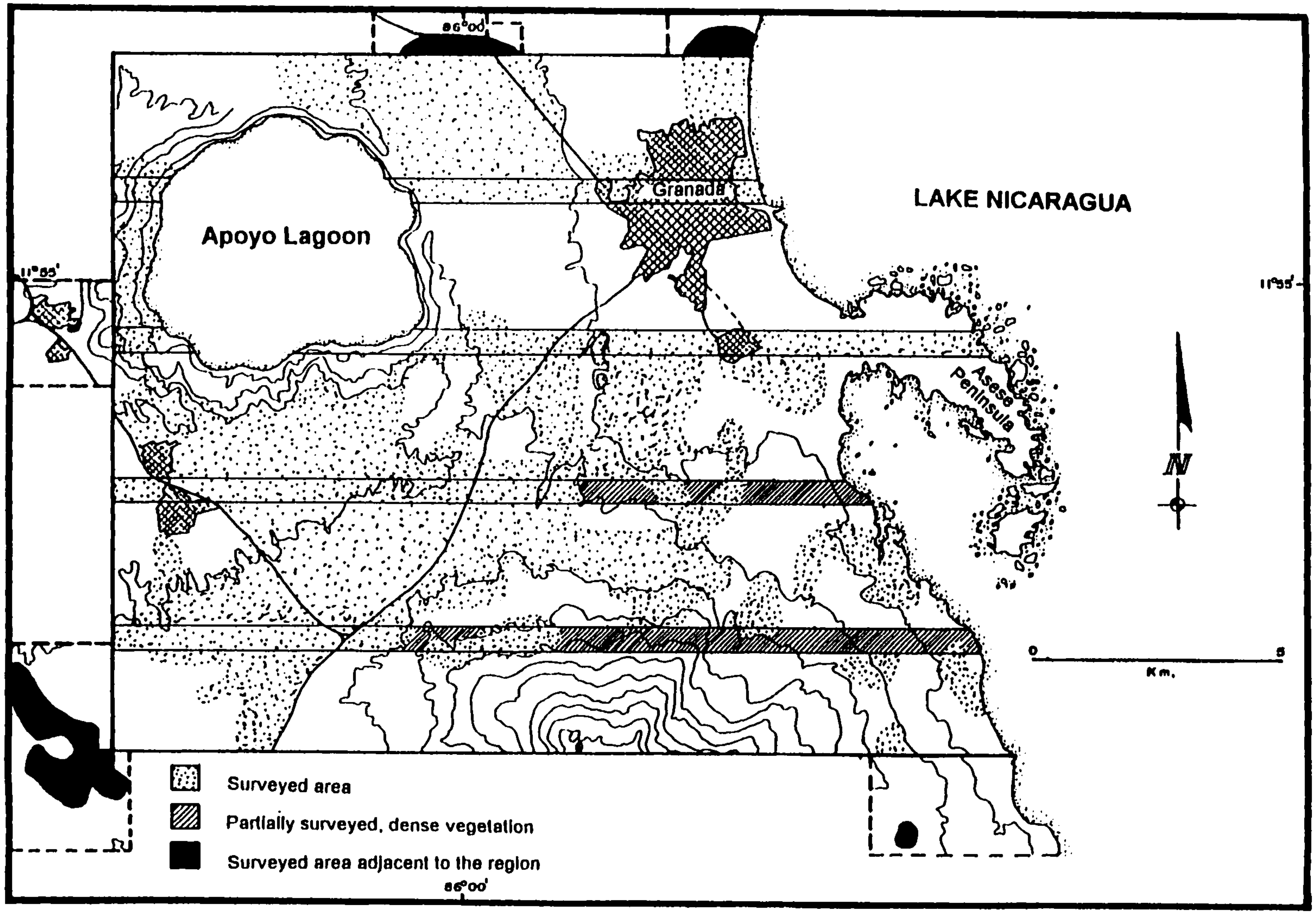

Figure 4.2 Area covered in the survey region

Table 4.1 General information on sites located in survey

SITE	AREA	SURFACE DENSITY			SURFACE FEATURES				SURFACE ARTIFACTS			CHRONOLOGICAL PERIODS			
N-GR	Hectares	Low	Medium	High	Knolls	Mounds	Statues	Petroglyph	Ceramics	Obsidian	Chert	Orosí Tempisque	Bagaces	Sapoá	Ometepe
2	483	X	X	X	X				X	X	X	X	X	X	X
5	1*	X	X						X		X			X	X
7	74*	X							X	X	X			X	X
8	18	X							X		X			X	X
10	224	X	X	X		X			X	X	X		X	X	X
13	1	X							X		X				
14	7	X							X			X	X	X	X
15	204	X	X	X		X	X	X	X	X	X	X	X	X	X
16	1*	X							X					X	X
17	9	X	X	X		X			X		X			X	
18	3		X					X	X		X			X	X
20	136	X		X					X		X	?	X	X	X
22	67	X	X			X			X	X	X	X	X	X	X
23	149	X							X	X	X	X	X	X	X
24	8*			X		X			X	X	X		X	X	X
26	9	X							X					X	?
27	2	X	X						X	X				X	X
28	38	X							X					X	?
29	3	X							X					X	?
30	3	X							X					X	X
31	67	X							X		X			X	X
32	1	X							X					X	?
33	1*	X							X					X	X
34	1	X							X					X	?
35	57	X	X						X					X	X
36	16*	X	X	X					X					X	X
37	17	X	X						X					X	
38	1*	X							X					X	X
39	60*		X	X	X	?	X		X		X			X	X
40	4	X							X					X	X
41	4	X							X					X	X
42	5		X						X	X	X			X	X
43	14		X		X				X					X	?
45	1							X							
46	14*	X			X	X			X		X			X	?
47	2	X				X			X					X	?
49	20	X							X					X	?
19[1]	150*	X	X	X	X				X	X	X		X	X	
21	1*	X	X						X	X	X	X	X	X	X
44	1	X							X					X	?
48	15*	X	X						X		X			X	X

* These sites could be larger since boundaries were not clearly defined.

1 Sites under dashed line are located adjacent to the survey region.

Table 4.2 Some relevant natural features associated to settlements in research region

Site	Altitude (Above sea level)	Proximity to permanent water source (km)		Proximity to seasonal water source (km)		Soil quality	Land use
N-Gr-	Meters	Horiz.	Vert.	Horiz.	Vert.		
2	300	3.5	.06	0	0	Good	Agricult.
5	500	6.25	.06	.75	0	Good	Coffee
7	160-200	.5	.14	.75	0	Medium	Agricult.
8	100	0	.04	.02	0	Medium	Agricult.
10	30	0	0	0	0	Good	Grassland
13	120	3.5	.14	.05	0	Low	Agricult.
14	300	2.5	.24	.05	0	Good	Agricult.
15	200-300	3.0	.06	1	0	Good	Agricult.
16	240	6.0	.36	0	0	Good	Agricult.
17	260	.6	.2	0	0	Good	Agricult.
18	30	0	0	.3	0	Medium	Bushes
20	60-200	0	0	0	0	Good	Agricult.
22	300	2.5	.24	0	0	Good	Agricult.
23	400	.8	.36	.6	0	Good	Agricult.
24	200	1.5	.17	1.5	0	Good	Agricult.
26	350	2.5	.36	.8	0	Good	Agricult.
27	350	2.5	.36	0	0	Good	Agricult.
28	240-300	3.5	.06	1	0	Good	Agricult.
29	260	2.5	.06	.7	.14	Medium	Pastures
30	350	2.5	.36	0	0	Good	Agricult.
31	120	3.2	.08	.6	0	Medium	Agricult.
32	30	.2	0	-	-	Medium	Agricult.
33	30	0	0	-	-	Medium	Bushes
34	30	0	0	-	-	Medium	Bushes
35	30	1	0	.2	0	Medium	Pastures
36	60	.5	0	-	-	Medium	Agricult.
37	100	0	0	-	-	Low	Bushes
38	30	0	0	-	-	Medium	Agricult.
39	30	0	0	-	-	Medium	Pastures
40	30	0	0	-	-	Medium	Bushes
41	30	0	0	-	-	Medium	Bushes
42	30	0	0	-	-	Medium	Bushes
43	330	5.2	.36	0	0	Good	Agricult.
45	300	.6	.26	-	-	Medium	Forest
46	200	1.5	0	.2	0	Medium	Bushes
47	100	.4	.06	.2	0	Low	Bushes
49	100	2.5	.06	-	-	Good	Agricult.
19[1]	260-300	8.0	.36	0	0	Good	Agricult.
21	500	1.5	.46	0	0	Good	Urban area
44	140	2.2	.14	1	0	Low	Pastures
48	260	2.2	.2	-	-	Good	Agricult.

[1] Sites under dashed line are located adjacent to the research region.

General Comments on the Location of Sites and Natural Resources

The chronological variation in the location of sites will be discussed in the section dedicated to each period. Here I will refer to some general conditions of the area.

A relevant aspect is the differential quality of the soils in the northern and southern halves of the region. The best soils are on the southern half, which includes the areas over 200 meters of altitude. These soils usually have a thick humic stratum, and nowadays agriculture is concentrated there. On the northern portion, including the coastal areas of Lake Nicaragua, the soils are either highly eroded, or contain great quantities of rocks produced by volcanic activity. The eroded soils are located in the plains between the city of Granada and the Apoyo lagoon, and the rocky soils south of Granada along the coast of Lake Nicaragua.

The distribution of the vegetation reflects the above mentioned differences (Fig. 4.2a). Areas with denser vegetation[1] are generally associated with higher quality soils. The exception are the coastal areas, mostly covered by forest and bushes, where the soil surface is limited by the great number of volcanic rocks on and/or under the surface.

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[1] This vegetation also includes coffee orchards and other planted areas.

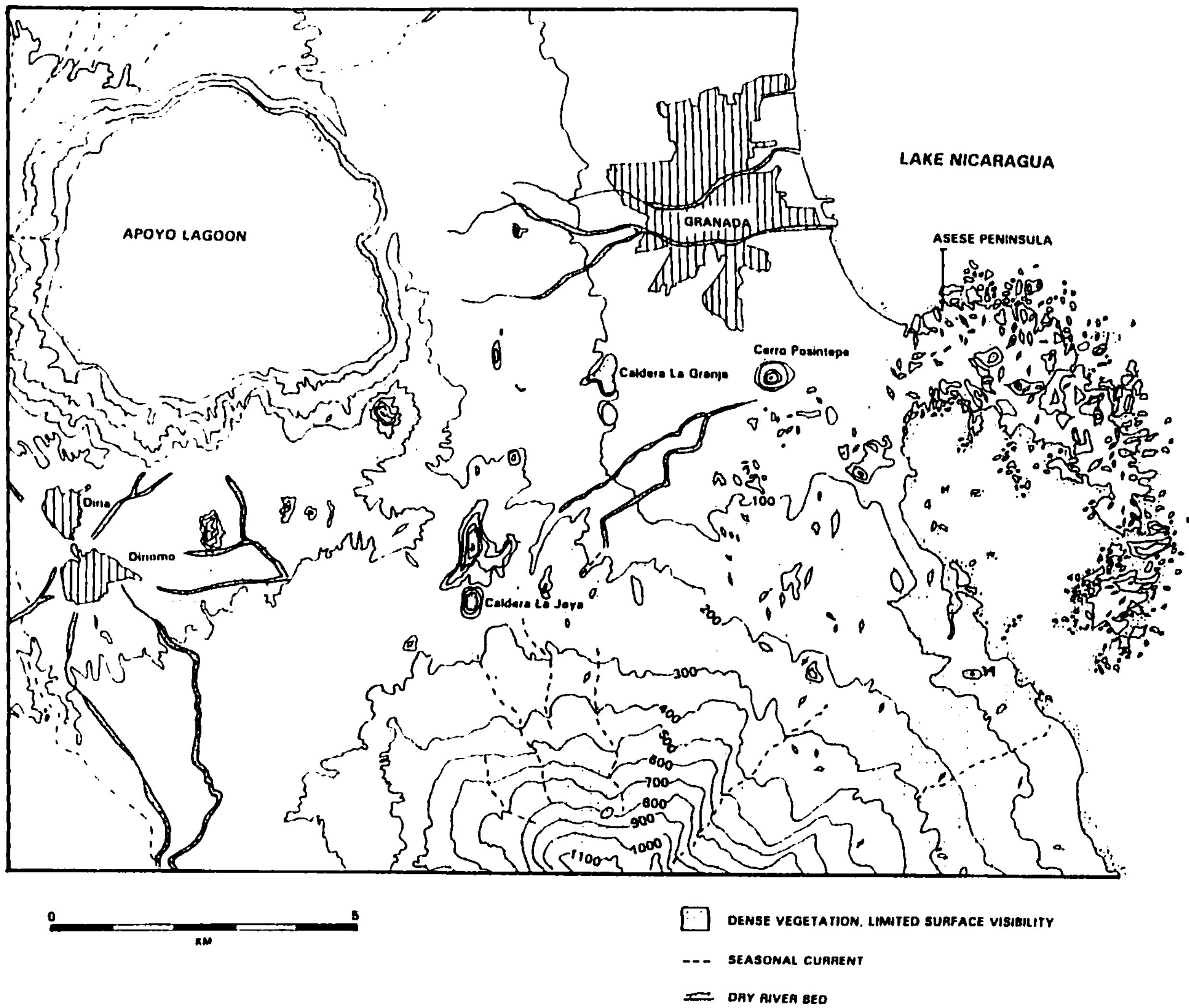

Figure 4.2a Distribution of some natural features of surveyed area

In the northern half there is a lighter, savanna-type vegetation with grasses and scattered trees. The concentration of sites there is less dense than in the northern half, with the exception of the coastal area (Fig. 4.1). This difference again could be related to the quality of soils.

Another characteristic of the area is the lack of permanent water sources on the surface, aside from Lake Nicaragua and the Apoyo Lagoon. Until a few years ago the lagoon was contained in the Caldera La Joya (Fig. 4.2a). Riverbeds are found in the region (Fig. 4.2a), but they are filled with water only during the rainy season.

Some archaeological sites are situated in areas where the nearest permanent source is located 3.5 km away or even more (Table 4.2). This seems to indicate that good soils frequently were more important than the proximity to a water source in the selection of settlement areas. Nevertheless, the possibility exists that in pre-Columbian times other permanent water sources existed. Indeed, during the survey we were informed that in the environs of the site San Ignacio (N-Gr-15), a spring provided water permanently until some years ago. Specialized studies are necessary to determine if other water sources existed near the sites.

If the pre-Columbian population did not have access to other sources of permanent water, important investments of time and human resources were probably involved in the solution of the problem. There is no indication that reservoirs were built, and perhaps the water had to be carried to the site in pottery or other types of vessels. Even in last century, Indian women from Masaya usually carried water from the lagoon of the Masaya volcano to their houses. Gourds were used as containers, and they were tied to the forehead with a leather strap.[2]

SETTLEMENT PATTERN OF THE OROSÍ/TEMPISQUE PERIODS

No evidence was gathered regarding the settlement of the region before 1000 B.C. The absence of this evidence cannot be explained by survey methodology, since even small sites were detected.

No Paleoindian or Archaic site has been reported so far in Pacific Nicaragua with the possible exception of the site of Acahualinca, in Managua (Williams, 1952). Very little evidence has been found in northwestern Costa Rica (Sheets 1984:156). In contrast, several findings of Paleoindian and

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[2] Stephen (1982:10) wrote that while visiting the Volcán Masaya he saw fifteen or twenty women carrying water from the lagoon. He stated that this was the only means they had to procure the water needed in their households. Until some decades ago, in rural areas of Costa Rica and Nicaragua big ceramic vessels were used as water containers. In a tropical environment clean water cannot be stored for more than a few days, even in this type of container that keeps water cool. This means that water needs to be carried frequently from the source. Stephen (1982:10) mentions that the women from Masaya spent a significant amount of time every day procuring the water.

Archaic occupation have been reported for other regions of Costa Rica and Panamá.

That difference indicates, perhaps, that the population on the southern end of the isthmus settled in a more permanent way and/or was larger than the population in the northern sector. That would explain why in the earlier periods of occupation in Nicaragua, little traces of preceramic sites have been found. In Honduras the situation is similar to Nicaragua, and the few indications of preceramic sites cannot securely be dated to the Paleoindian or to the Archaic (Hasemann and Lara Pinto 1993:155-157). Nevertheless, it is worth noting that--to the best of my knowledge--no specific project has been directed to locate Paleoindian and/or Archaic settlements in these countries.

The Problem of Separating Orosí and Tempisque Surface Components

There are not any well-defined ceramic complexes for these periods in the regional sequence. Therefore, based only on surface remains, I cannot establish clear-cut divisions between them. So far, only the excavations at Ometepe have yielded materials to define ceramic complexes that pertain to Orosí in Pacific Nicaragua.[3] The sequence from Rivas did not establish ceramic complexes associated

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[3] I refer here to published materials. An ongoing project directed by Fred Lange has yielded some ceramics that could be related to Orosí (Lange, personal communication 1995).

with Orosí (Healy 1980), though it is probable that some of the Avilés components may be related to this period (Healy 1980; Lange 1980a).

The main problem in differentiating these periods, based on surface remains, is related to the chronological placement of the Bocana Incised type. Though Bocana is generally associated with complexes dating to the latter part of Orosí (Lange 1980a), some researchers date the type to the Tempisque period[4] (Hoopes 1987). In the absence of stratigraphic contexts for this type in Granada, the possibility exists that the samples of Bocana found on the surface belong to Tempisque and not to Orosí.

In addition, the scarcity of Rosales Engraved samples on surface makes the identification of early Tempisque components difficult. Rosales is present only in small numbers in sites of Guanacaste and Pacific Nicaragua, but it is diagnostic of the Tempisque period.

A general problem of the components of Orosí and Tempisque is the limited size of the sample collected. Except for the Ayala site (N-Gr-2), the sample did not

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[4] Indeed, the type is present in components of the Los Angeles phase (800-300 B.C.) at Ometepe (Haberland 1992:74-75). Only traces of it were found in Avilés components (Healy 1980: 300), dated by Healy to what is now the Tempisque period. To the south, in Costa Rica, Lange (1980a) defines Bocana as diagnostic of the Loma B (800-300 B.C.) complex, but Hoopes (1994:74) considers Bocana as a type of the early part of the Tempisque period (Early Arenal, 500 B.C.- 0) in the Arenal region.

exceed 10 sherds of Bocana and Rosales combined. This could be related to the components being covered by latter ones, therefore limiting their presence on the surface. But, most likely, it could also be related to the fact that the cultural remains are scattered, especially in the case of Orosí components. So far, Orosí sites excavated in other regions have yielded relatively small artifactual samples (Haberland 1992:70, Hoopes 1987:169, 177).

Other types, such as Espinoza Red Banded and Usulután-related reach their maximum popularity during Tempisque (Gorin 1990:240; Healy 1980:115-118, 239-241; Hoopes 1987:415-420), but are also present in Bagaces. When these types are found with types diagnostic of Bagaces, it is not possible to determine if they are the product of the cultural activity of Tempisque or Bagaces.

The problems discussed above could only be solved with future stratigraphic excavations in components of Orosí and Tempisque.

<u>Settlement Pattern</u>. Five sites, 14% of all recorded within the region, were occupied during Orosí/Tempisque (Table 4.3). The site N-Gr-23 is the only one located near a permanent water source (Table 4.2), and none was found on the coast of Lake Nicaragua. They are located inland between the Mombacho Volcano and the Apoyo Lagoon, between 200 and 300 meters of altitude, in the southern half of the region (Fig. 4.3). Though the soils are fertile, I do not know if

Table 4.3 Orosí/Tempisque period settlement system

Site N-Gr-	Estimated Area (Hectares)	Site type	Imported Artifacts	Level of Hierarchy
2 Ayala	100[1]	Dispersed village	-	1
14 Veracruz Abajo	1	Hamlet	-	1
15 San Ignacio	3	Hamlet	-	1
22 Arlen Siu	2	Hamlet	-	1
23 Mena	1	Hamlet	-	1
21 Catarina[2]	Undetermined	Undetermined	-	-

[1] The area of the Ayala site represents a cluster of Orosí/Tempisque sites ranging in area from 1.5 to 28 hectares. A map is included in the next chapter showing the distribution of each component of the cluster.

[2] Sites under dashed line are located adjacent to the research region.

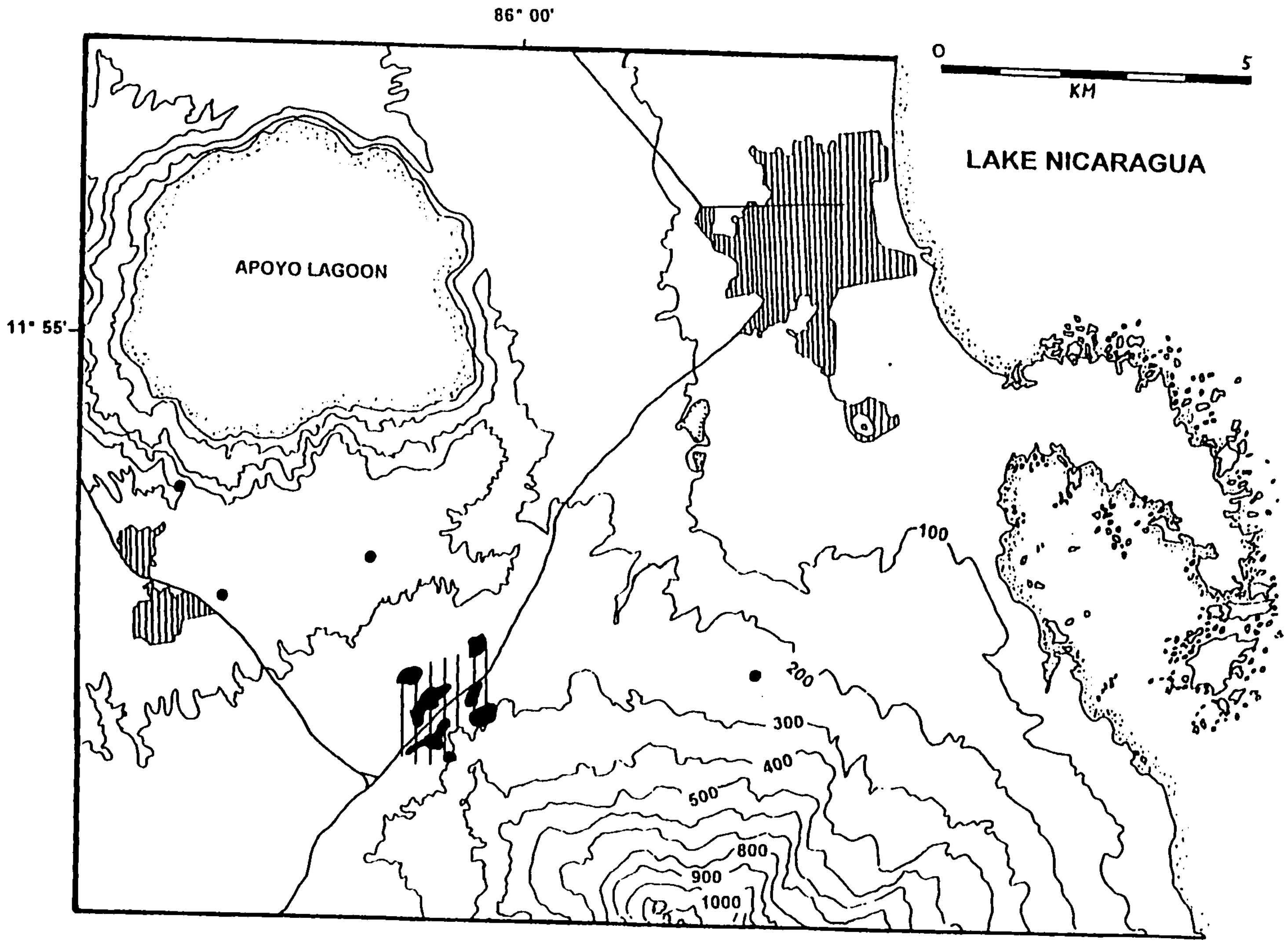

Figure 4.3 Orosi and Tempisque periods, settlements in the survey region

agriculture was part of the productive activity of these periods.

In sites of northern Costa Rica evidence of agriculture dates as early as 2000 B.C., during the Early Tronadora phase, are indicated by macrobotanical and pollen specimens recovered in the Arenal region (Hoopes 1987:74-80; Mueller 1992:210). Haberland (1992:73-74) argues that the early Orosí occupation in Ometepe could very likely be explained by the high fertility of its soils. No other resource seems to have offered an advantage for the population to move from the isthmus to Ometepe (Haberland 1992:73). Botanical data from these regions supports the probability of an early development of agriculture in Granada.

The main settlement, the Ayala site (N-Gr-2), is a dispersed village, while the rest are hamlets (Fig. 4.4). Ayala, as will be discussed in the next chapter, could perhaps be better described as a cluster of sites, since its surface components are spaced (Fig. 4.4). These components varied in size from 1.5 to to 28 hectares.

There is not a clear indication of a hierarchy of settlements, though an incipient process of nucleation can be observed at N-Gr-2. This process seems to precede the development of a regional hierarchy in the following period, where N-Gr-2 is at the top of the hierarchy.

Outside the region only one site has components of Orosí/Tempisque (N-Gr-21). Its extension and other features

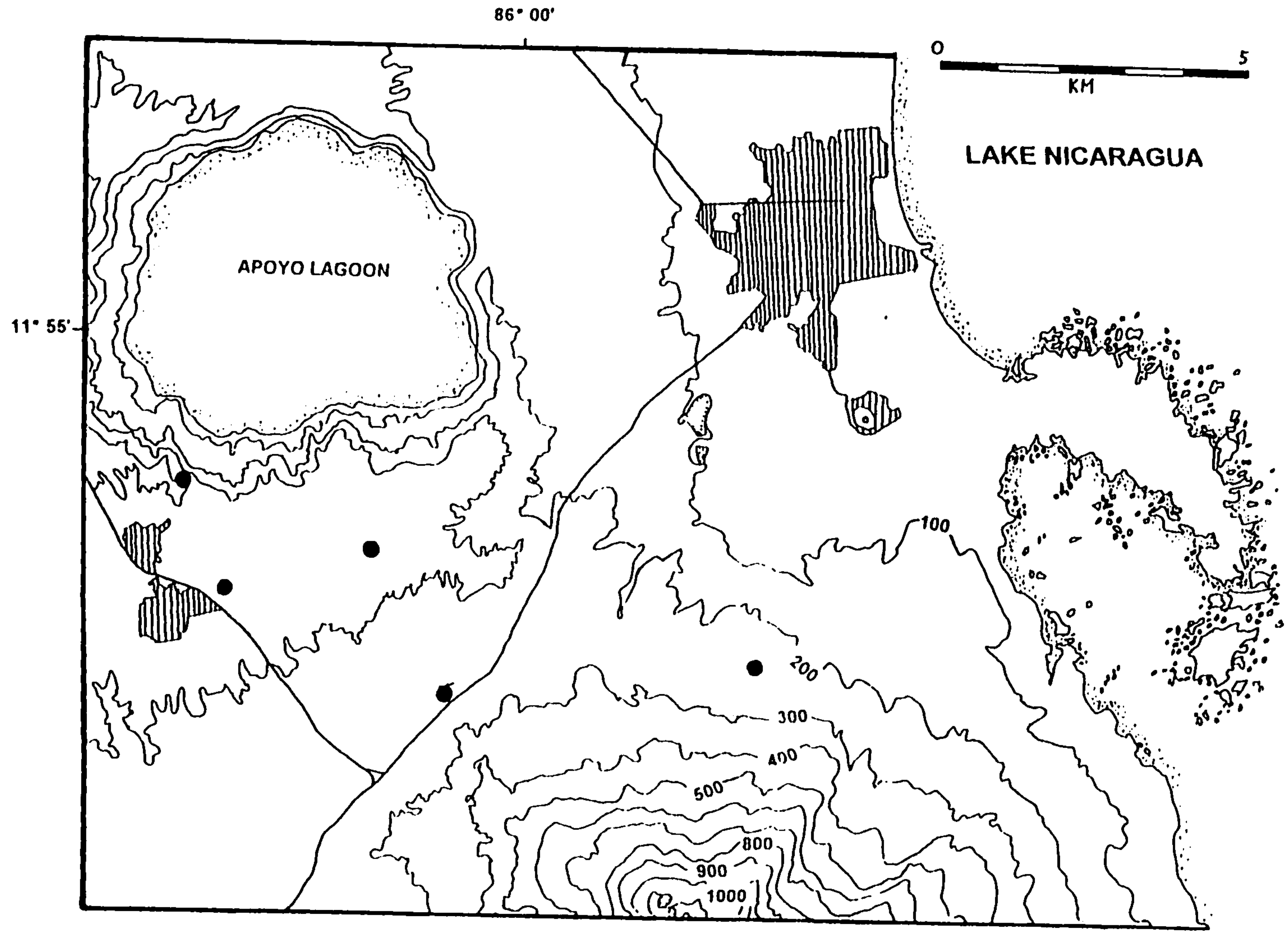

Figure 4.4 Orosi and Tempisque periods, hierarchy of settlements

were not determined. The site, as well as all from these periods, is multicomponent.

The settlement system of Orosí/Tempisque is a disperse one. The evidence gathered on the surface indicates that the population was not spatially concentrated, and therefore did not produce areas with high concentration of cultural remains. The population estimated for the period is 1,200.[5]

THE SETTLEMENT PATTERN OF THE BAGACES PERIOD

Eight sites--or 24% of all sites located within the region--have Bagaces components. This represents an increase of 3 sites (60 percent) with respect to Orosí-Tempisque (Table 4.4).

The occupation of the Orosí/Tempisque sites continues during Bagaces, and all but the Mena (N-Gr-23) site grew larger. This and the higher number of sites indicate an increasing population, estimated at 3,150 for the whole region.

Most sites are located in the area between the Mombacho and the Apoyo Lagoon. New areas were also settled. A hamlet (N-Gr-10) is on the coast of Lake Nicaragua (Fig. 4.5), but the scarcity of evidence of its occupation suggests the possibility of a seasonal or sporadic occupation (see

[5] The method by which I obtained the population figures presented in this chapter is explained in chapter 3.

Table 4.4 Bagaces period settlement system

Site N-Gr-	Estimated Area (hectares)	Site type	Imported Artifacts	Level of Hierarchy
2 Ayala	200	Nucleated village	Cer[1] Obs[2]	1
10 Tepetate	1	Hamlet		2
14 Veracruz Abajo	3	Dispersed village		
15 San Ignacio	20	Dispersed village		2
20 Evert Silva	10	Dispersed village		2
22 Arlen Siu	25	Dispersed village		2
23 Mena	1	Dispersed village		2
24 Cutirre	2	Undetermined		?
43 Justina Vázquez	2	Hamlet		2
19 Playas Verdes[3]	130	Nucleated Village	Cer Obs	1
21 Catarina	Undet.	Undetermined		?

1 Ceramics including Delirio Red-on White, Ulua Polychrome, Tenampua class of Ulua Polychrome, Galo Polychrome Jaguar Variety. The latter was found only at N-Gr-2 Ayala.

2 Obsidian from Guinope, Ixtepeque and Zacualtipan. The identification of obsidian sources applies to N-Gr-2, but obsidian from Playas Verdes very likely comes from Guinope and Ixtepeque.

3 Sites under dashed line are located adjacent to the research region.

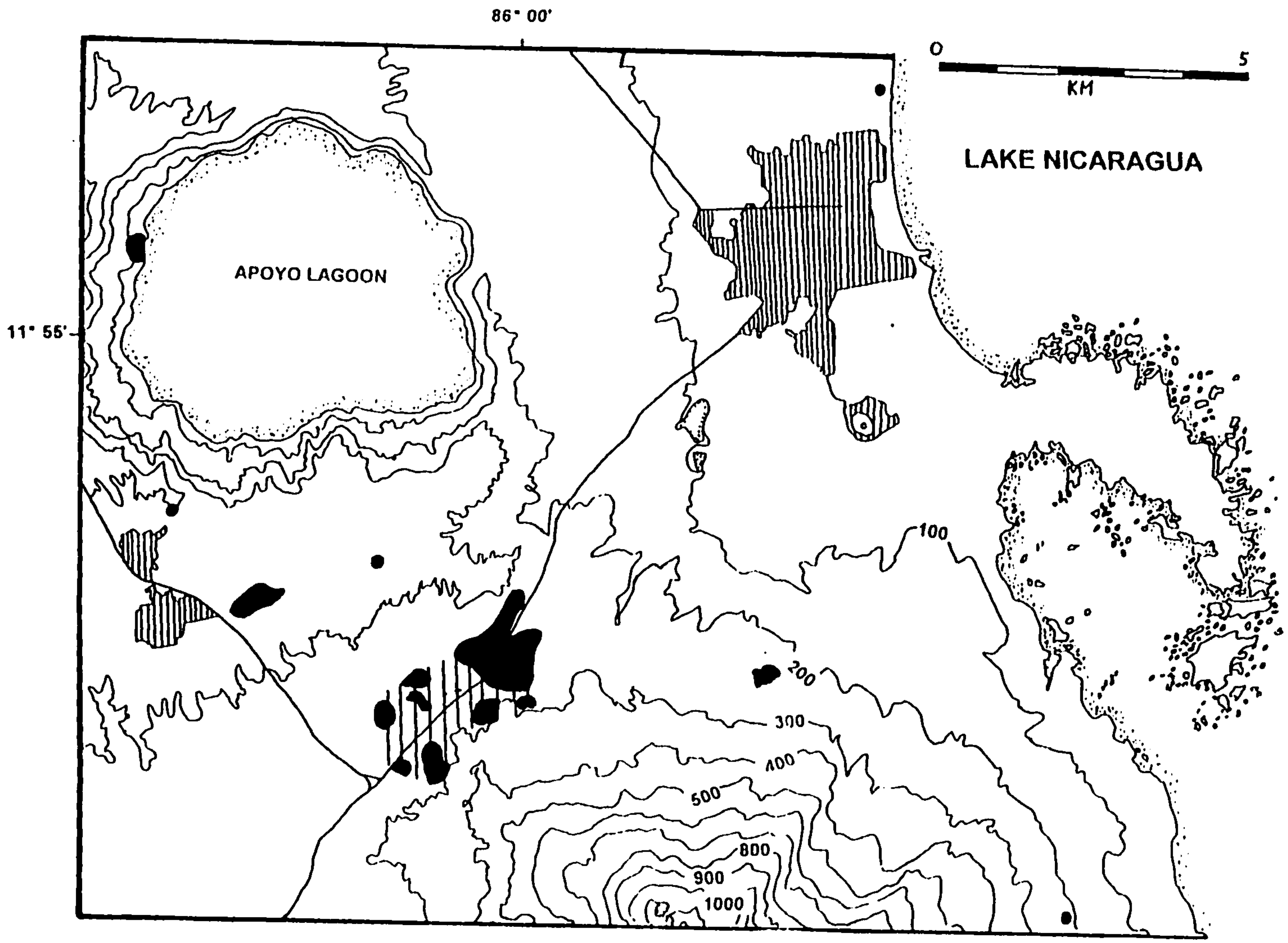

Figure 4.5 Bagaces period, settlements in the survey region

Appendix B).[6] Another site (N-Gr-24) is located two kilometers inland, south of the Mombacho Volcano. Since its boundaries were not clearly determined I left it unclassified.

A hierarchy of settlement can be clearly defined for the first time (Fig. 4.6). Ayala (N-Gr-2) is at the top of a hierarchy of two levels. The site is clearly larger (Table 4.4) and is more densely occupied than any other site of the period. In addition, this is the only site where foreign artifacts were recovered (Table 4.4). Indeed, during Bagaces there was indication of increasing macroregional interaction, especially with regions located to the north of the research area. I will discuss this in more detail in the next chapter.

Aside from the density and extension of the occupation, the layout of the sites does not show dramatic changes. There is no surface indication of public architecture or construction of residential mounds. The only difference is that, for the first time, knolls are clearly utilized to place domestic structures.

The settlement system indicates the emergence of a society with at least an incipient process of social and

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[6] As discussed in the description of the site in Appendix 2, the evidence of occupation is limited to less than 1% of the ceramic sample collected at the site. Nevertheless, it should be mentioned that Lange and associates (Lange et al. 1992) also report Bagaces occupation for this site.

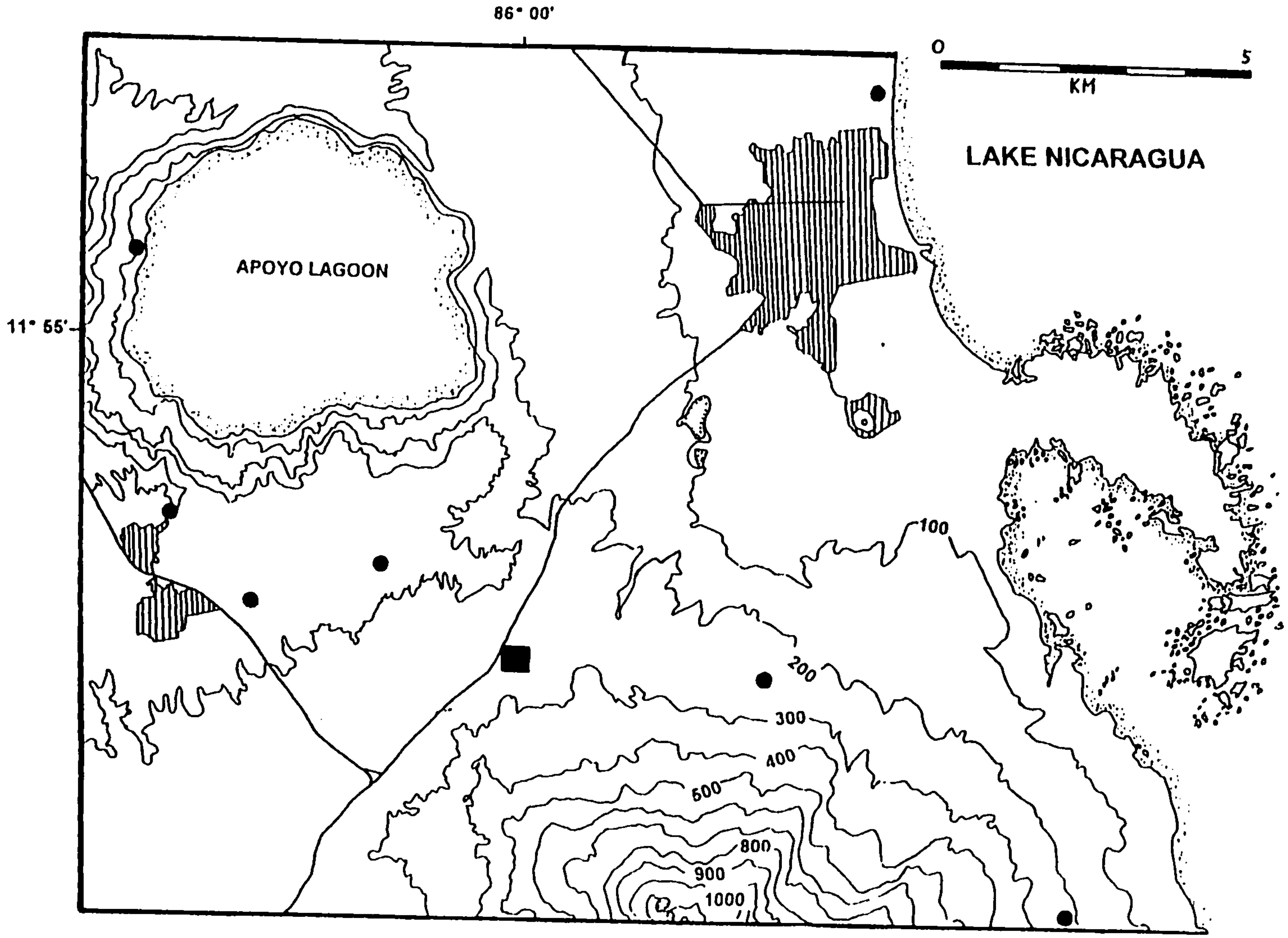

Figure 4.6 Bagaces period, hierarchy of settlements

■ First level ●Second level

political differentiation. Using the ideal types discussed in chapter 2, the settlement of this period corresponds to a society similar to those commonly classified as chiefdoms. A regional center emerged (Ayala site) and most of the population apparently was nucleated there. The inhabitants of this center, or at least a group of them, apparently controlled the networks of long-distance trade, and therefore dominated one of the mechanisms of wealth accumulation. The relevance for emergent or well-established elites to associate themselves with distant places has been highlighted in chapter 2. This association usually takes place by means of the acquisition of material objects and/or esoteric knowledge. The control of a long-distance network is therefore not only a mechanism of wealth accumulation, but also of building status. Both factors potentially contribute to the creation and consolidation of political power.

Outside the survey region two sites were located (Table 4.4). One was already occupied during Orosí/Tempisque (N-Gr-21). The other site is a nucleated village (N-Gr-19) with an approximate extension of 150 hectares. The boundaries were well defined except for those of the northeast sector, where vegetation impeded an accurated determination. Nevertheless, that sector shows a low surface density, and it is likely that the boundaries remain quite close to the area defined so far. This site has similar characteristics to Ayala (N-

Gr-2), though the evidence of occupation is not as dense and extense as in Ayala. The latter has a nucleated sector of 128 hectares with remains in high density. This alone almost corresponds to the area of Playas Verdes. Evidence of the utilization of knolls for the placement of domestic structures and access to foreign artifacts were also recovered at Playas Verdes.

At this point I cannot assess if both Ayala and Playas Verdes were part of a single polity, or if they were the seats of two different polities. All the sites located within the region are closer to Ayala than to Playas Verdes, and for this reason I associated them with the former. In the absence of site distribution data to the south, west and east of Playas Verdes, I cannot determine if this site is related more closely to other sites outside or to the sites inside the region.

To solve this problem the survey region needs to be expanded. Its boundaries, after all, were arbitrarily defined and did not correspond to a geographic region.

THE SETTLEMENT PATTERN OF THE SAPOA PERIOD

There is a dramatic increase in the number of sites and in the occupation of the coastal area. Thirty-five Sapoá sites were recorded (Table 4.5), representing 95% of all sites identified within the region. The remaining 5% were not assigned a chronology in the absence of diagnostic

Table 4.5 Sapoá period settlement system

Site N-Gr-	Estimated area (hectares)	Site type	Foreign Artifacts	Level of Hierarchy
2 Ayala	235	Dispersed village	Obsidian	3
5 La Chuscada	1*	Undetermined		Undet.
7 Laguna Azul	74	Dispersed village	Obsidian	3
8 La Joya	18	Dispersed village		3
10 Tepetate	224	Town	Obsidian	1
14 Veracruz Abajo	7	Dispersed village		3
15 San Ignacio	204	Nucleated village	Obsidian	2
16 San Diego	1*	Cemetery		
17 La Conquista	9	Nucleated village		3
18 El Tulito	3	Hamlet		3
20 Evert Silva	136	Nucleated village		3
22 Arlen Siu	67	Nucleated village	Obsidian	3
23 Mena	149	Dispersed village	Obsidian	3
24 Cutirre 1	8*	Undetermined	Obsidian	Undet.
26 Rafaela Herrera	9	Dispersed village		3
27 Cementerio Diriá	4	Hamlet	Obsidian	3?
28 Tepeyac	38	Dispersed village		3
29 La Chanchera	3	Hamlet		3
30 La Zopilota	3	Hamlet		3
31 Raf. Joya Arana	67	Dispersed village		3
32 El Diamante	1	Hamlet		3
33 San Rodolfo	1*	Undetermined		Undet.
34 Chavarría	1	Hamlet		3
35 Argüello	57	Cemetery		
36 La Calera	16*	Undetermined		Undet.
37 Punta La Calera	17	Dispersed village		3
38 El Arenal	1	Undetermined		Undet.
39 El Rayo	60*	Nucleated village		2
40 La Marota	4	Hamlet		3
41 La Venada	4	Hamlet		3
42 La Concha	5	Hamlet	Obsidian	3
43 Justina Vázquez	14	Dispersed village		3
46 Méndez	14*	Undetermined		3
47 El Elequeme	2	Hamlet		3
49 Torovenado	20	Dispersed village		3
19 Playas Verdes[1]	5	Hamlet		
21 Catarina	Undet.	Undetermined	Obsidian	
44 Capulín 2	1	Hamlet		
48 Cutirre 2	15*	Undetermined		

* The boundaries of these sites are not clearly defined.

[1] Sites under dashed line are located adjacent to the research region.

material. Twenty-eight new sites were occupied, an increase of almost 300% in site occupation from Bagaces. At the same time, a continuity in the occupation of Bagaces sites must also be noted. The population for this period is estimated at 17,750 inhabitants.

Several changes occur in the settlement pattern. The number of sites situated on or near the coast of Lake Nicaraguais notable. Fifteen settlements, representing 40% of all Sapoá sites are located in this area (Fig. 4.7), contrasting with only a 12% of Bagaces sites. During Sapoá the first occupation of the areas of savanna located in the northern half and the plains near the coast of the Apoyo Lagoon (Fig. 4.7) also takes place. Sites are larger, in general, than in the preceding period (Tables 4.4, 4.5).

Other significant changes occur in the settlement pattern at the site level. Some cemeteries are spatially separated from habitation sites (N-Gr-16, N-Gr-29 and N-Gr-35). Architecture visible on the surface appears for the first time, but only in some settlements[7] (Fig. 4.2, Appendix B). This is limited to low stone-faced mounds, contrasting with the use of natural features for the placement of domestic structures during Bagaces.[8] With the

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[7] These sites include N-Gr-10, N-Gr-15, N-Gr-17, N-Gr-22, N-Gr-24, N-Gr-36 and N-Gr-40.

[8] Unfortunately, areas where mounds were located had a very poor density, due to vegetation. We were unable to clear any of these mounds totally. The mounds that we were able to observe, at least partially, were low mounds,

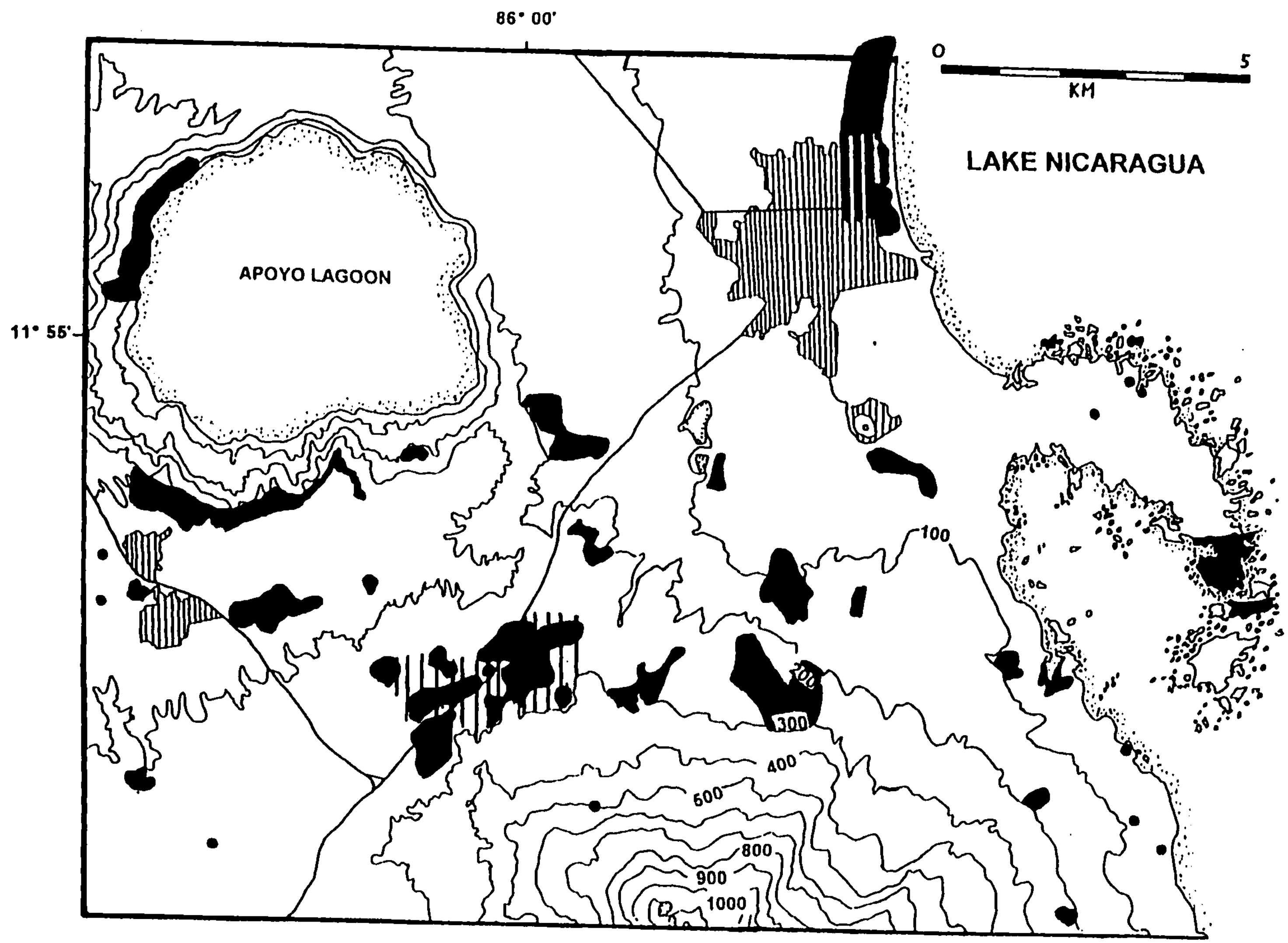

Figure 4.7 Sapoa period, settlements in the survey region

advent of these architectural features statuary also emerges in some sites (N-Gr-15, N-Gr-39), providing a strong indicator not only of specialization but also of regional hierarchization, as discussed in chapter 3. Finally, among the notable changes observed in the settlement pattern of Sapoá is the emergence of new regional centers that replace the main settlement of Bagaces[9] regional centers--both within and adjacent to the region (N-Gr-2 and 19)--losing their importance and becoming lower ranking sites in the regional sociopolitical hierarchy (Figs. 4.6, 4.7).

In Sapoá the regional pattern is structured in a three level hierarchy (Fig. 4.8). At the top of the hierarchy is the town of Tepetate (N-Gr-10), located on the coast of Lake Nicaragua. As explained in the description of the site in Appendix B, the area where mounds were located was destroyed in the early 70s, and just two mounds, partially destroyed, could be observed during the survey. Based on the reconstruction of the site made with aereal photographs, the stone-faced mounds seem to have been spatially arranged around a plaza (Appendix B, Fig. B.1). Foreign artifacts are

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similar to platforms. The height is usually under 1.5 meters and they are flat on top. The mounds are covered with slab-stones. Gordon R. Willey (1959) described this type of mounds, that he saw at Tepetate, as "vaguely ovoid in outline and look as though they may have been platforms."

[9] Indeed, Ayala (N-Gr-2) and Playas Verdes (N-Gr-19) are reduced to lower ranking sites in the regional hierarchy of Bagaces. It must be remembered that Playas Verdes is located adjacent to and not within the research region.

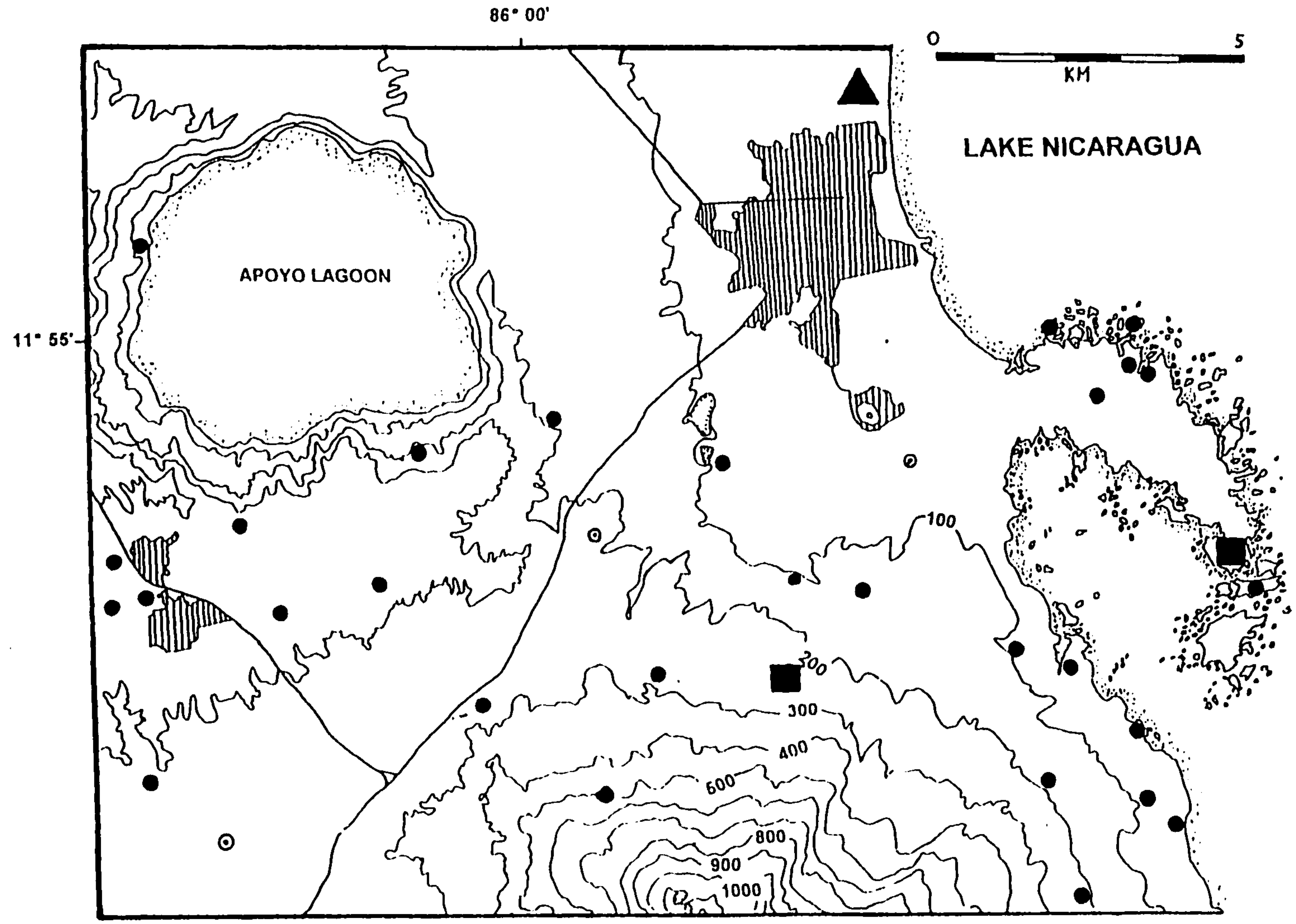

Figure 4.8 Sapoa period, hierarchy of settlements

▲ First level ■ Second level ● Third level ⊙ Cemetery limited to obsidian. Evidence of craft specialization in this site is suggested by numerous ceramic figurine molds (Appendix B).

In the second level of the hierarchy are two nucleated villages (Fig. 4.7), San Ignacio (N-Gr-15) and El Rayo (N-Gr-39). The first is located in the piedmont of the Mombacho Volcano, the other in the Asese Peninsula (Fig. 4.6). These sites are clearly differentiated from other nucleated villages by the presence of statuary, and by the extension and density of their nucleated area[10] (Appendix B). Sites from the first and second level of the hierarchy are equidistant, situated 8-8.5 kilometers apart forming a triangle (Fig. 4.8).

In the third level of the hierarchy are the remaining settlements, including 3 other nucleated villages, 11 dispersed villages as well as a number of hamlets (Table 4.5, Fig. 4.8). All sites adjacent to the survey region were occupied during Sapoá.

Foreign artifacts, limited to obsidian, are more widely distributed than in the previous period (Table 4.5). Nine sites (26% of all sites) had imported artifacts, while during Bagaces only one did (13% of all sites). In other words, while Sapoá sites from the three levels of the

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[10] As detailed in the description of each site in Appendix B, both N-Gr-15 and N-Gr-19 have a nucleated area associated to Sapoá, whose extension is at least twice the size of other nucleated villages of the period.

regional hierarchy had access to these goods, only the main settlement did during Bagaces. Perhaps this is related to a less centralized control over imported goods due to wider and more dynamic exchange and trade mechanisms.

Other aspects probably point to the development of a more dynamic economy during Sapoá. I have already mentioned that evidence for specialization has been noted at Tepetate (see description of the site, Appendix B). The wider distribution of sites in the region could also point towards specialization, with sites on the coast of Lake Nicaragua extracting certain products and exchanging them for cultigens and other inland products. Indeed, Werner (n.d.) mentions the existence of Indian fishing villages near the city of Granada in early *Tasaciones.* The reconstruction of the economy of this period will require intensive research including excavations. At this point the ideas presented here are speculative, though, as will be discussed in chapter 6, excavations at Ayala also yielded some evidence for specialization, this time in the production of obsidian artifacts.

In summary, the Sapoá settlement system is more complex than Bagaces. A series of changes occur both at the macro and the micro levels of the settlement pattern, in addition to an important growth of the population and occupation of new areas. These changes are accompanied by changes in the technologies of lithic and pottery artifacts and in the iconography of the latter. These will be discussed in chapter 6.

The three level hierarchy--as well as the other data discussed for the period--indicates that the polities of Sapoá could perhaps be better typified as complex chiefdoms. Intermediate centers in the hierarchy are supposedly the seat of ruling elite members that occupied middle levels in the chain of political and social power.

The Spaniards described the native settlement pattern as disperse, with few settlements having areas of nucleation around plazas. The largest settlements were composed by a string of nucleated and dispersed areas. The pattern emerging from Sapoá does not greatly differ from that picture.

SETTLEMENT PATTERN OF THE OMETEPE PERIOD

Problems Differentiating Ometepe from Sapoá Settlements

A continuation of the main decorated types of Sapoá in Ometepe ceramic complexes makes it difficult to distinguish surface remains from each period. As will be discussed in detail in chapter 6, the latest ceramic phase defined extends from A.D. 1150 to A.D. 1550. This means that it covers the latter part of Sapoá as well as Ometepe.

The ceramic complexes of the regional phases of Sapoá and Ometepe have Papagayo Polychrome as its main polychrome type, and Sacasa Striated as the main type with plastic decoration. Other types--such as Vallejo Polychrome, Madeira Polychrome, Luna Polychrome and Castillo Engraved--are part of the complex associated to the latter part of Sapoá as well as Ometepe. But all these types, though significant in chronological terms, are usually present in percentages of less than two percent in stratified deposits. In sites with low density surface remains, it is probable that these minor but chronologically significant types are present in minimal quantities on the surface, and were perhaps missed during collection.

I classified as Ometepe only those sites where the minor but chronologically significant types were collected. The probability exists that I did not classify some Ometepe sites as such, and they are indicated with a question mark in figure 4.2. Only excavations or perhaps very systematic surface collections will permit a definitive answer to the chronological range of those sites.

The Settlement Pattern

Twenty six settlements, or 70% of all located within the region, are assigned to Ometepe with certainty (Table 4.6). This represents a decline of nine sites from the preceding period. Consequently, the estimated regional population decreases to 16,450 inhabitants. As I mentioned previously, these estimates should be taken cautiously since Ometepe components are perhaps underrepresented in the regional sample.

Table 4.6 Ometepe period settlement system

Site N-Gr-	Estimated area (hectares)	Site type	Foreign Artifacts	Level of Hierarchy
2 Ayala	240	Dispersed village	Obsidian	3
5 La Chuscada	1*	Undetermined		Undet.
7 Laguna Azul	74	Dispersed village	Obsidian	3
8 La Joya	18	Dispersed village		3
10 Tepetate	224	Town	Obsidian	1
14 Veracruz Abajo	7	Dispersed village		3
15 San Ignacio	204	Nucleted village	Obsidian	2
16 San Diego	1*	Cemetery		
18 El Tulito	3	Hamlet		3
20 Evert Silva	136	Nucleated village		3
22 Arlen Siu	67	Nucleated village	Obsidian	3
23 Mena	149	Dispersed village	Obsidian	3
24 Cutirre 1	8*	Undetermined	Obsidian	Undet.
27 Cementerio	4	Hamlet	Obsidian	3?
30 La Zopilota	3	Hamlet		3
31 Raf. Joya Arana	67	Dispersed village		3
33 San Rodolfo	1*	Undetermined		Undet.
34 Chavarria	1	Hamlet		3
35 Argüello	57	Cemetery		
36 La Calera	16*	Undetermined		Undet.
37 Punta La Calera	17	Dispersed village		3
38 El Arenal	1	Undetermined		Undet.
39 El Rayo	60*	Nucleated village		2
40 La Marota	4	Hamlet		3
41 La Venada	4	Hamlet		3
42 La Concha	5	Hamlet	Obsidian	3
21 Catarina[1]	Undet.	Undetermined	Obsidian	
48 Cutirre 2	15*	Undetermined		

* The boundaries of these sites are not clearly defined.

[1] Sites under dashed line are located adjacent to the research region.

The nine sites apparently abandoned belong to Sapoá's lowest hierarchy level (Tables 4.5, 4.6). The reduction of the occupation occurs mainly in the southern half of the region (Fig. 4.9), where 66% of abandoned sites were located.[11] The other abandoned sites are located on the coast of Lake Nicaragua. The settlement pattern is now more concentrated on the lake's coast, where almost half (46%) of the sites are situated (Fig. 4.9).

In spite of the decline in the number of sites, the regional hierarchy maintains three levels (Fig. 4.10). Tepetate continues as the main center of the region, and San Ignacio and El Rayo are the only second level sites (Table 4.6, Fig. 4.10). The remaining sites are classified as tertiary centers. The polities of Ometepe are considered having roughly the same characteristics as those from Sapoá.

Ometepe sites with access to foreign goods remain the same as Sapoá (Table 4.6). Nevertheless, in relative terms these sites increase from 26% in Sapoá to 35% in Ometepe.

If the data from the Ometepe settlement pattern are accurate, then the apparent decline in the population of the regions remains to be explained. Excavations in the Sapoá and Ometepe sites will be necessary to reconstruct this change and to refine our understanding of the social processes that took place during those periods.

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[11] These include N-Gr-17, 26, 28, 29, 43 and 49 in the southern half, and 32, 37 and 46 on the coastal area.

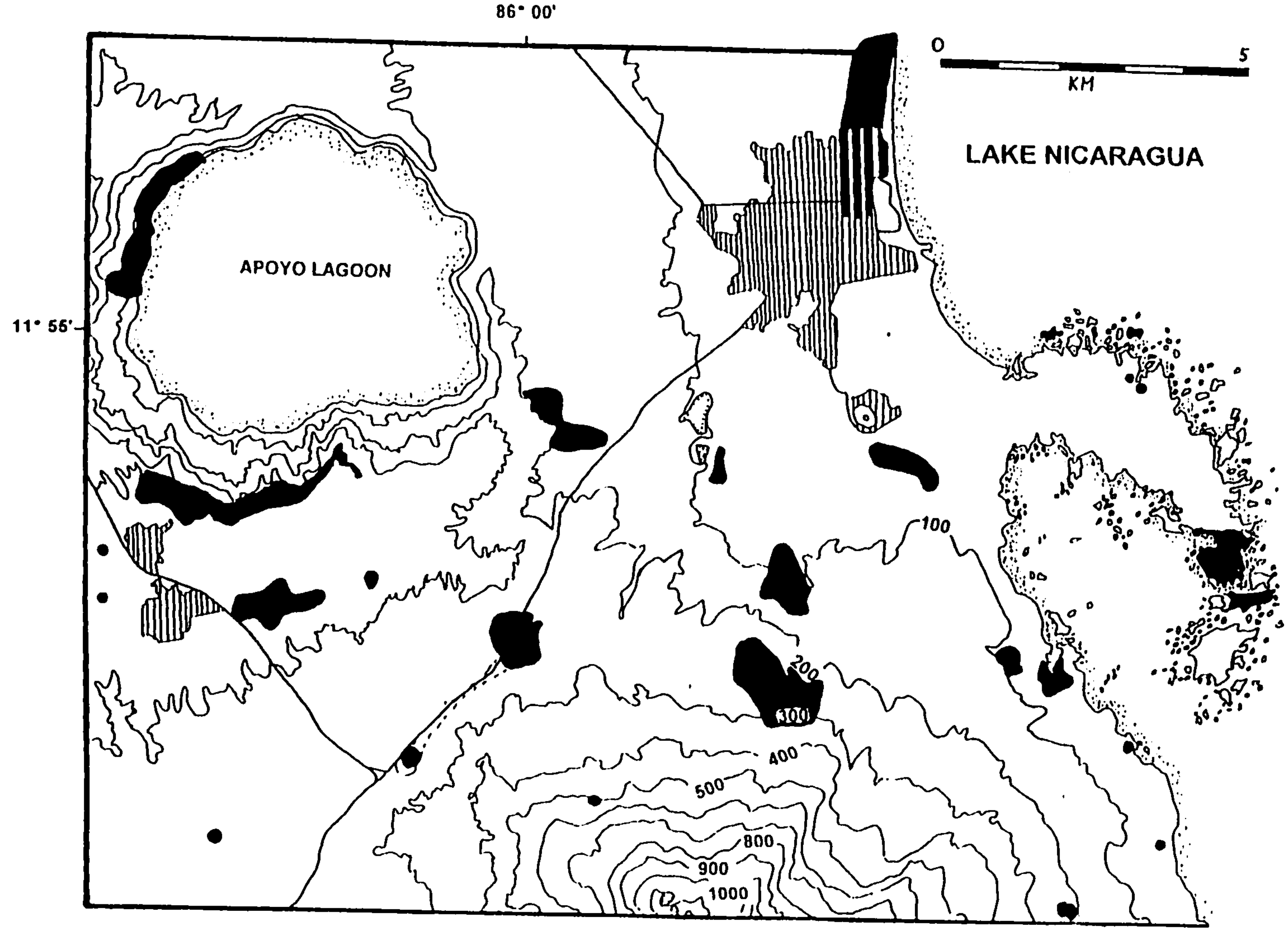

Figure 4.9 Ometepe period, settlements in the survey region

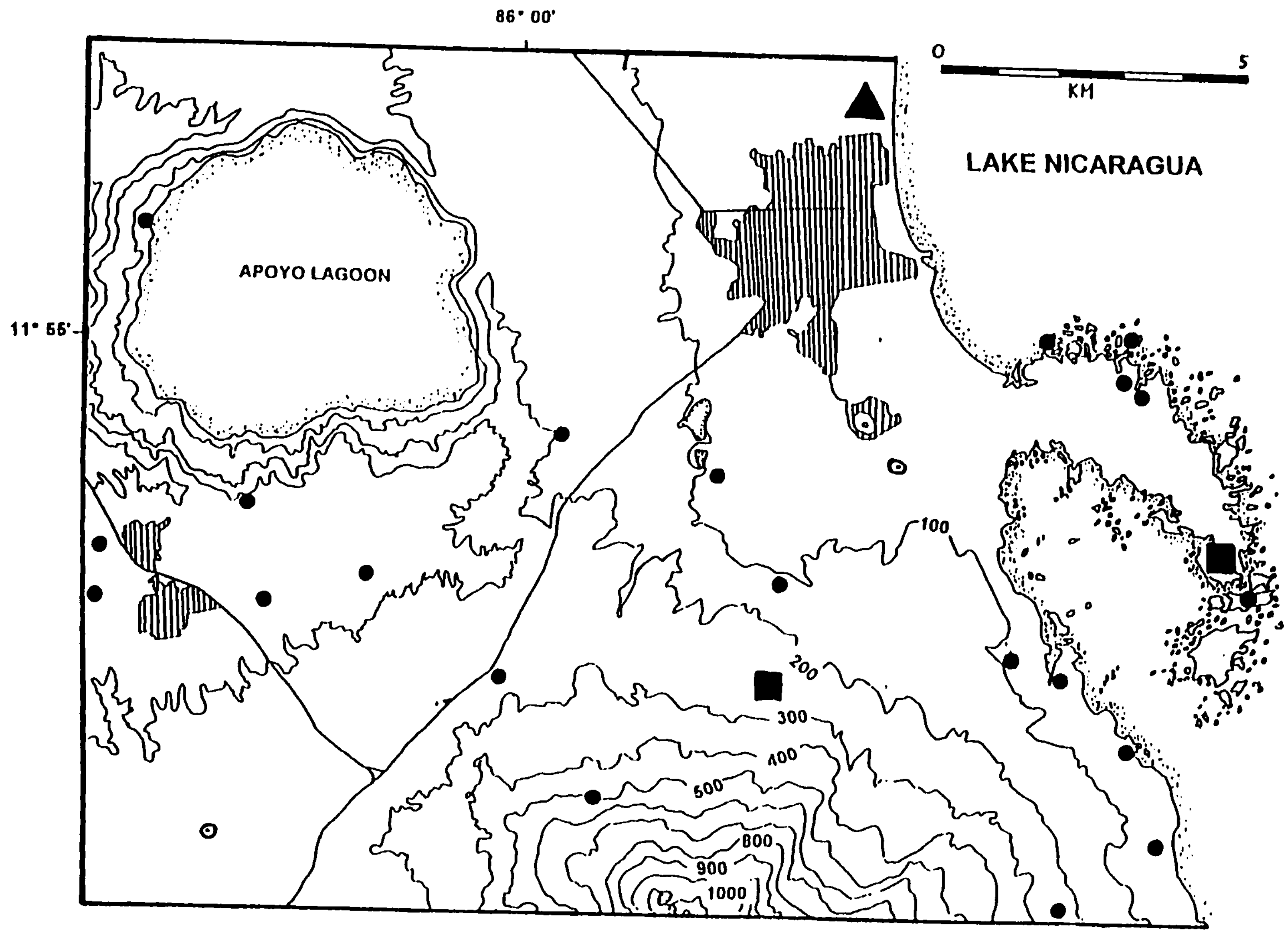

Figure 4.10 Ometepe period, hierarchy of settlements

First level ■ Second level ● Third level ⊙ Cemetery

THE REGIONAL PATTERN OF GRANADA AND OTHER REGIONS OF PACIFIC NICARAGUA

Recent archaeological projects in Pacific Nicaragua provide a still weak comparative data base. Only at the general level can comparisons be established. The lack of well-established ceramic and chronological sequences in other regions obscures the reconstruction of the settlement system and its changes.

Estelí/Madriz

The settlement pattern of this region and its changes through time cannot yet be clearly reconstructed. No long-term regional sequence has been established, though it is certain by crossdating that many sites were occupied at least during Bagaces, and probably earlier (Fletcher 1994). No certainty exists about occupation later than Bagaces (Fletcher 1994; Salgado and Fletcher 1994), but the few examples of sherds pertaining to the Sapoá and Ometepe periods in Greater Nicoya open the possibility of at least a minor occupation during those periods (Fletcher 1994:24-25).

This ongoing project has yielded, so far, a total of fifty-nine sites, of which thirty have circular or ovoid stone-faced mounds (Fletcher 1994:71-72) and sometimes platforms. The sites generally are located on alluvial plains close to rivers, and almost all are habitation sites.

Two hilltop and two petroglyph sites are the only exceptions. A linear-stream pattern has been observed with the larger alluvial plains occupied by the largest and more complex sites and the secondary tributary streams by smaller and simpler sites.

The layout of sites is different from those of Granada. Not only almost half of the sites have mounds, but some have up to 128 of them. In settlements with numerous mounds a pattern of hierarchization is frequently observed. Larger and higher mounds and platforms are located in a central area, usually around a plaza. This area is surrounded by minor structures (Fletcher, Salgado and Espinoza 1994). Among the larger sites there is possibly more than one plaza. Rectangular basal platforms sometimes served as the base for the construction of mounds (Fletcher 1994:7).[12] The structure of these sites clearly differs from the known sites of Granada, which are larger but lack the architectural complexity observed in Madríz/Estelí.[13]

Reportedly all major sites are coeval and roughly fall in the chronological range of the Bagaces period (Fletcher

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[12] In some sites a platform serves as the base for a mound, but in other cases 2 to 3 mounds were built on a platform.

[13] The sites in the Estelí/Madríz project are smaller, the largest estimated area being 14 hectares (Fletcher 1994:39). But evidently the architectural complexity of the sites is far greater than anything we observed in Granada.

1994:5).[14] The three regional centers are situated in an equidistant pattern forming a triangle, each of them located on a strategic position in the region. According to Fletcher (1994:9) this pattern makes it possible to "monitor and/or control comings and goings of groups; key access points to dominate in economic, political or military materials."

The findings of the Estelí/Madríz project indicate a process of political centralization roughly coeval with the one reported for Granada. Nevertheless, both regions are clearly differentiated by most material culture produced during that process. These differences are illustrated not only in the layout and extension of sites, but also in the ceramic and lithic complexes. The derivation of these differences will be discussed in chapter 7.

Lake Managua Basin

The nearest project to the north, in the basin of Lake Managua, yielded sites with components that extend from Tempisque to Ometepe (Espinoza, González and Rigat 1994). A general difference with Granada is the size of settlements. Seventy-seven of the 78 sites recorded have an area of 5 hectares or less (Espinoza, González and Rigat 1994).

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[14] Diagnostic ceramics enable cross-dating with Honduran sequences, due to the presence of stylistic similarities with some types of Central Honduras, as well as the findings of Ulua Polychrome sherds, including Black Stage and Tenampua class examples. Delirio Red-on-White, from Quelepa, were also found (Fletcher 1994:24-28).

Approximately 63% (49) of all sites were not dated, and the rest were assigned mainly to the Sapoá and Ometepe periods.

The settlement pattern in the northeastern section of the basin is characterized by small sites with an average size of .25 hectares (Espinoza, González and Rigat 1994:160), and located near rivers. Most are habitational, but apparently only a few are funerary, and one was classified as a lithic workshop (Espinoza, González and Rigat 1994:164). Mounds reportedly were common in some sites, but most of them have been leveled by agriculture and other activities.

From excavated deposits at the Tamarindo site, the construction of mounds can be associated with Bagaces, Sapoá and Ometepe. A hierarchy of sites has not been clearly defined, but reportedly there is a pattern of distribution of some smaller sites around larger ones (Espinoza, González and Rigat 1994:160). Nevertheless, there is no specification of the period or periods in which this occurs.

In the southern sector of the basin the average size of sites is 1.5 hectares. Two sites have larger areas, San Cristóbal and Los Placeres. San Cristóbal was settled during Orosí/Tempisque and occupied continuously until Ometepe. The site was mapped by Wyss (1983) in the late 70s. At that time it had an approximate area of about 120 hectares with 60 low and circular earthmounds. The six largest mounds were centrally located surrounded by smaller mounds (Wyss

1983:37). These structures have been totally leveled since Wyss work (Espinoza, González and Rigat 1994:164). The peak of the occupation seems to have been reached during Sapoá and Ometepe, but Wyss did not establish if the mounds were built during those periods. Nevertheless, it seems very likely that this is the case. The second site, Los Placeres, was occupied from Bagaces to Ometepe. The area of this site is 20 hectares (Lange et al. 1992:40-41), where 30 mounds were built.

Due to the lack of chronological control not much can be said with certainty about the regional settlement pattern of the basin region compared to Granada. So far, the possibility of a regional hierarchy, and therefore a process of political centralization and social complexity, is offered by the evidence provided by San Cristóbal and Los Placeres. But, as in many regions of Nicaragua, further research is necessary to determine if a process of that nature took place as well as its chronology.

Lake Nicaragua Isles

Two regional projects have been carried out in Zapatera and in Ometepe. Haberland's project in Ometepe located 53 sites (Haberland 1992:76-77). This isle has the longest occupation sequence defined so far in Nicaragua, as was discussed in chapter 1. During the San Roque phase (A.D. 500-950) the occupation reached its climax (Haberland 1992:116), but there is no indication from published data of a hierarchy of settlements at any point of the cultural sequence.

In Zapatera, the projects conducted in the last fifteen years have not dealt directly with questions of social and political organization. In spite of this, it has been suggested that sites such as Punta de las Figuras and Sonzapote, differentiated from simpler sites both in size and layout (Baker and Smith 1987), are the product of societies with sociopolitical hierarchies (Bruhns 1992:340). Both sites reportedly contained ceremonial centers defined by the presence of earthmounds and numerous statues (Lange et al. 1992:28). Bruhns argues that settlements of this nature "suggests either that there was a very important site in an area, head and shoulders above the others in terms of access to labor and general wealth, or, equally, that these were specialized sites, whose effusion of artwork was supported by others for some, as yet, unknown reason" (Bruhns 1992:342).

The main occupation of these sites occured during Sapoá and Ometepe. Though I am not certain they were not ocuppied before, it seems safe to state that a process of sociopolitical differentiation is manifested in Zapatera during those two periods.

Although in a speculative manner, it seems to me that at least Zapatera, and perhaps Ometepe, were part of a larger system involving mainland sites. Again, this could not securely be determined at this point, and hopefully the ongoing research in Zapatera will help clarify the problem.

Chontales

Ninety-seven sites were located during a regional project in Chontales (Gorin 1990; Espinoza and Rigat 1994), defining an occupation that extends from 500 B.C. to the Contact (Gorin 1990). As in other projects discussed so far, questions regarding sociopolitical complexity were not addressed in this project, although some very general information on the settlement pattern has been published (Espinoza and Rigat 1994).

A site with some degree of architectural complexity emerged during the Cuisalá phase (A.D. 400-800), coeval to Bagaces. This settlement (El Tamarindo) has an approximate area of 1.6 hectares, and is situated near the river Cuisalá. It has at least 8 earthmounds, some larger than others, and arranged around a possible plaza.

In the following phases this pattern seems to grow in complexity. Sites grew larger, and those containing mounds have more of these structures. There is also evidence of statuary at least in some of them. As in Pacific Nicaragua, the statuary apparently emerges after A.D. 800 (Espinoza and Rigat 1994:147). The complexity of these sites reaches its climax in the Cuapa phase (A.D. 1400-1600) when three sites have numerous mounds and probably more than one plaza. San

Jacinto, the largest and most complex, has 197 circular mounds spread over 6.5 hectares, the largest of which is centrally located around a plaza. La Candelaria reportedly has 47 stone-faced circular mounds distributed over 3 hectares, and again the largest structure is situated in front of a possible plaza. Finally, El Amparo presents a more spatially structured pattern in terms of the placement of mounds. A closed plaza bordered at each side by two parallel rows of mounds is situated in the southwest sector, and three smaller plazas bordered by mounds were observed. This site has an extension of 4 hectares.

If the difference between mounded and non-mounded sites represents a regional hierarchy, the emergence of at least an incipient complexity is roughly coeval in Chontales, Granada and very likely in Madríz/Estelí.[15] In chapter 7 I will explore whether these developments were part of related or independent dynamics.

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[15] As will be discussed in chapter 8, the material culture of these three regions differs significantly, but it does not imply an independent development (e.g. Salgado and Fletcher 1994).

Chapter 5

THE COMMUNITY PATTERN: THE AYALA SITE

Ayala was chosen as the case study at the community level. The survey showed the site as the main regional settlement when social complexity emerged during Bagaces. In addition, Norweb's (1961b) limited excavations yielded evidence of interaction with regions situated to the north of Nicaragua (Salgado 1992), an aspect also noted through survey data. The focus of my research was to determine the chronology and mechanisms involved in the emergence of social complexity. In this regard, Ayala provided an ideal case study, especially considering the research interest in exploring the relation between macroregional dynamics and local processes.

The research in Ayala was directed to shed light on the settlement pattern at the community level, particularly during Bagaces, though some inferences can be drawn for other periods. I will next discuss briefly the community pattern as reflected by surface data. Later on, I will address the community pattern as reconstructed from stratified deposits.

SURFACE DATA

The Ayala site is the largest in the region, with an area of almost 500 hectares (Table 4.1). A nucleated center extends for approximately 65 hectares with high (40 hectares) and medium (25 hectares) density surface remains (Fig. 5.1). The rest of the site, extending to the south and southwest of this nucleated area, has low density deposits. I interpret this distribution as representing, during certain periods, that of a village with a nucleated residential area surrounded by agriculture fields. Testing this hypothesis will require systematic collection of pollen and phytolits[1] to determine the concentration and distribution of cultigens in the site.

<u>The Orosí/Tempisque pattern</u>

Ayala can be better described as a cluster of sites. Together they represent an occupied area of 85 hectares. The cluster is located to the south and southwest of what will become a nucleated area in following periods. As discussed in the previous chapter, the largest has an extension of 28 hectares (Fig. 5.2, a), and is surrounded by smaller dispersed villages (Fig. 5.2, b-f) and one hamlet (Fig. 5.2,

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[1] Samples for phytolith and pollen analyses were obtained in operations 7 and 8. Unfortunately, they became contaminated when many of the bags containing samples broke, and the samples had to be discarded.

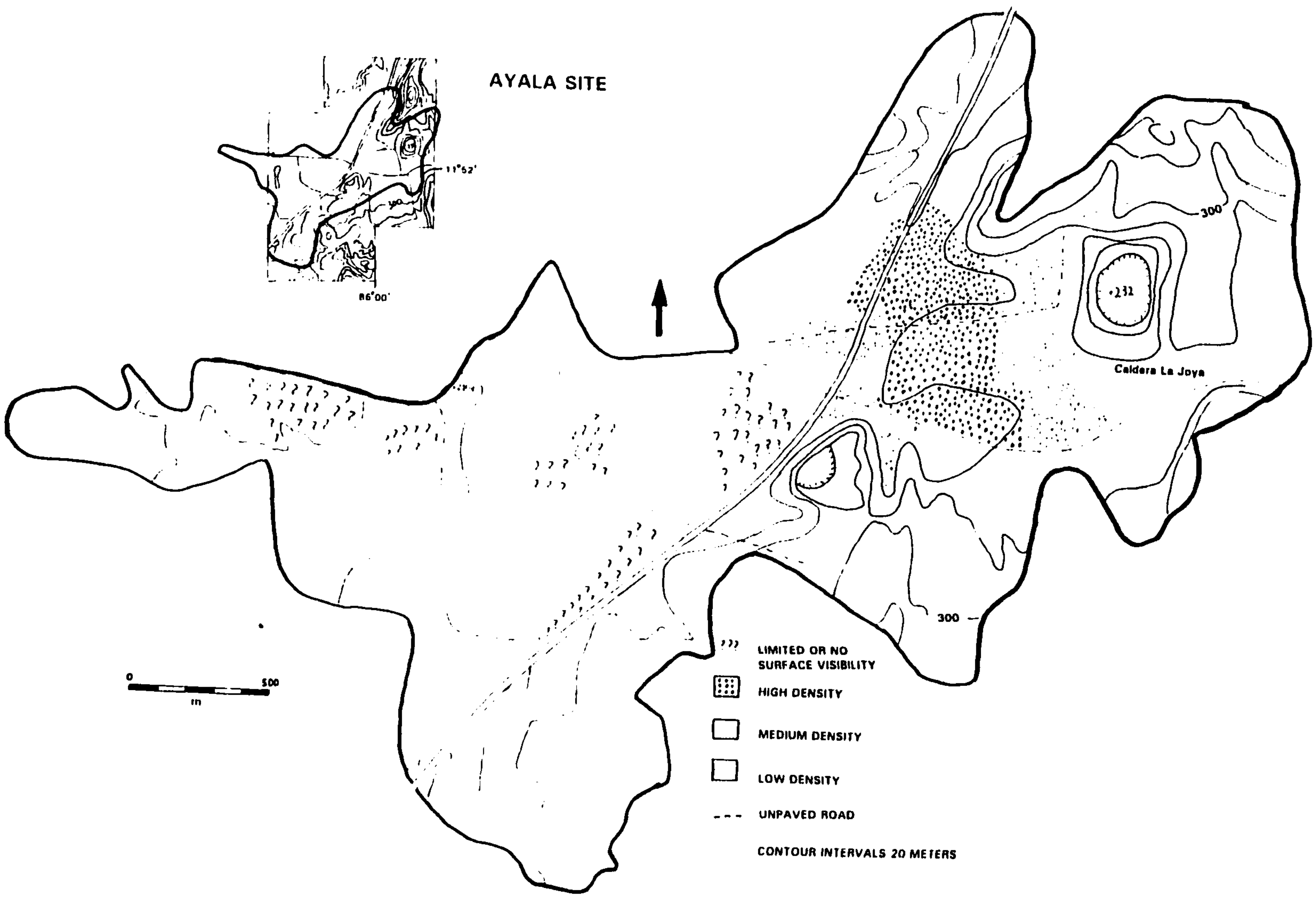

Figure 5.1 Distribution of surface densities, Ayala site

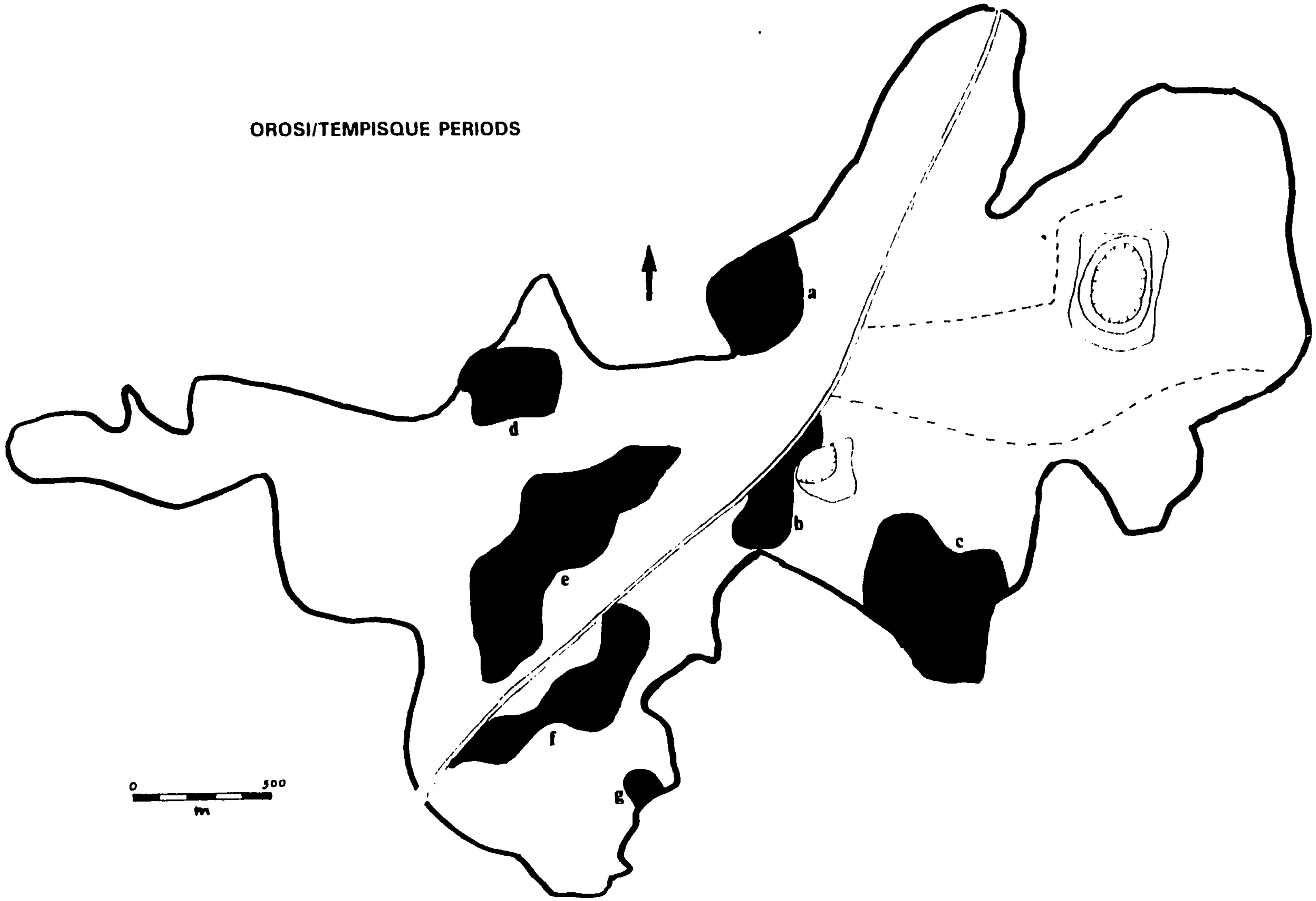

Figure 5.2 Distribution of Orosí/Tempisque surface components, Ayala site

g). Aside from their size[2] no other feature differentiates them, including surface density, which was homogeneously low.

The Bagaces pattern

The spatial organization of the Ayala site changes with the emergence of a nucleated center in a previously unsettled area (Fig. 5.3, a), wherein Bagaces remains are found continuously over 120 hectares. Of these more than half have medium and high density. Foreign ceramics and obsidian were recovered.

Other sectors of the site are located to the south and southwest of that area (Fig. 5.3, b-h).[3] They all have low density remains and roughly correspond to the cluster of sites settled during Orosí/Tempisque. The total occupied area is approximately 200 hectares.

In the nucleated area approximately 27 knolls were located (Fig. 5.4). These features are the product of differential erosion on volcanic derived soils (Mario Zamora, personal communication 1993), and have been modified by human occupation. At least some of them served as the base for residences or other related structures. The knolls

[2] Areas in hectares are as follows: a=12.5, b=6.5, c=23.5, d=10, e=28, f=14.5, g=2.

[3] Size in hectares is b=2, c=19, d=14, e=8, f=19, g=5, and h=16.

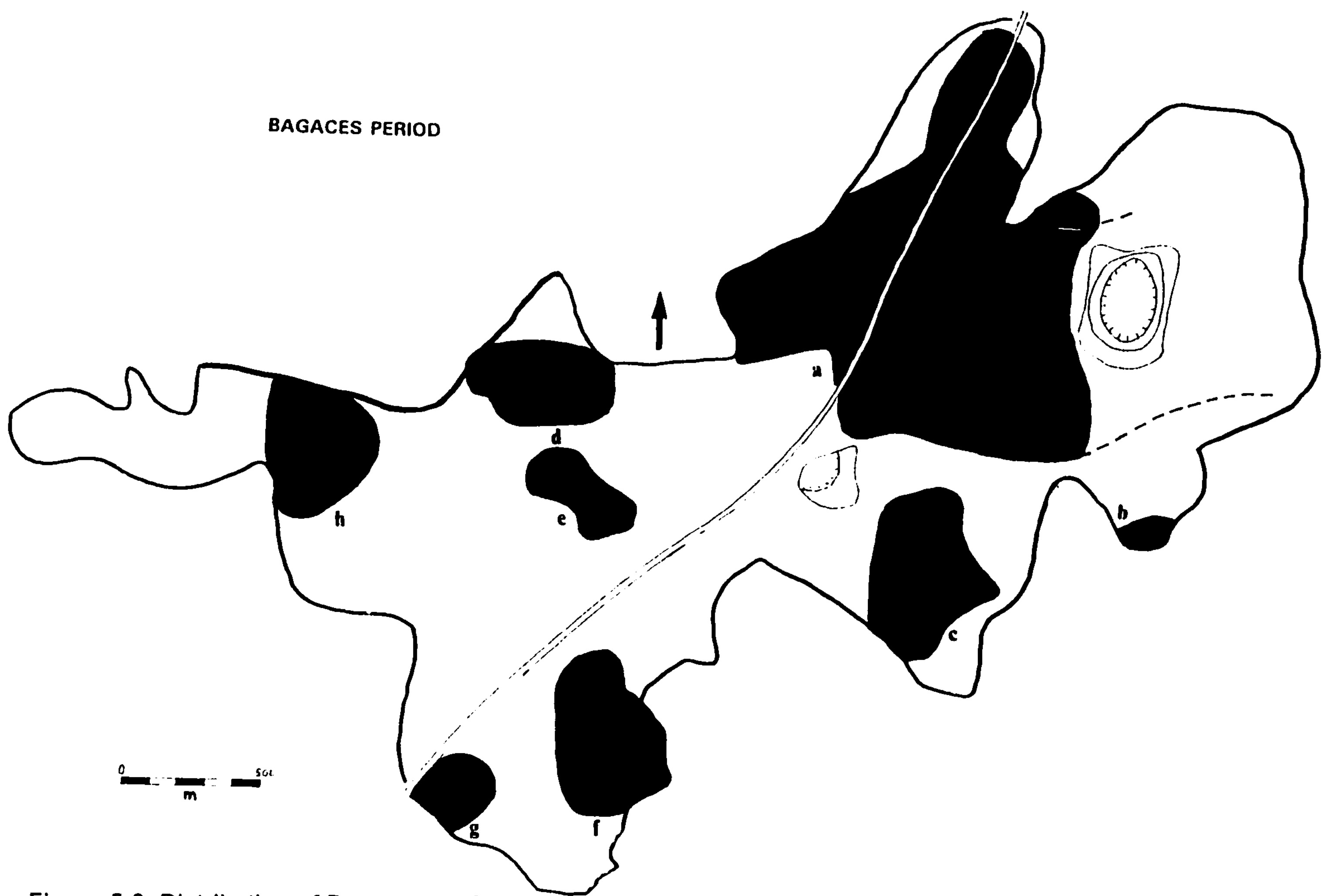

Figure 5.3 Distribution of Bagaces surface components, Ayala site

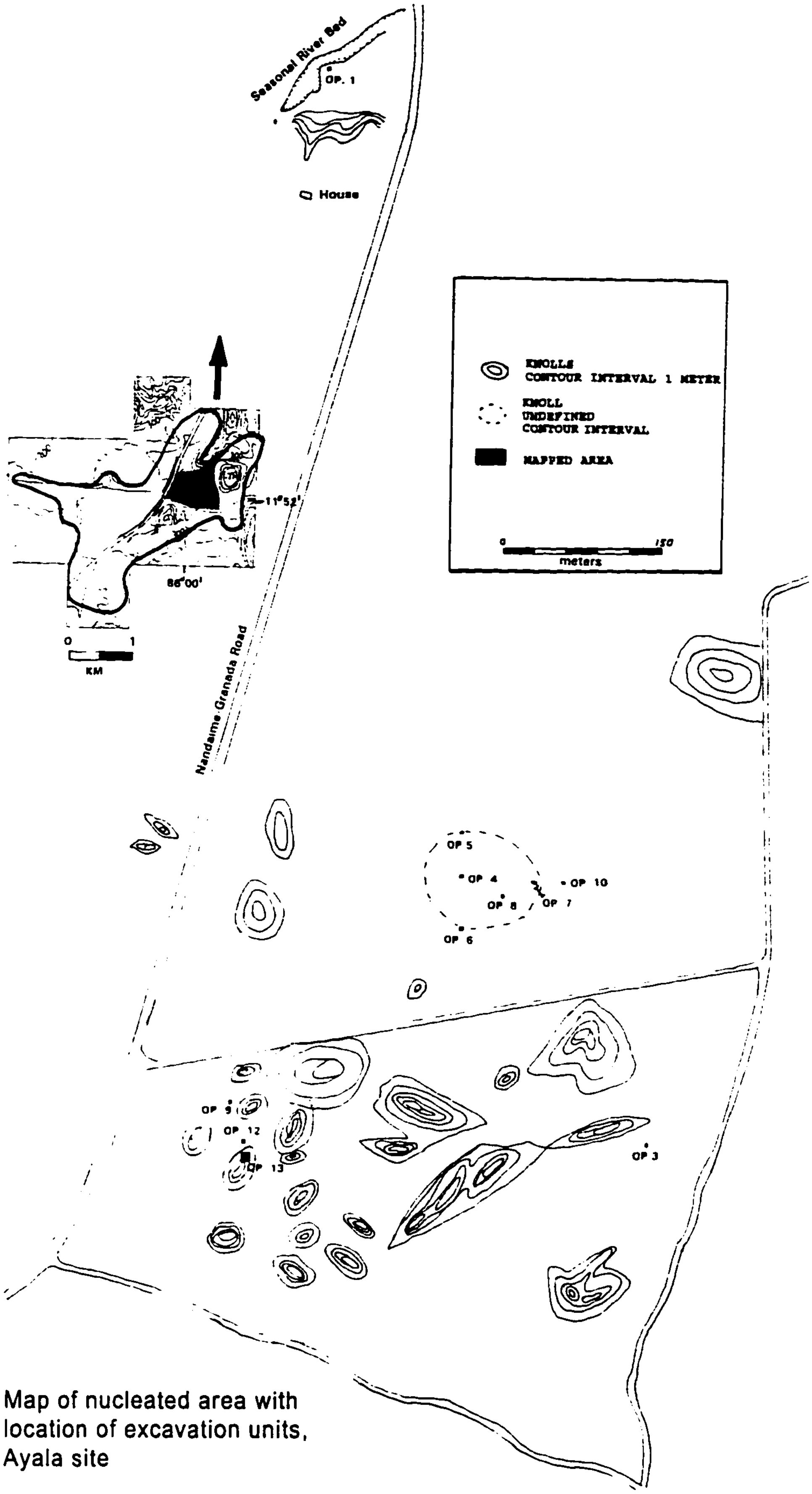

Figure 5.4 Map of nucleated area with location of excavation units, Ayala site

have among the higher concentration of materials in the site.

The layout of the site can, for the first time, be typified as a large nucleated village surrounded by agricultural fields. Though special activity areas were not detected on surface, some evidence was found in excavations (Appendix C).

The changes in the spatial organization clearly indicate a process of nucleation and growth of the population. The notable presence of foreign artifacts points to a process of wealth accumulation and expansion of macroregional networks. Ayala played a central role in the constitution of these processes in the region.

The Sapoá pattern

The total occupied area is 235 hectares, larger than Bagaces (Tables 4.4 and 4.5). But the remains show the occupation to be less intense. The density is lighter in the nucleated area where high density rarely occurs, and even medium density is not that common. This area has a size of 130 hectares (Fig. 5.5, a), and smaller areas with cultural remains were defined in other sectors of the site (Fig. 5.5, b-g).[4] Imported artifacts are limited to obsidian.

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[4] The area in hectares for each occupied sector of the site is as follows: b=8, c=2, d=13.5, e=28, f=38, g=14. All have very light surface density.

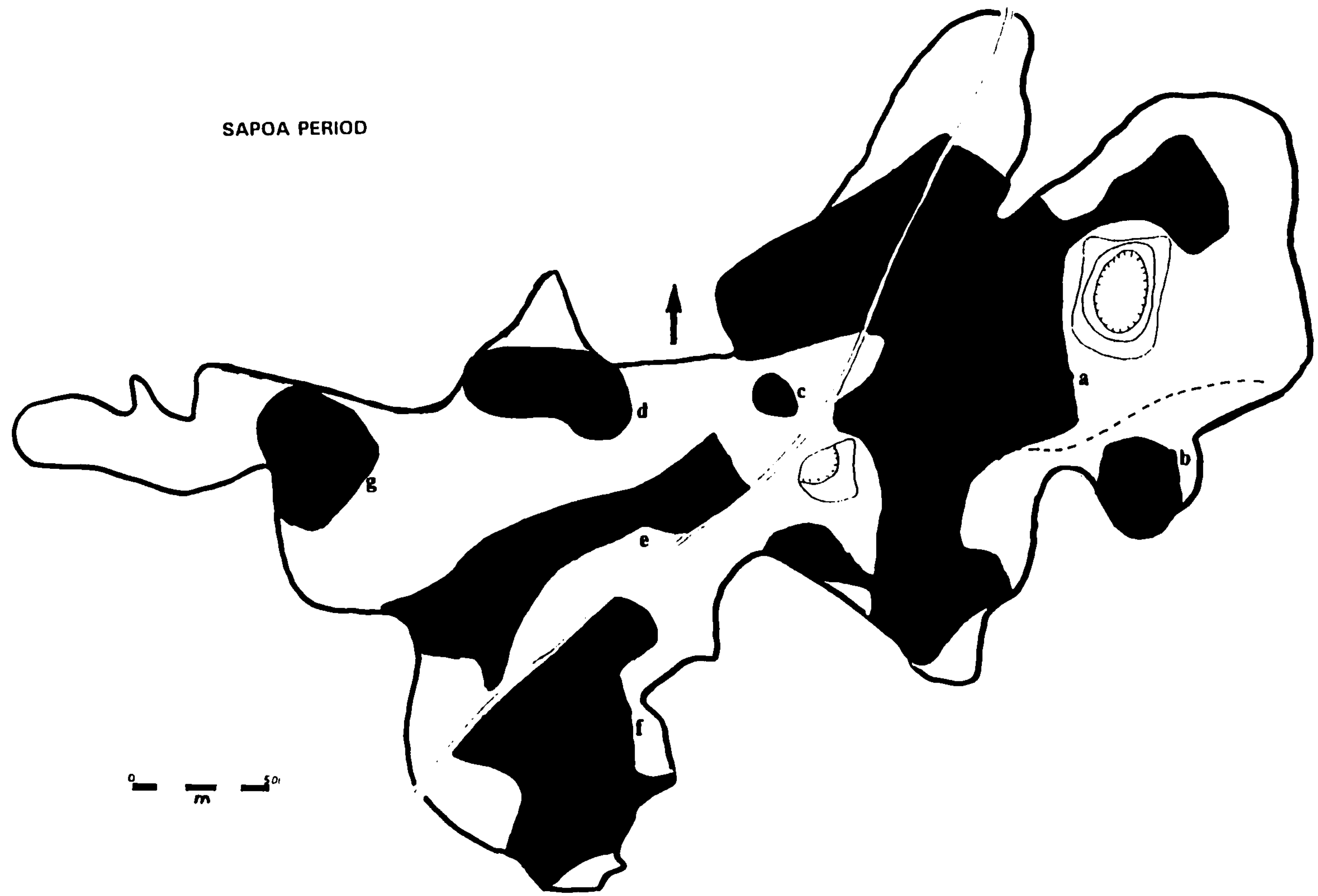

Figure 5.5 Distribution of Sapoá surface components, Ayala site

Overall the surface data point to a decline in the intensity of the occupation at the site. It seems that knolls were not occupied for domestic purposes, or at least with less intensity than in Bagaces.

The Ometepe pattern

By Ometepe the settlement is limited basically to the nucleated area (Fig. 5.6), with a size of about 60 hectares. The total occupied area is 65 hectares, the lowest since Bagaces. Remains are distributed unevenly, continuing a pattern observed in Sapoá. The only evidence of trade during Ometepe is offered by obsidian artifacts.

As stated in Chapter 4, it is difficult to be certain that our surface data reflect the total occupied area during the period. Nevertheless, as will be discussed later, even if the occupation is restricted in its extension, it seems that its intensity is higher than during Sapoá.

The pattern observed during Sapoá and Ometepe is consistent with the regional pattern. Ayala reaches its maximum development in the regional hierarchy during Bagaces, and at the community level this is shown by the density of surface remains. After this, Ayala lost its dominant place and was replaced by new centers. At the community level this is reflected by a decline in occupation.

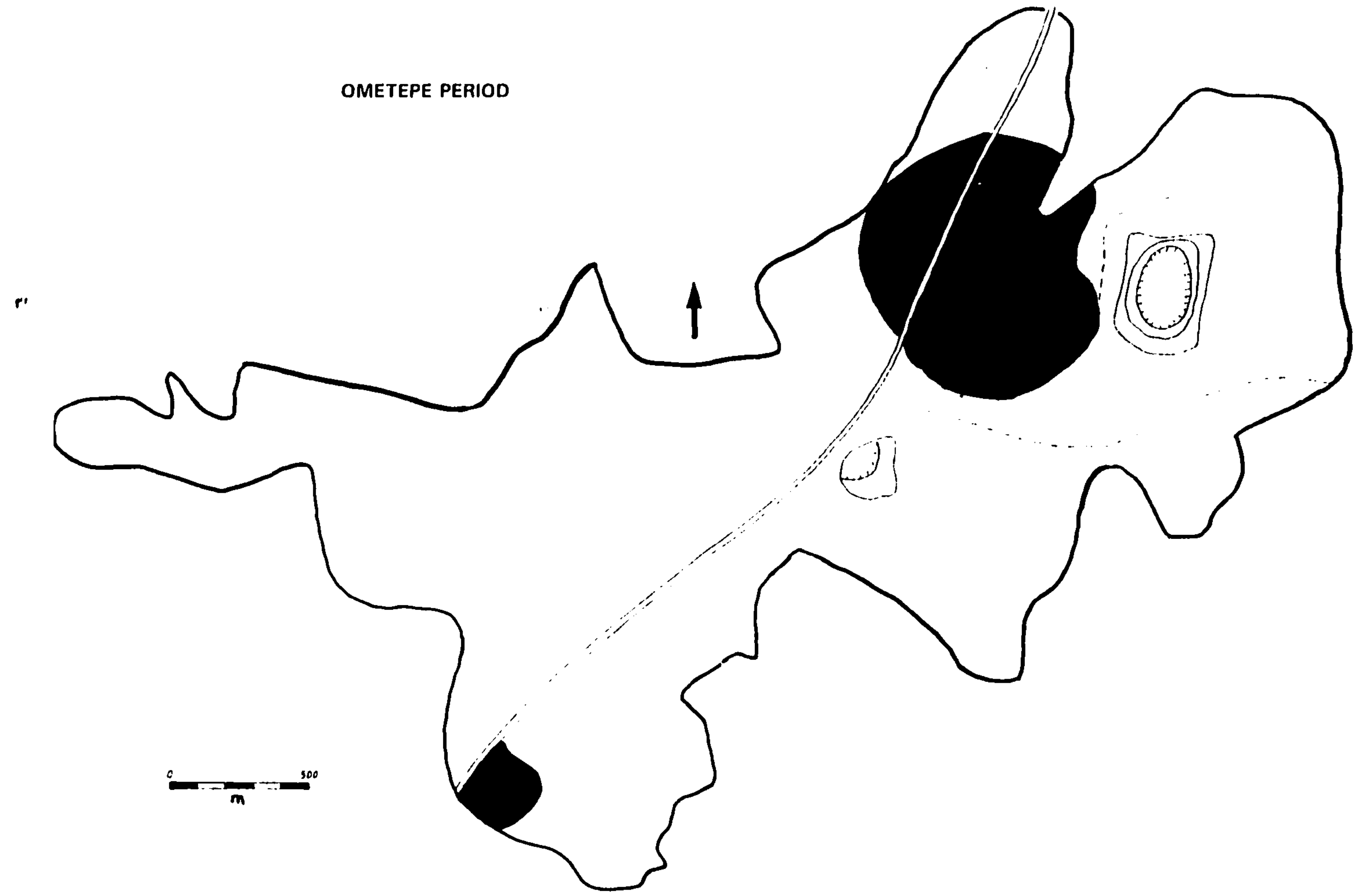

Figure 5.6 Distribution of Ometepe surface components, Ayala site

EXCAVATED COMPONENTS

Most of the fourteen excavation units were placed in the nucleated area (Fig. 5.4). A description of each excavation is provided in Appendix C. Previous excavations by Albert Norweb yielded over 3 meters of stratified deposits, most of them corresponding to Bagaces (Salgado 1992). We did not find such depth in our excavations, but the density of materials in some strata suggests very intensive activity, especially in the Ayala phase (A.D. 650-900/950). Both Norweb's data and our own indicate that Ayala reached its highest occupation during this phase.

The community pattern which emerges from the excavations reinforces that obtained from surface data. Strata corresponding to Orosí/Tempisque were absent from all but perhaps one excavation unit placed outside the nucleated center (see Operation 2, Appendix C). Nevertheless, in previous excavations conducted by Norweb east of operation 13[5] (Fig. 5.4) within the confines of finca El Socorro, stratified deposits corresponding to the latter part of Tempisque were identified (Salgado 1992).

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[5] Unfortunately, we were unable to find the exact location on Norweb's excavation, but it is probably approximately 80 meters southeast of operation 13, near the eastern fence of Finca El Socorro. Norweb placed a 3x3 meter pit on top of a knoll about 4 meters in height (Norweb 1961b).

Remains from the latter phase of Bagaces were uncovered in all the excavation units, even in some with small yields, but only 65 percent of them reported Sapoá/Ometepe components. Nevertheless, as shown below, it is worth noting that at least some stratified deposits of the Xalteva phase (1150-1550 A.D.) a higher density than those of the Ayala phase (650-950 A.D.).

Table 5.1. Artifact density in excavated components* (N/m^3)

Ometepe	Sapoá		Bagaces		Tempisque
	Xalteva	Cocibolca	Ayala	San Antonio	Siu
	6950	2650	4770	1140	270

* Calculations are based on deposits from op.7 and op.8 refuse middens. From previous excavations by Norweb, I calculated the density of occupation for the earliest phase of Bagaces, San Antonio, and the late phase of Tempisque, Siu.

Since we did not locate pure San Antonio phase or Siu phase components in the recent excavations, data recovered by Norweb served to compare the densities in stratified deposits of those earlier phases (Norweb 1961b; Salgado 1992). Not surprisingly, there is a continued increase in the density of deposits from the Siu (1-300/400 A.D.) to the Ayala phase (650-950 A.D.). These data are consistent with the way in which the occupation was reconstructed from surface components.

The density of deposits of the last two phases of occupation differs from the reconstruction based on the distribution of surface materials. Cocibolca surface deposits occupy the largest area in the entire sequence of occupation. However, the density of deposits seems to suggest that activity in the occupied area was not as intense as in the previous Ayala phase. This is perhaps related to a more disperse community pattern. Finally, during Xalteva (1150-1522 A.D.) deposits are more dense than in any other phase, though the area of occupation is the smallest since Ayala. Apparently during Xalteva settlement was more nucleated than in the previous phase.

The information in Table 5.1 provides an approximation to the characteristics of the community during the different phases. This is a provisional reconstruction requiring a more extensive sample of excavation units to achieve a solid understanding of the community pattern and its changes.[6]

In light of both the regional and the community data, the noted decrease in the density of occupation during Sapoá (Cocibolca phase) could have, at least, two probable explanations. Either a temporal abandonment took place followed by a later reoccupation, or part of the population abandoned or was displaced from the site when Ayala lost is dominant place by the end of Bagaces/beginning of Sapoá.

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[6] It should also be noted that artifact density could be determined by formation processes. Changes in soil erosion, artifact disposal patterns, and other factors are important in the formation of deposits. Further research could provide the base for a detailed reconstruction of formation processes, and therefore improve our ability to understand patterns at Ayala site.

Whatever the case, more extensive excavations are required to understand these differences. These would obviously have to include the Sapoá and Ometepe main settlements. Only then will it be possible to reconstruct the community pattern at different levels of the regional hierarchy.

The Bagaces community pattern

Most of our data come from this period, especially from the Ayala phase. Unless otherwise indicated, the data presented in this section refer to that phase.

The domestic space: Evidence of domestic activity was recovered both at a wattle and daub domestic structure and at refuse middens. The former had a perimeter of about 4x4 meters defined by aligned stones and an approximate area of 16 square meters (Fig. 5.7). The perimeter is probably disturbed by plowing, as are other features. Several fragments of bahareque were recovered in and around the perimeter (Fig. 5.7; Fig. 5.8, a,b). The size of cane imprints in the bahareque suggests *Gynerium sp* was used to build the walls (Aida Blanco, personal communication 1994). A fragment of this wild cane was identified among the macrobotanical remains of the structure (Table 6.3). This cane grows in the region and is still used for construction of domestic structures. A small fragment of plaster was also recovered (Fig. 5.8, c).

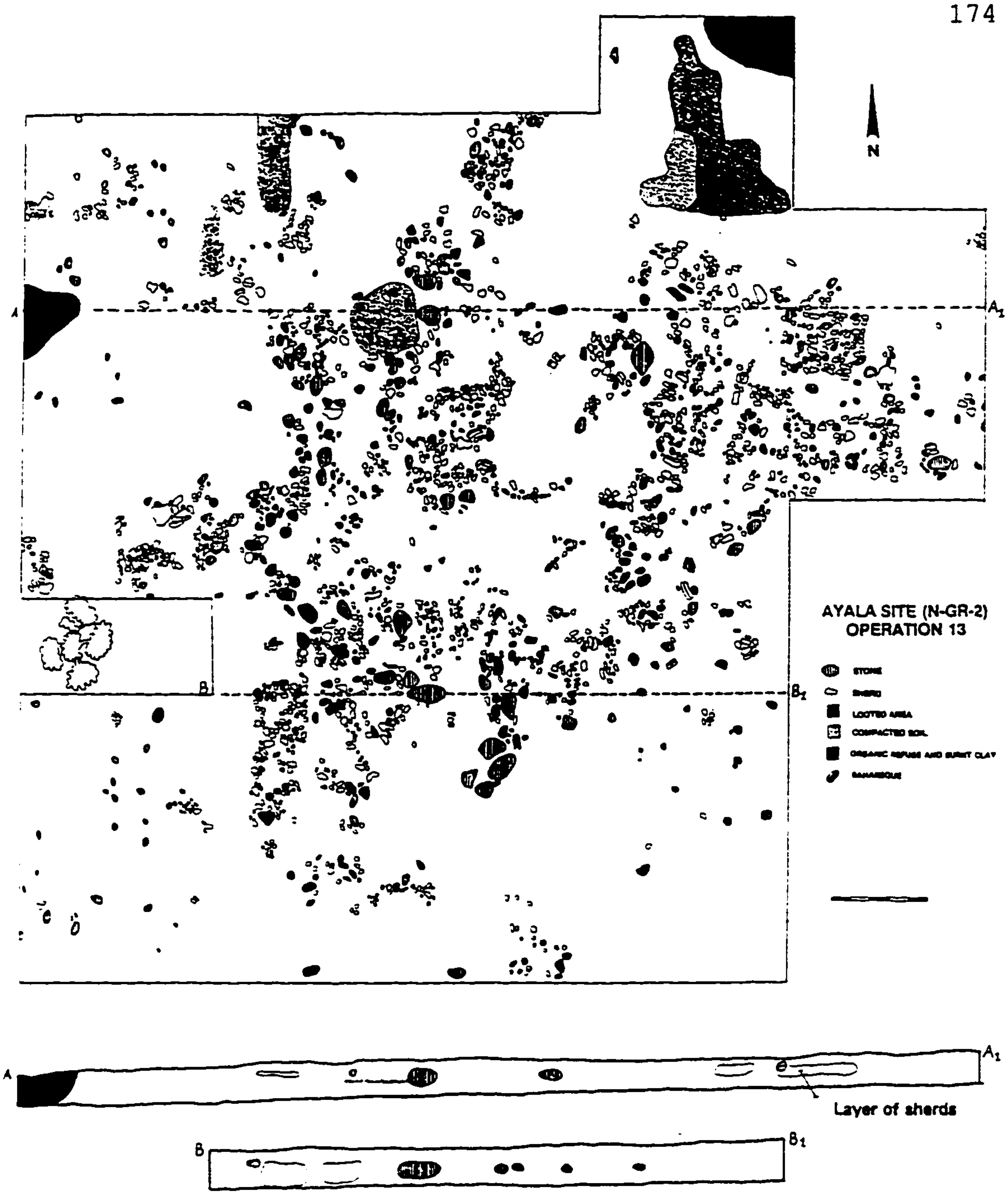

Figure 5.7 Domestic structure

Figure 5.8 Bahareque and plaster fragments
Top: bahareque; bottom: plaster

From small preserved sections of the floor it was noted that it was made of compacted soil, approximately 5 cm thick, and covered by a thin layer of sand. No postholes were observed; the very dark and soft organic soil made difficult their location.

I cannot determine whether or not the structure was part of a cluster of structures utilized by a household, or if it represented the entire walled domestic space. Unfortunately, no domestic structures of Bagaces have been excavated in Pacific Nicaragua, and we lack a comparative base for the characteristics and organization of the domestic space. The situation is similar in northwestern Costa Rica, with scant data in this regard (Bradley 1994; Vázquez 1986).

The structure was filled with debris (Fig. 5.7), mainly fragments of Ayala Plain types (Salgado 1992). Common ceramic vessel were big jars (Fig. 5.9, a), deep open bowls (Fig. 5.10, a,b) and, to a lesser degree, grater bowls and comales (Fig. 5.10, c,d). The size and volume capacity of some of these jars suggest the possibility of their use as water containers. Similar jars are still used for that purpose in some households of the region (Fig. 5.9, b). A culinary function for some jars is also indicated by sherds darkened by smoke and/or with charcoal attached to the interior walls.

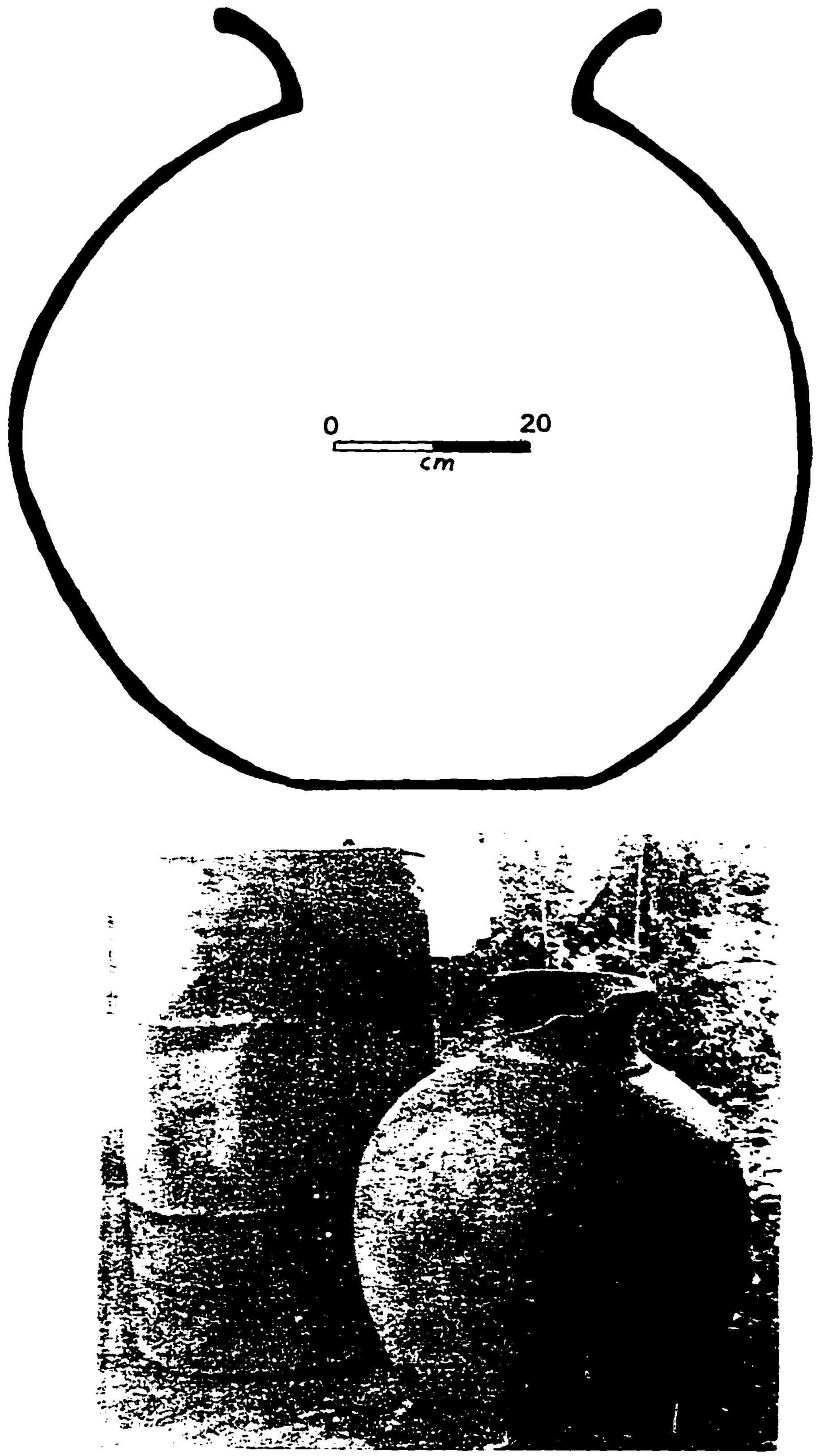

Figure 5.9 Large pottery jars.
Top, reconstructed jar form commonly found in domestic structure.
Bottom, modern pottery vessel used for water storage.

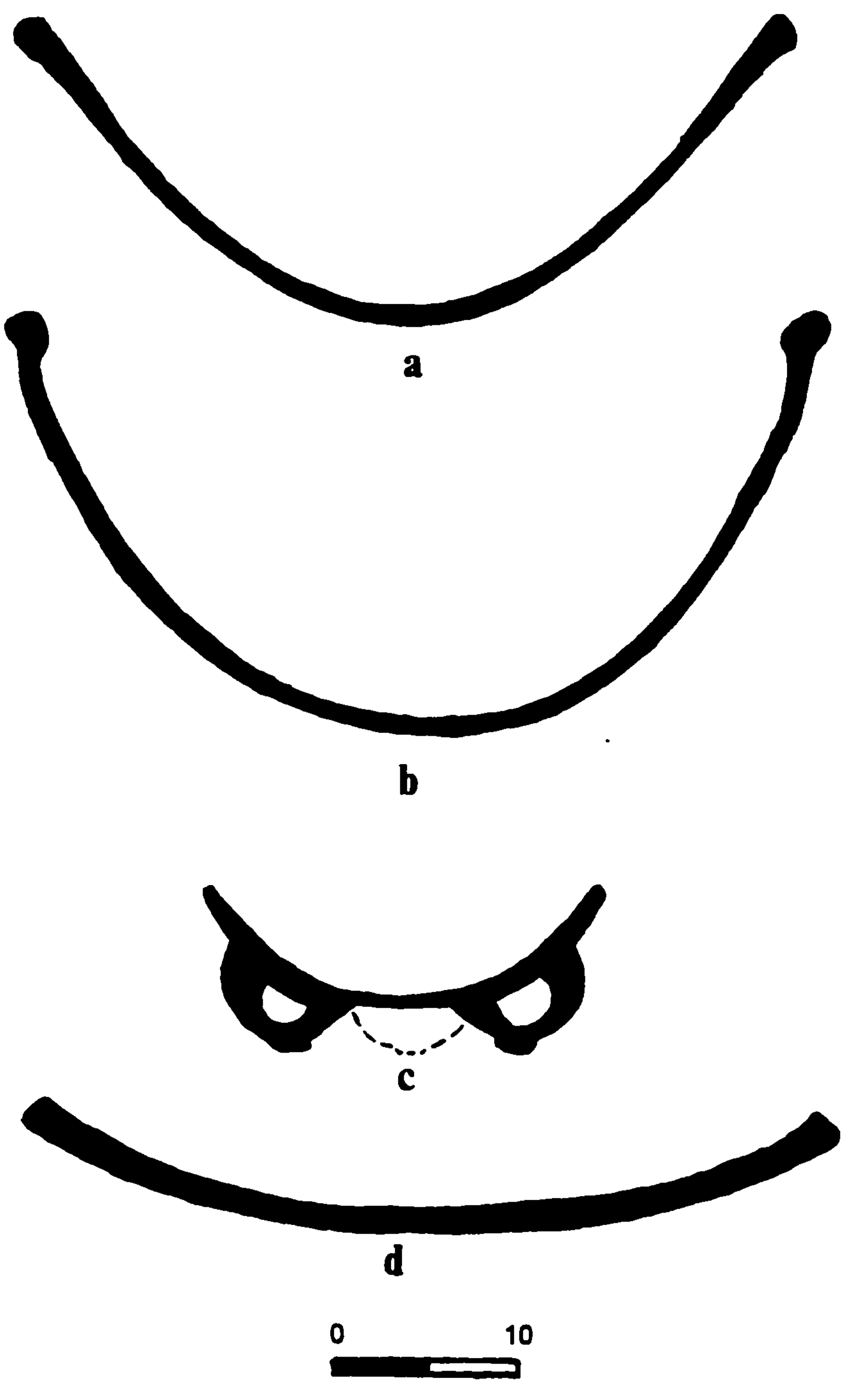

Figure 5.10 Common vessel forms found at the domestic structure

Numerous fragments of metates, manos, mortars and pestles were recovered inside or near the structure (Fig. 5.11). Carved metates--rarely recovered in other excavation units--constituted thirty percent of all metate fragments in and around the structure. Most of the above-mentioned artifacts were probably used for the processing of cultigens. Macrobotanical remains indicate that, indeed, maize, beans, cacao and cotton were cultivated products consumed by the household. In addition, as will be detailed in Chapter 6, a series of wild, protected, and semicultivated fruits and vegetables were accessible (Blanco 1994). Areas of darker, and sometimes oxidized, soil--probably resulting from open fires--presented the highest concentrations of botanical and faunal remains. These areas were located north, outside of the structure's perimeter, and are indicated in figure 5.6 under organic refuse and burnt clay.

Six fragments of solid ceramic female figurines were recovered. Five of them were inside the structure and grouped in its southwestern part (Fig. 5.11). The sixth was adjacent to the area with organic refuse located in the northernmost corner of operation 13. All had lost their heads and limbs (Fig. 5.12, b,c,d), except for one that still had the legs attached (Fig. 5.12, a). It is not clear whether they were intentionally "dismembered" or if this was a by-product of their discard. In the manufacturing process

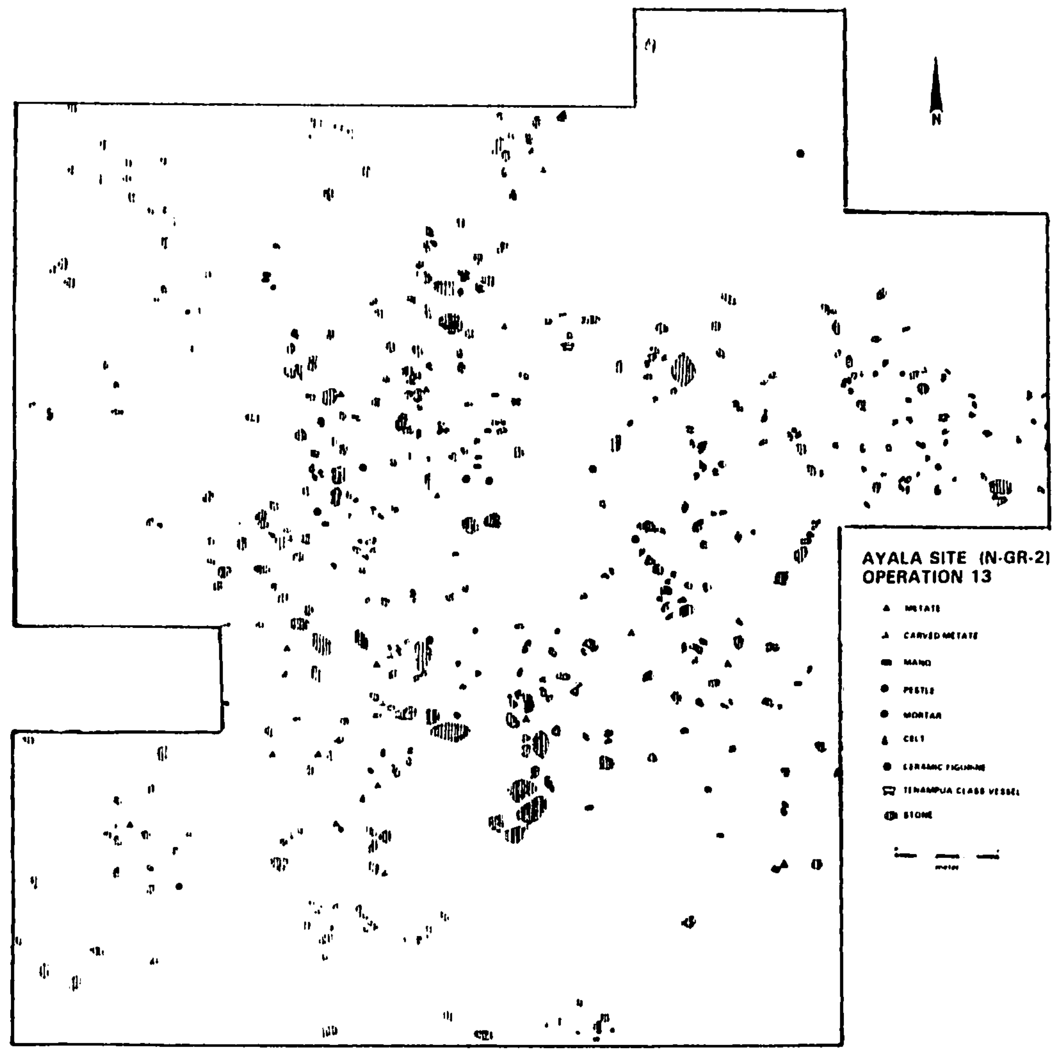

Figure 5.11 Distribution of artifacts in domestic structure

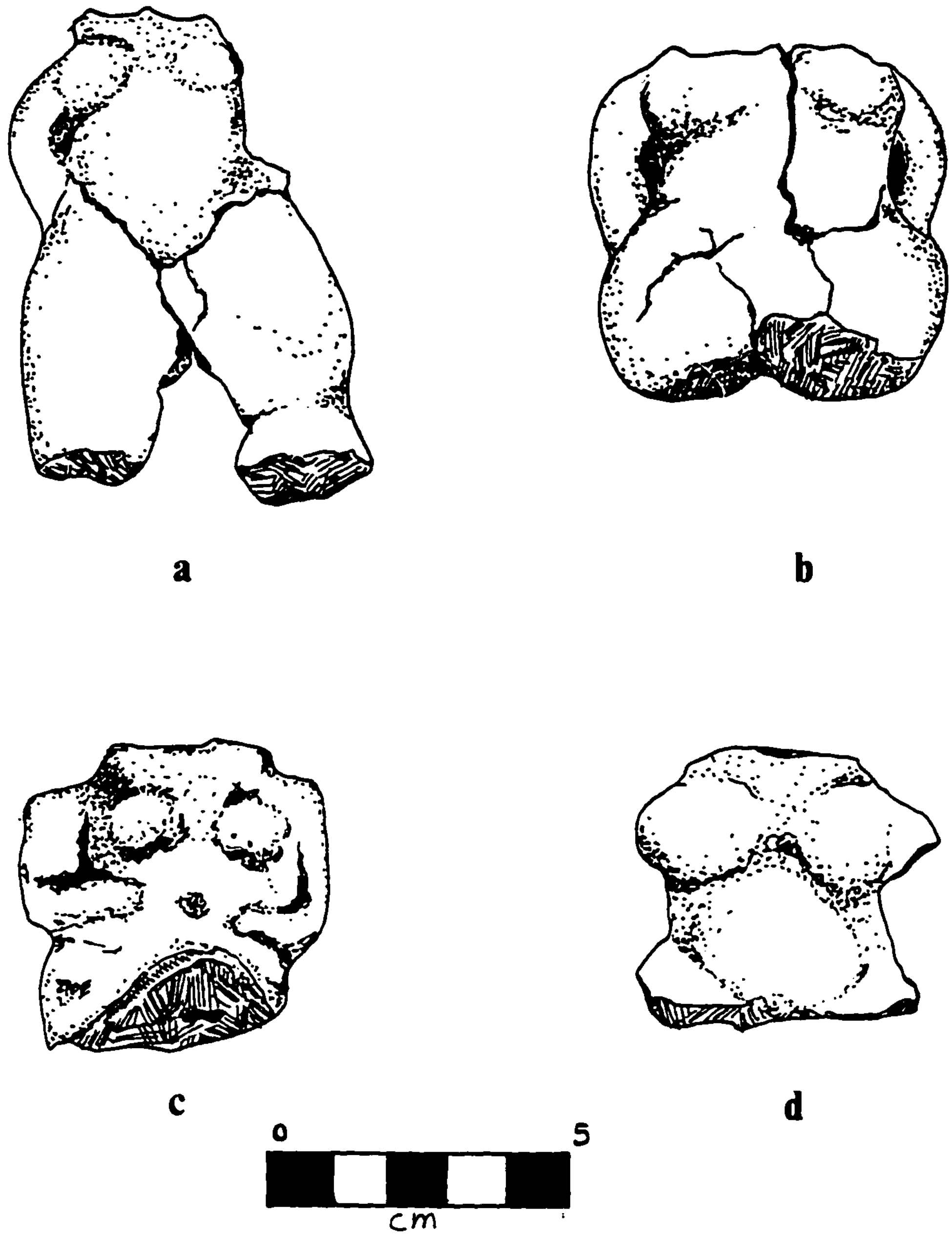

Figure 5.12 Fragments of figurines recovered at domestic structure

limbs are later joined to the torso of a figurine, which may increase the fragility of joints. If so, the extremities may have been unintentionally separated from the main body when discarded. However, even when the entire soil matrix was excavated with trowels and sieved through 1/8" screens, none of the missing parts of the figurines were recovered in the excavation.

The materials and energy invested to build the structure do not indicate any outstanding use or possession/manipulation of resources. In other words, these elements offer no indication of wealth accumulation or special status. Such evidence is perhaps provided by the numerous fragments of imported artifacts recovered. One hundred forty-two Delirio-Red-on-White sherds (Fig. 5.13, a-e), 163 sherds and 1 partial vessel of the Tenampua class of Ulua Polychrome (Fig. 5.13, f-j) were found in and around the structure. Fifteen badly eroded stuccoed sherds and 3 fragments of the Jaguar variety of Galo Polychrome were also identified. These sherds were briefly reviewed in an attempt to match those pertaining to a same vessel, but only in a few cases were the fragments associated. I cannot at this point determine how many vessels are represented by these sherds, but they are certainly numerous.

Compositional analysis indicates these ceramic types were not manufactured locally (Appendix D). Based on the criterion of abundance it is probable that the variety

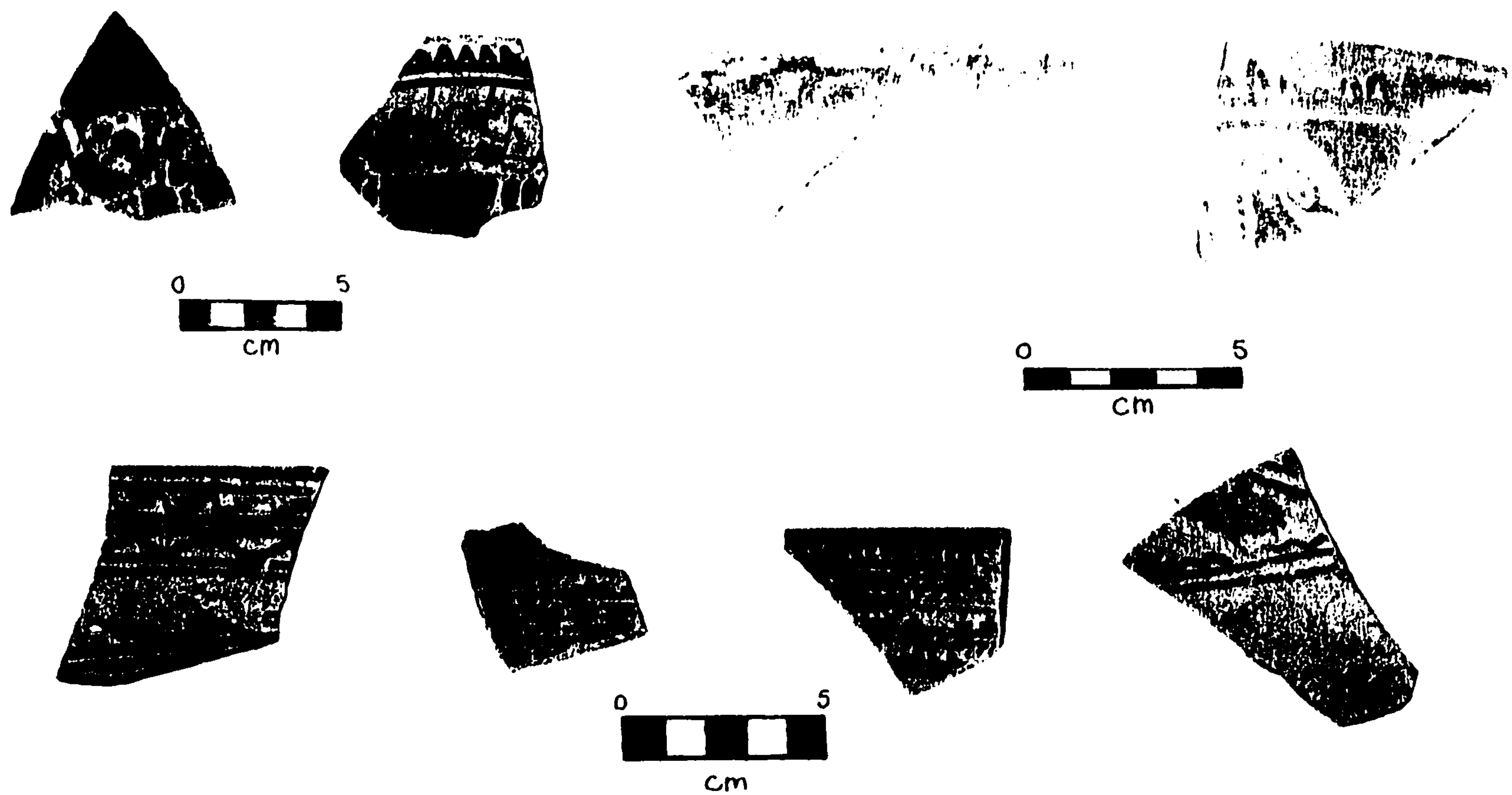

Figure 5.13 Foreign pottery recovered at domestic structure
Top row: Tenampua sherds
Bottom row: Delirio sherds

Jaguar of Galo Polychrome was made somewhere in northwestern Costa Rica (e.g. Baudez et al. 1992:137-138; Bonilla et al. 1990:143-145), Delirio was manufactured in the area of Quelepa (Andrews 1976), and Tenampua in the Comayagua Valley (Glass 1966; Dixon 1989:150). The origin of the stuccoed sherds has not been determined. To the best of my knowledge they have not been reported in Nicaraguan sites, although several vessels were reportedly found at the Bay of Culebra (Lange 1984:178).

In the absence of comparative data on the distribution of artifacts among domestic structures, I attempt to establish comparisons among two contemporaneous refuse middens. One of the middens (Fig. 5.4, Op. 12) is considered to be associated with the domestic structure described before. The other refuse midden is located approximately 400 meters southeast (Fig. 5.4, Op. 7).

The results of such comparisons are presented in Table 5.2. There is clearly a higher density of imported ceramics in Op. 12, the midden associated to the domestic structure. The stuccoed sherds are found only in this midden and in the domestic structure itself.

Interestingly, the other refuse midden (Op. 7) has a lesser concentration of imported ceramics, but has a higher concentration of obsidian artifacts, another imported material. When the domestic structure is included in the comparison, the same results are obtained. Higher densities

Table 5.2 Absolute numbers and densities of imported goods, Ayala phase

Artifacts	Operation 7*		Operation 12		Operation 13		Operation 14**
	N	N/m^3	N	N/m^3	N	N/m^3	
Imported pottery (total)	6	3.81	25	7.81	322	20.90	
Delirio	2	1.27	11	3.44	142	9.22	X
Ulua: Tenampua class	2	1.27	7	2.18	163	10.58	
Ulua: Black Stage	2	1.27	2	.63	2	.13	X
Stuccoed	0	0	5	1.56	12	.78	
Galo: Jaguar	0	0	0	0	3	.19	
Obsidian	17	10.79	28	8.75	150	9.74	X
Jade beads	0	0	0	0	2	.13	
Seashells	0	0	0	0	0	0	X
TOTAL	23	14.6	53	16.56	474	30.77	

* This column corresponds to Op 7. S0-1.25 E2.5-4.

** The matrix of operation 14 was not screened (Appendix C). Artifacts are indicated only by presence/absence.

of imported ceramics and lower of obsidian are associated with the structure. Other chipped-stone made of local materials also have a lesser density in the domestic structure and its associated refuse midden. The higher presence of chipped-stone in Op. 7--including both obsidian and local materials like cherts--could perhaps be related to the emphasis of activities performed by some households at the site.

The varied distribution of imported ceramics suggests the possibility that the inhabitants of the domestic structure had privileged access to foreign goods. To the extent that these artifacts can be linked to wealth accumulation, the household was probably wealthier than, at least, some others at Ayala.

Other data point to this possibility, as well. Some artifacts were only recovered in the structure and its associated refuse midden. These include an obsidian biface, a green obsidian artifact from the source of Zacualtipan in Mexico, and a couple of green-stone beads. As discussed before, stucco sherds and examples of the Jaguar variety of Galo were exclusively associated with this structure, and fragments of carved metates were rarely recovered in other contexts.

Based on the differences in the distribution of foreign goods discussed above, I would argue it is highly unlikely that all contemporaneous households had equal access to such a diversity and quantity of foreign goods. If this is correct, the evidence points to social differentiation not only at the regional but also at the community level.

Specialized activity areas: Operation 14 provided the only evidence for a specialized activity area (Appendix C). Here, numerous antlers and metapodials of deer were recovered, as well as artifacts made from them. Some bones had been hardened by fire, probably to prepare them for artifact manufacture.

Among the artifacts recovered were awls and needles (Fig. 5.14). Other bone artifacts of undetermined function were also found. One had a longitudinal perforation (Fig. 5.15, top), while the other was a flat turtle bone, squared and perforated in the center (Fig. 5.15, middle). In addition, a maxillary bone and the palatial bones of a human were uncovered (Fig. 5.16). The palatial was cut off from the rest of the cranium (Ricardo Vázquez, personal communication, 1995), and the teeth were extracted. Both a complete tooth and a partial perforated tooth were recovered (Fig. 5.16), and seem to have belonged to the same individual. Thus it appears that human bones and teeth were reutilized, at least for the manufacture of ornaments.[7]

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[7] For later periods, the utilization of human bones for adornment has been documented in the site of Nacascolo, Bay of Culebra. There, a maxilla with perforations was recovered in an interment (Wallace and Accola 1980), and perhaps was part of a necklace.

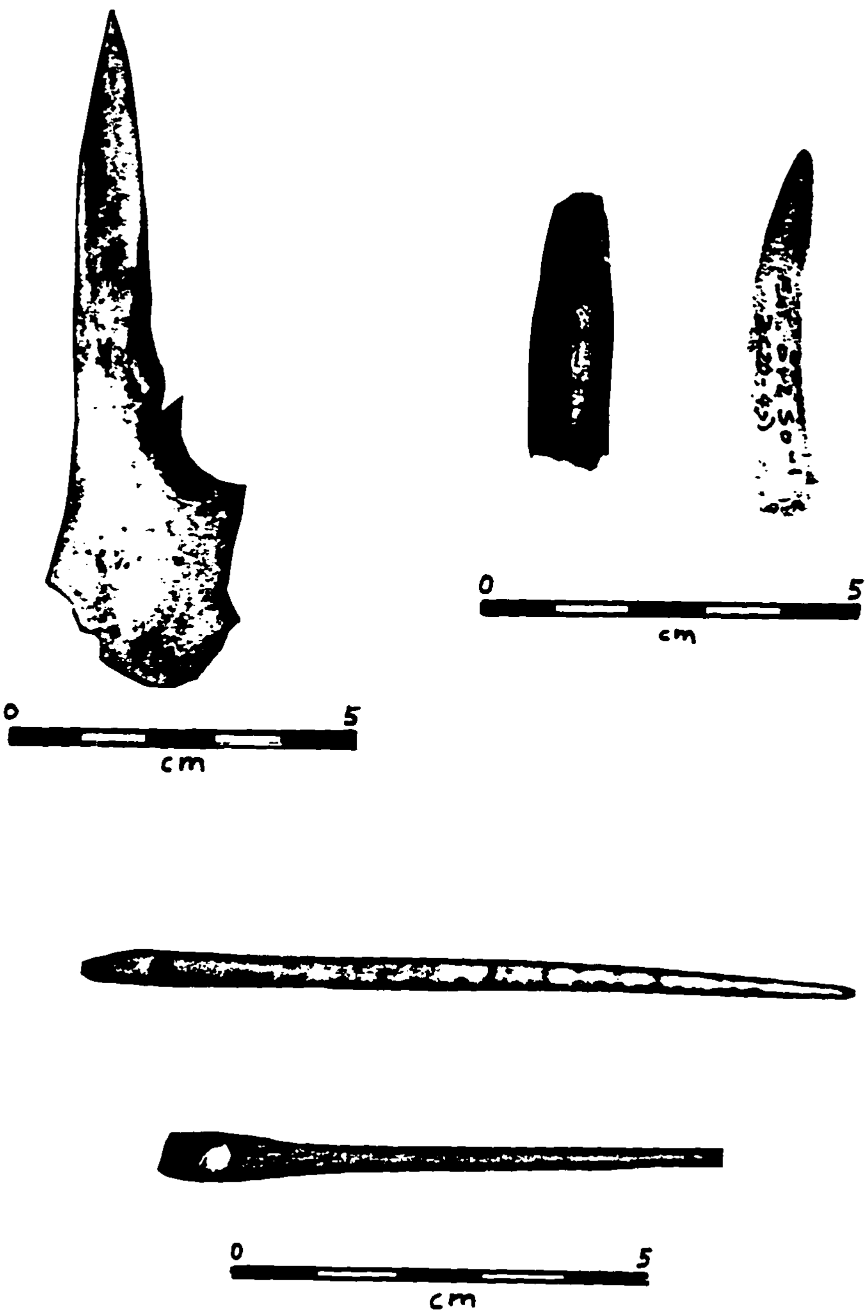

Figure 5.14 Bone artifacts. Top: awls; bottom: needles

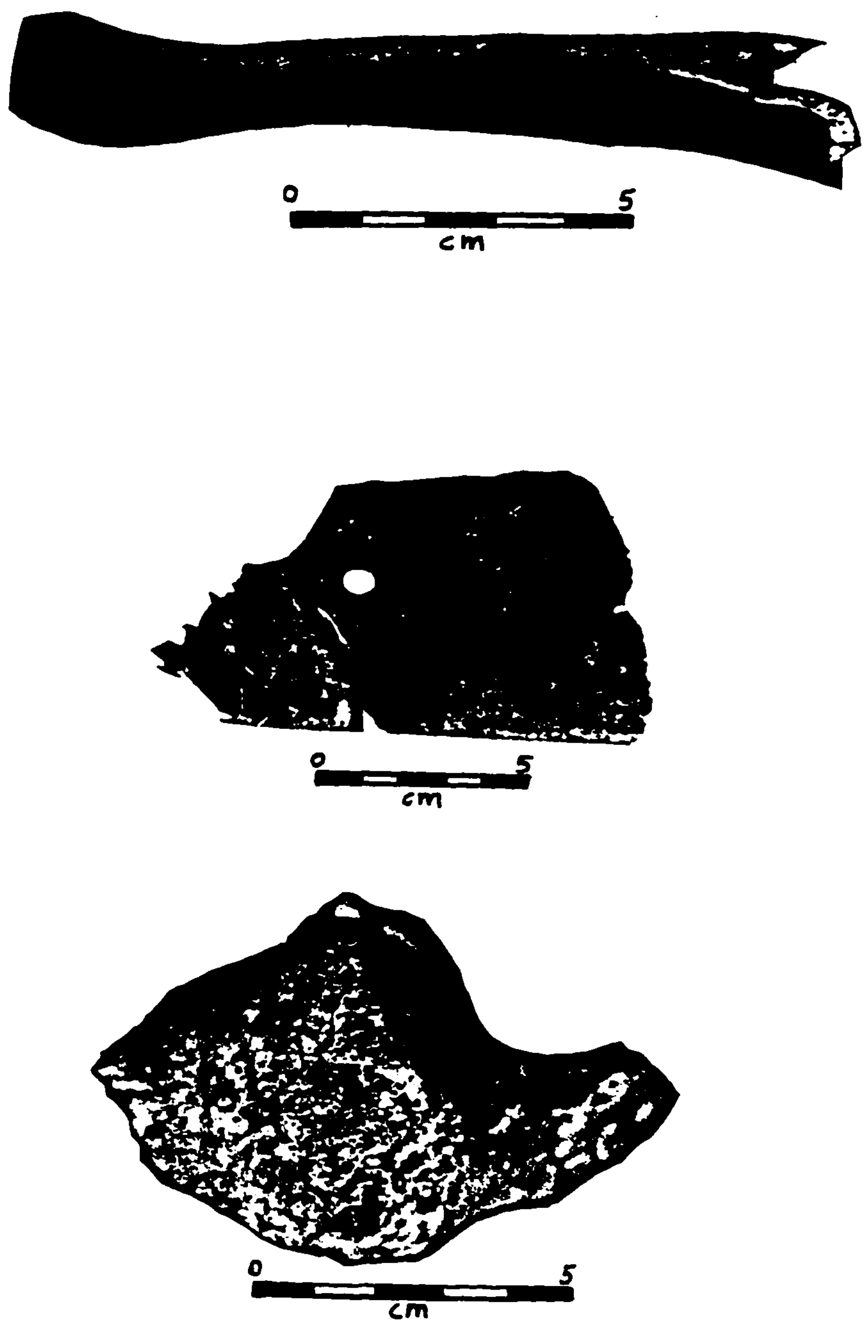

Figure 5.15 Various artifacts
Top and middle: undetermined bone artifacts; bottom: pumice artifact

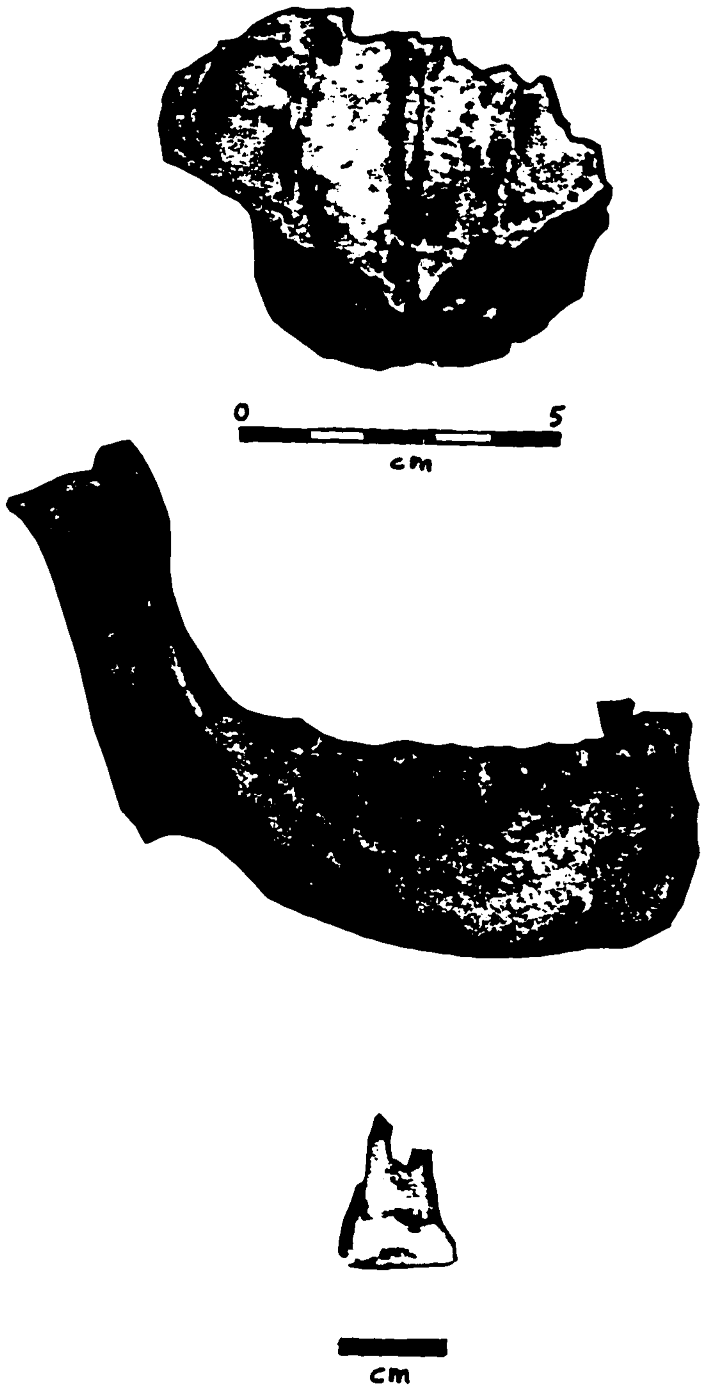

Figure 5.16 Human remains

A pumice artifact associated with this area has wear marks that indicate that it was probably used as a polisher or smoother for the surface of bone artifacts (Fig. 5.15, bottom).

The only three fragments of seashells recovered were found in this area. They include a fragment of the spiny oyster *Spondylus Princeps*, and two conch shells: *a Strombus galeatus* and a *Fasciolaria princeps.*[8] These specimens were badly deteriorated, and I could not determine if they had been modified.

The area is interpreted as a workshop where bone artifacts, and perhaps also shell artifacts, were manufactured. Awls and needles made of deer bones, in association with other tools, are considered part of the instruments used for leather-working in Mexico (Flannery and Winter 1976:34-35). Other probable functions attributed to needles are sewing and basket making, among others (Flannery and Winter 1976:37).

Funerary features: At least one funerary feature and one probable feature were excavated in different suboperations of operation 4 (Appendix C). One of them contained the remains of an infant younger than six months (Ricardo Vázquez, personal communication 1993), accompanied

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[8] The identifications were made by Dr. Alfonso López from the Universidad Nacional Autónoma de Nicaragua.

by 5 ceramic vessels (see Appendix C, Operation 4 S0-1 E10-12).

The second probable feature had no associated osteological remains. A tripod bowl of the Chávez White-on-Red type was the only artifact found in an apparent funerary pit noted on the wall of operation 5 (Appendix C). Since Chávez is abundant throughout Bagaces, it is not possible to specifically link the feature to any phase.

The existence of exclusively funerary spaces within the village could not be confirmed. Nevertheless, pot-hunters indicated that they had found ceramic funerary urns containing cremated human remains in an area west of operation 13. This funerary practice was indirectly confirmed when one of the looters showed us a funerary urn of the Ayala Plain type containing human cremated bones[9] (see Appendix C, operation 12).

Few comparative data on funerary practices for the period are available. Isolated features have been reported in some sites around Managua, Rivas and Ometepe (Goodstein 1989; Haberland 1992; Healy 1980; Zambrana 1995). Only one spatially separated cemetery has been located (Wyckoff 1976), and is situated near León. So, as well as in Ayala,

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[9] Ricardo Vázquez examined the bones and confirmed that they were human. Nevertheless, the identification was made difficult by the deformations caused by the cremation. Only in the site of Los Inocentes, in northwestern Costa Rica, has such practice been reported (Guerrero et al. 1993).

data do not permit an association of varied funerary practices to social and economic differentiation.

The Community Pattern after Bagaces

The data from later periods is more limited, but differences with the Bagaces community pattern can be sketched. As already discussed, the extension and density of the occupation is lighter than in Bagaces. Most data pertain to Xalteva phase contexts, including the latter part of Sapoá and all of Ometepe. Unless otherwise indicated, the discussion is focused on Xalteva patterns.

Domestic activity: Evidence of this type is limited to remains recovered in refuse middens (Appendix C, Operations 4, 5, 6, 8, 9, and 10). No significant variations in the content of these middens can be related to social differentiation. Nevertheless, there is a significant change in the lithic industry, with a marked increased in obsidian artifacts, and especially those products of a core-blade technology (Braswell 1994; Braswell et al. 1994). This technology requires highly-skilled craftsmen, and therefore implies at least some level of specialization (Lange et al. 1992:174). Apparently, the specialists did not reside at the site, since the core-blade artifacts were somewhere else in the region (Braswell 1994).

As in Bagaces, agriculture was part of the productive activities. Hunting and fishing were also extractive activities. The importance of each of these activities in the diet of the population has not yet been determined.

Specialized activity areas: No indication of specialization was uncovered in the stratified deposits of the later periods.

Funerary features: Three excavated tombs are associated with the Xalteva phase. One looted tomb with stone-slabs was uncovered (Appendix C, operation 9). The original form could no longer be reconstructed, but pot-hunters described them as stone-cist tombs. Reportedly, several such tombs had been looted on the same area. In a cemetery of the Gato phase (1000-1200 A.D.), in Ometepe, Haberland (1992:93) reports that "the dead were placed on or, more rarely, beneath a layer of large stone slabs."

The other two tombs found were simple excavated pits (Appendix C, operations 4S0-1 E30-32 and N8-9.5 E16-17.5) with few offerings (2 ceramic vessels each). As in Bagaces, funerary practices seem varied, but no link can be established with social differentiation.

A general comparison among two Sapoá/Ometepe communities: Current research by the author on excavated collections from the Tepetate site (Willey and Norweb 1959) suggests that the pattern there at the community level is somewhat different from that of Ayala. As discussed in Chapter 4, this is the main site of the regional hierarchy of both Sapoá and Ometepe. It was probably the first site occupied, perhaps permanently, during those periods. Not only is the layout different from that of Ayala (see Appendix C), but there are clearly higher densities of materials than those in Ayala during the later periods. At the same time, a greater variety of the main painted types is found at Tepetate (N-Gr-10) than at Ayala. Finally, the presence of numerous figurines ceramic molds, as well as figurines, points to a specialized production at Tepetate. This production was probably for exchange/trade with sites of the region, and with those of other regions. So far, figurine production has not been reported in other regions of Pacific Nicaragua (e.g. Haberland 1992; Healy 1980). Some sites, like Santa Isabel "A" situated on the coast of Lake Nicaragua in Rivas (Healy 1980:262-264), yielded numerous figurines but no molds.

This very general comparison of excavated remains at Ayala and at Tepetate suggests that the differentiation seen in the regional settlement pattern (Chapter 4), can be extended to the community pattern of the latter periods. Not only are there differences in the extension of the sites and their layout, but there is also contrast in the intensity of the occupation, and the diversity of activities carried on at some sites.

CHANGES IN THE COMMUNITY PATTERN AND ITS RELATION TO POLITICAL CENTRALIZATION

The community pattern of Bagaces provides some basis for the argument that social differentiation existed at the site. Processes of specialization, differential wealth accumulation, and expansion of long-distance relations were part of the social dynamics of the latter phase of Bagaces.

The evidence for social differentiation in Ayala cannot be directly tied to the specific identification of a political elite. John Henderson (1992) justly argues that the archaeological correlates of a regional hierarchy --indicative of sociopolitical centralization--cannot be extended to the identification of an elite. Supposed status goods are often linked to the the presence of an elite, but contrast in the distribution of these goods must be demonstrated first, and only then can it provide a solid basis from which to define social and political hierarchies.

The data obtained in Ayala have obvious problems for the identification of a political elite. Since they are quite limited, we cannot be certain of how many gradations the social hierarchy had. We can, however, speculate that the hierarchy had at least two levels: 1) a group with higher access to foreign goods, and 2) another group with less.

The data are not available to prove that the households with more foreign goods necessarily held a position in the political hierarchy. To clarify this, we would need to expand the data on the characteristics of households, as well as their relation to the public spaces where political and ritual activities were very likely conducted. Only then could we establish solid links between differential wealth accumulation and the sociopolitical hierarchies at the community level.

The comparative study of residences could be an excellent starting point to reconstruct social hierarchies. This is an area of archaeological inquiry barely explored in Pacific Nicaragua and northwestern Costa Rica, and it should be a priority for future research at Ayala.

COMMUNITY PATTERNS IN GREATER NICOYA

In this section I will consider the community pattern in other regions of Pacific Nicaragua and northwestern Costa Rica. The information discussed here is limited to excavated components, and it is discussed in an attempt to discern links between the social processes seen at Ayala and those of other communities/regions.

As discussed in chapter 1, Pacific Nicaragua and northwestern Costa Rica are considered to be the northern and southern sectors of Greater Nicoya, respectively. This subarea is thought to be integrated by certain cultural manifestations throughout the ceramic periods. I would assume these manifestations would be derived from similar sociopolitical processes. The community pattern could serve to start exploring the strength of that assumed cultural unity.

Limited data are available to reconstruct community dynamics in Pacific Nicaragua; a few sites have been excavated in León, Managua, Rivas and Ometepe. In the southern sector I focus on the Bay of Culebra community pattern since it is the better known so far.

Orosí/Tempisque communities in other regions

The village of Vidor in the Bay of Culebra reportedly had a relatively large and settled population (Lange 1984:173). Nevertheless, most settlements in northwestern Costa Rica (Hoopes 1987; Norr 1986) and in Nicaragua (Espinoza 1995a; Haberland 1992) share the pattern observed at Ayala. The intensity of the occupation, as measured in stratigraphic deposits, points to a dispersed population.

In contrast to Orosí settlements, it seems that known Tempisque communities are villages of intensive occupation (Haberland 1992:75; Lange 1984:172, 1992c:114).[10] In

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[10] Numerous sites have been reported in almost every researched region in northwestern Costa Rica, including the Tempisque Valley (Baudez 1967), coastal areas (Coe and Baudez 1961; Sweeney 1975; Lange 1971; Lange 1980a), and regions in and adjacent to the Guanacaste Cordillera (Norr

northwestern Costa Rica these villages usually have spatially separated cemeteries (Lange 1984:172). In some of them, burials include elaborate paraphernalia of high craftsmanship. Carved metates, mace heads and jade artifacts are found in individual interments. The presence of this funerary complex is interpreted by some scholars as indicative of social ranking and emergent chiefdoms (Lange 1984:173).

No evidence at the regional or community level hints to a similar process in Ayala, or in the Granada region, during Tempisque. In spite of that, it appears that the inhabitants of Granada were engaged in some interaction, primarily with regions located to the north. This is shown in the presence of sherds related to the Usulután tradition of Honduras,[11] as I will discuss in Chapter 6.

Bagaces communities: These are poorly known throughout Pacific Nicaragua. Stratified deposits show an intensification in the occupation of sites in León (Wyckoff 1976), Managua (e.g. González Rivas 1995; Goodstein 1989;

1986; Sheets and Mueller 1984). In Pacific Nicaragua, sites of this period are reported in Ometepe and Rivas (Healy 1980). Few sites have been reported in the region around León (Wyckoff 1976), the Lake Managua basin (Espinoza and Rigat 1994), and Chontales (Gorin 1990).

[11] Wyckoff (1976) argues that the abundance of Usulután-related ceramics around León implies local production. Recent research in northern Nicaragua and compositional analysis support Wyckoff's argument (Bishop 1994; Healy 1988; Wyckoff 1976), though some Usulután-Resist vessels could have been imported.

Lange 1995a), Rivas (Healy 1980), and Ometepe (Haberland 1992). Nevertheless, little is known about the layout of the sites or the organization of areas of activity. In other words, beyond the sequence of occupation, the ceramic and, in some cases, lithic complexes, almost nothing else is known.

As in the region of Granada, only a few sites around Managua yield imported ceramics[12] (Espinoza and García 1995:102), but the intrasite distribution of these artifacts has not yet been defined. Ulua Polychrome is reportedly the most abundant type, while numerous examples of Sulaco Bichrome and Polychrome have been found at the site of Acahualinca (Espinoza and García 1995:102; Goodstein 1989:155). Delirio is absent in those sites in Managua that reported the aforementioned Honduran types. Unless a chronological gap exists between the Ulua/Sulaco recovered in Managua, and the Delirio/Ulua:Tenampua in Ayala, this contrast is probably caused by different spheres of interaction.

In the region of Rivas two predominantly Bagaces communities were excavated (Healy 1980). The site of San Jorge "is characterized by a series of artificial mounds ranging in height from 1.5 to 2.5 m." (Healy 1980:41). The

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[12] Although the type Los Llanitos Polychrome has reportedly been found at one site in Managua, the identification is not definitive due to bad preservation (Espinoza and García 1995:102).

area mapped by Norweb (Healy 1980:Fig. 9) is about 4 hectares, with only 4 mounds recorded, but the site may, in fact, be larger.[13] The mounds are reportedly habitational and do not show any spatial patterning in their distribution. The other site, Santa Isabel "B" is 3 km north of San Jorge and seems to have only one mound (Healy 1980:57), thus making its layout simpler. Both sites were first occupied in Tempisque, with light densities in stratified deposits. The main occupation took place during Bagaces, with a dramatic drop in the following Sapoá and Ometepe periods. This replicates the chronological pattern of occupation seen in Ayala. The information available on the two sites in Rivas does not indicate specialization, intrasite differentiation, or long-distance trade.

Communities in the region of León provide the best comparative data to Ayala. Two habitation sites, only 18 kilometers apart, were surveyed and excavated by Wyckoff (1976). They were first settled during Tempisque, but the main occupation occurred during Bagaces, followed by a decline. The site of Pulpería la Cruz has an extension of 40 hectares and, though some mounds have already been destroyed, Wyckoff mapped eight low mounds arranged around

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[13] After reviewing Norweb's field notes it becomes clear that he did not carry out surveys to define the boundaries of sites. For example, he defined three different sites in what I consider a single site, Ayala. My impression is that he just looked for locations with dense surface deposits and mounds or knolls to define a site.

an open space. The site of El Cortezal extended over 7 hectares with 14 low mounds also situated around an open space. Wyckoff argues that the distribution of obsidian artifacts--which constitute nearly all of the lithic artifacts found at Pulperia La Cruz--indicates specialized production (Wyckoff 1976:82-83). In addition, numerous Ulua Polychrome sherds were recovered, while this type was absent at El Cortezal. It is not totally clear if the difference in findings is due to chronological differences or to a unequal access to this pottery. Wyckoff considers a process of complexity unfolded in Bagaces, with an intensification of the interaction with Honduran societies during the second half of the period, roughly corresponding to the Ayala phase.

In northwestern Costa Rica the occupation seems very intense, but the villages are smaller than Ayala. The villages of Nacascolo (Vázquez 1986) and Vidor (Accola 1978; Vázquez and Weaver 1980), in the Bay of Culebra, have been extensively excavated. No village exceeds 50 hectares (Vázquez 1986: Fig. 5.1.). Most were probably considerably smaller (e.g. Abel-Vidor 1980b:43), but the stratified deposits are dense. Only one domestic structure was excavated in Nacascolo, and it suggests a domestic/culinary space shared, perhaps, by several nuclear families (Vázquez 1986:82). Numerous excavated refuse middens have apparently failed to yield information on specialization or differential wealth accumulation. A few examples of Delirio Red-on-White were recovered at Vidor (Fred Lange, personal communication 1995), but evidence of the kind of trade/exchange networks that reached Ayala has not been noted.[14] Thus, the only indication of social differentiation is provided by contrasting funerary contexts (Hardy 1992; Vázquez 1986:83).

Indeed, the strongest general contrast between communities in northwestern Costa Rica and the Ayala site is seen in the funerary practices reported in the former region during Bagaces. Not only are cemeteries abundant, but some of them have large funerary stone mounds in numbers varying from 1 to 12 (Guerrero et al. 1994:103). Diverse funerary practices are shown by the presence/absence of funerary mounds, varied tomb construction, and variations among cemeteries in the types and numbers of artifacts found in interments. As in Tempisque, there is a continuity in the presence of green-stone artifacts, including jadeite.

Guerrero and colleagues argue that funerary sites reflect social ranking--and very likely chiefdom polities--in some regions of northwestern Costa Rica (Guerrero et al. 1994:107). But since regional hierarchies have not been established, political centralization has only

[14] Lange (1992c) reports the finding of an Ulua Marble fragment at the Vidor site. Some Ulua Marble vessels reportedly have been found by looters primarily around the Bay of Culebra (Lange 1992c:121).

been indirectly inferred (Guerrero et al. 1994:108).[15] While funerary sites are highly visible, habitational sites are not; this causes a disparity in the location and recording of habitation sites.

The funerary pattern of the southern sector is so visible that, if present in Pacific Nicaragua, it would not have gone undetected. It has been argued elsewhere that this differentiation could indicate regionalization related to the emergence and/or consolidation of several political units (Salgado and Zambrana 1994; Salgado and Fletcher 1994). These units were probably competing to expand their alliances--for territory, resources, or both--, including control over long-distance trade networks. In chapter 7 I will address these issues in a broader context, to attempt to model the nature of interaction networks and their relation to dynamics of social change during Bagaces.

The community pattern during Sapoá/Ometepe

Limited excavations have been conducted in the communities of these periods in Nicaragua, including sites in Managua, Ometepe, and Rivas (e.g. Haberland 1992; Healy 1980; Wyss 1983; Zambrana Fernández and García Vázquez 1995).

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[15] Nevertheless, the authors are inclined to typify Bagaces polities in northwestern Costa Rica as chiefdoms (Guerrero 1994:107).

Communities in the island of Ometepe have dense stratified deposits (e.g. Healy 1980:65-72), but no indication of intracommunity differentiation has been cited. Nevertheless, the statuary found for the first time in excavated components of Sapoá (Haberland 1992:109) strongly suggests some degree of occupational specialization, as discussed in preceeding chapters.

There are well-defined funerary areas in habitation sites (Haberland 1992:113), as well as spatially separated cemeteries (Haberland 1992:90-104). No social differentiation has been noticed in these cemeteries. Cranial deformation is common in the form of frontal flattening (Haberland 1992:94-95), a practice that emerged at the onset of Sapoá and has also been reported in the southern sector (e.g. Blanco et al. 1986; Wallace and Accola 1980).

The sites in Managua and Rivas do not indicate social differentiation. Nevertheless, one should bear in mind that none of the sites have been excavated following the strategies that lead to this type of information.

In the Bay of Culebra the site of Papagayo has a layout that contrasts with other villages. Papagayo is a relatively small village of 12 hectares (Baudez et al. 1992:11). Its layout and other features set it apart from others, such as Nacascolo and Vidor.

The foundations of three circular structures were uncovered around a plaza. Their perimeter was defined by aligned stones that probably held a wattle and daub construction, as was indicated by bahareque remains. The diameters of the structures range from 21 to 15.5 meters. They are not only larger than those uncovered at Nacascolo (Vázquez 1986, maximum diameter 12 meters), but two of them have a series of statues placed along or within their perimeters (Baudez et al. 1992:19-27). The plaza is approximately 45x15 meters, and in its center 14 fragments of statues were associated with other features that have been interpreted as indicative of ceremonialism (Baudez et al. 1992:27).

The contrast between the site of Papagayo[16] and other villages of the Bay of Culebra indicates a hierarchy during the latter periods of occupation (Salgado and Blanco 1985).[17] An active trade network is indicated by various

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[16] Other sites in the Bay of Culebra are reported to have statuary. None of them has been excavated, and so far no comparison has been made with Papagayo.

[17] In December 1985 several archaeologists working in Greater Nicoya gathered for a workshop sponsored by the CAL/Smithsonian Institution. The idea was to compare data and, through discussion, create a synthesis of the archaeology of the subarea. Only in the case of the Bay of Culebra did archaeologists think there was indication of a regional hierarchy, based on the contrast between Papagayo and the other villages of Sapoá/Ometepe in the Bay. To the best of my knowledge, that is still the only data available indicating regional hierarchies in the southern sector. Nevertheless, it is important to remember that regional projects have not yet been conducted in important areas,

ceramic types imported from Pacific Nicaragua (Lange et al. 1990; Bishop 1994). In addition, a few Plumbate vessels (Lange 1984:182), cooper artifacts (Lange 1984:182), and a handful of obsidian artifacts (Baudez et al. 1992:239-240; Lange 1980b:90, 1984:182) are also imports. It has not been determined whether the distribution of these artifacts can be linked to differential wealth accumulation or social differentiation, especially when it comes to domestic contexts. Intrasite social differentiation has been suggested based only on funerary data (Wallace and Accola 1980). The statuary is, perhaps, the only evidence for probable occupational specialization.

There are differences in the community pattern of the Bay of Culebra and Granada during the later periods of the sequence. Our knowledge of that pattern is still limited in both regions, but some of the most notable differences are: the layout of sites at the top of the regional hierarchy; the size of sites in general (though the characteristics of the landscape in the Bay impose obvious constraints in this regard); the presence or absence of occupational specialization; and the presence or almost absence of obsidian in the lithic complexes. As I will discuss in the next chapter, there is also contrast in the lithic and in

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such as the Tempisque Valley. I would expect the presence of regional hierarchies in that region, at least during Sapoá/Ometepe, as the ethnohistoric data point in that direction.

the ceramic complexes. Nevertheless, there are general similarities in the production and display of statuary, in some practices seen in the funerary features, and a significant intensification of exchange and trade networks.

SOCIAL PROCESSES AND CULTURAL INTEGRATION

The process of nucleation and social differentiation observed at Ayala seems to have unfolded almost suddenly sometime around 650 A.D. There is no indication that it was preceded or triggered by population pressure, scarcity of land resources, or any form of circumscription.

Macroregional interaction preceded by centuries the emergence of complexity in Ayala. It certainly intensified just prior to, or with, the process of social differentiation during the Ayala phase (650-950 A.D.). This interaction primarily involved societies located in northern regions and, to a lesser degree, some located to the south. The trade/exchange networks in which Ayala was involved did not reach all of Pacific Nicaragua or northwestern Costa Rica, nor did all the networks of Pacific Nicaragua and northwestern Costa Rica reach Ayala.

Important aspects of material culture of the southern sector are absent not only from Ayala but from the whole region of Granada, and apparently from other regions of Pacific Nicaragua as well. The idea of a cultural unity among the regions encompassed by the concept of Greater Nicoya should be called into question, or, at least, examined critically for the Bagaces period. In this regard, it should be noted that in the southern sector, social differentiation, and, perhaps, political centralization preceded by centuries such processes in the region of Granada.

Following Bagaces, important changes in regional and community patterns are noticed. Sites previously settled were abandoned or suffered a decline in the density of occupation near the end of Bagaces or the beginning of Sapoá. Larger sites emerged and their layout differed from that of previous sites. These changes are noticed throughout Greater Nicoya, where for the first time there is indication of regional hierarchies in both sectors of the subarea. It is probable that these changes are related to the arrival of Mesoamerican groups to the subarea, since they are also accompanied by significant changes in the artifactual complexes. I will discuss this possibility in more detail in chapter 7.

During these later periods there appears to be more integration of the regions encompassed by the Greater Nicoya. It is not clear whether this integration is the product of a shared cultural system, or simply reflects a more dynamic and extensive exchange/trade network.

Chapter 6

THE ARTIFACTS

The principal aspects of the ceramic and the lithic complexes are discussed in this chapter. I have added comments on data from excavated artifacts of the Tepetate site (Norweb 1959b; Willey and Norweb 1959). These comments are the product of my ongoing research on collections housed at the Peabody Museum, Harvard University.

Macrobotanical and faunal remains are considered at a general level because their analysis is still in progress. Appendices D and E are related to this chapter. Appendix D includes data related to the ceramic sequence. Appendix E shows the results of compositional analysis on obsidian (Glascock 1994). Compositional data on pottery have been published partially (Bishop 1994). In this text I comment on non-published data that I have recently discussed with Dr. Ronald L. Bishop.

THE CERAMIC SEQUENCE

I have detailed elsewhere a sequence extending from 300 A.D. to 800/900 A.D. (Salgado 1992, n.d.a; Salgado and Zambrana 1994). This sequence was built with materials recovered from a stratigraphic pit dug by Norweb at the Ayala site (Salgado 1992). The new data, and a closer examination of other regional sequences lead me to modify the former sequence. The discussion, then, is centered on the chronological changes in the earlier phases, new information added to previously established phases, and the addition of two new phases chronologically related to the Sapoá and Ometepe periods (Table 1.1).

All the ceramic types cited both in Table 6.1 and in the text have been previously described, and the reader is referred to those works if interested in more detail (Abel-Vidor et al. 1990; Salgado 1992, n.d.a). Nevertheless, illustrations of non-published diagnostic types, as well as main types of the new phases, are included to provide a general idea of their surface features. All the illustrations show artifacts recovered in stratified contexts of Granada.

Appendix D includes tables showing the absolute and the relative distribution of types in operations 7 and 8 (Tables D.1 and D.2), and a table with radiometric dates from samples obtained in those operations (Table D.3). Finally, a graphic displays the seriation of stratigraphic levels from these operations (Fig. D.4). This graphic also includes the seriated levels of a stratigraphic pit used to build the first regional sequence (Salgado 1992).

Siu Phase (0-300/400 A.D.)

Diagnostic pottery of the Siu phase includes Usulutan-related, Charco Black-on-Red:Puerto variety, Potosi

Table 6.1 Principal ceramic types of regional sequence

PERIOD	PHASE	DIAGNOSTIC TYPES	COMMENTS
Ometepe (1350-1522 A.D.)	Xalteva (1150-1522 A.D.)	Vallejo Polychrome Vallejo Lazo Cara Mombacho Madeira Polychrome Las Marías Banda Combo Colander Lago Black Modelled Castillo Esgrafiado Bramadero Polychrome Luna Polychrome Granada Polychrome	Some types continue from the preceding phase, including Sacasa, Papagayo, Ayala and Pataky. Most varieties of Papagayo peak in Xalteva. By the end both Papagayo and Pataky decline
Sapoá (800-1350 A.D.)	Cocibolca (950-1150 A.D.)	Sacasa Striated Papagayo Polychrome Manta Pataky Polychrome	Ayala Slipped continues as an important type
	Ayala (650-950 A.D.)	Ayala Plain Ayala Slipped Momta Polychrome Agurcia Polychrome Borgoña Striated Tenampua Delirio	Chávez, Tola and Galo continue. Tola seems to peak, as does the Belo variety of Galo. Ayala unslipped continues as does Rivas
Bagaces (300-800 A.D.)	San Antonio (300-650 A.D.)	Rosalita Polychrome	Chávez White-on-Red, Tola Trichrome, the variety León of Rivas Red and Galo emerge in this phase. León and the variety Lagarto of Galo peak in this phase. Ayala unslipped and Rivas Red continue
Tempisque (500 B.C.-300 A.D.)	Siu (0-300 A.D.)	Charco Black-on-Red Puerto variety García Ridged	Espinoza Red-Banded Rivas Red, Usulutan-related pottery, and Potosi Appliqué are present. All seem to to peak during Siu

Applique, and Garcia Ridged. Espinoza Red banded peaks though it continues in the following phase. Rivas Red is the most important non-decorated type followed by Ayala Plain (Table 6.1). The phase was initially dated 300-500 A.D. based on the absence of Rosales Engraved (Salgado n.d.a, 1992, Salgado and Zambrana 1994), a type diagnostic of the Tempisque period.

In Ometepe two phases roughly correspond to Tempisque (Table 1.1). The first is Sinacapa (200 B.C-1 A.D.), whose diagnostic types are Schettel Incised and Rosales Polychrome, with a minor presence of Garcia Ridged and some Usulutan-related examples (Haberland 1992:77). The following phase is Manantial (1-500 A.D.) defined by the continuity of Garcia, and the presence of Espinoza Red-Banded and Charco Black-on-Red:Puerto variety (Haberland 1992:81). Manantial ceramic complex is the closest to Siu of all the contemporaneous complexes in Greater Nicoya. Before the definition of Siu, Haberland stated that Manantial did not seem to correlate to the established phases of Greater Nicoya (Haberland 1992:83). But, indeed, there are some general links between the San Jorge phase in Rivas and Siu, especially with the emergence of Charco Black-on-Red:Puerto variety, the main diagnostic type of San Jorge (Healy 1980:300-301). The chronological range of San Jorge coincides with that assigned to Siu (Lange 1990, Table 1). In Managua recent research defined La Colonia Complex (500

B.C-300 A.D.). The last three centuries of La Colonia overlap with Siu. Espinoza Red-Banded is the only type of Siu present in La Colonia (Espinoza 1995a:22-23).

The noted relation between Siu, San Jorge and Manantial merits a modification of the chronological range previously defined for Siu (Salgado n.d.a; 1992). The initial date now coincides with that of Manantial and San Jorge. The closing date is set at 300/400 A.D. based on the absence of Chavez White-on-Red and Tola Trichrome, both diagnostic types of the Bagaces period. Nevertheless, since this chronology is not backed by radiocarbon dates, it is tentative and will require a reevaluation when more data become available.

Relations of Siu to Contemporaneous Phases of Northwestern Costa Rica. Two ceramic types reportedly unified the ceramic complexes of Pacific Nicaragua and northwestern Costa Rica during Tempisque: Rosales Engraved and Bocana Incised (Lange 1984; Abel-Vidor et al. 1990). Both are absent from the ceramic complex of Siu. Although this could be related to an earlier occurrence in the region of Granada, Rosales has only been rarely recovered in surface collections (Table B.1) or stratified deposits (Salgado 1992). Rosales is a type poorly represented in those regions located north of Rivas (e.g. Goodstein 1989; Espinoza 1995a; Lange et al. 1992). Distributional and compositional data indicate Rivas was the region where the type was manufactured (Bishop 1994).

The ceramic complex of Siu has only general relations with those of northwestern Costa Rica. The stronger of these is seen in the predominance of red slipped ceramics, including both plain and decorated, and some modes of decoration like the use of black painting seen in the variety Puerto of Charco Black-on-Red.

It is worth noting that red-slipped ceramics dominate coeval ceramic complexes, not only in northwestern Costa Rica, but also in the Central Valley and in eastern Costa Rica. Healy has already noted general similarities between the ceramics of Rivas and the above mentioned areas of Costa Rica (Healy 1980:316). Snarskis details decoration modes shared by ceramics of the Tempisque region and those of the Atlantic Watershed of eastern Costa Rica (Snarskis 1976:104). Likewise, Hoopes (1994b:185) mentions relations at the modal level between the Guinea Incised type of the Arenal region and ceramics of the Atlantic Watershed in Costa Rica.

In Chontales, minor types of the Mayales phase (200 B.C.-400 A.D.) seem to relate to types of the Tempisque Valley (Espinoza and Rigat 1994:145; Gorin 1990), but there are no direct relations with the ceramic complexes of Rivas, Ometepe or Granada.

In summary, the closest relation of Siu is with San Jorge and Manantial. Beyond Rivas and Ometepe, the relations are very general. As discussed before, some ceramic complexes of Costa Rica, both within and outside of Greater Nicoya, could be more closely aligned among themselves than to that of Siu. If what unites Greater Nicoya is overall a series of pan-regional types (e.g. Lange 1984, 1994; Bonilla et al. 1990), the region of Granada has very weak relations at that level during Siu.

Imported Pottery and Foreign Connections. Usulutan-related sherds constitute a small percentage of the ceramic complex of Siu (about 1%). They are set apart by a distinctive paste, surface finish and technological attributes (Salgado 1992). Resist decoration is present in very few sherds in our sample (Fig. 6.1c,d, Fig. 6.2).

The limited presence of resist decoration (Fig. 6.1 a,b) in our sample is a feature that could be generalized to the Usulutan pottery found in Nicaragua (Salgado and Fletcher 1994). Interestingly, Usulutan ceramics in Honduras are characterized by the use of resist decoration only as a minor mode (Urban and Schortman 1991). This feature sets apart the Usulutan pottery from Honduran and Nicaragua from coeval complexes of the Late Preclassic Usulutan tradition of southern Mesoamerica, characterized precisely by this decorative technique (Andrews 1976; Sharer and Demarest 1982, 1986).

Usulutan-related pottery is significantly more abundant in sites of Managua, León and, especially, in the region of

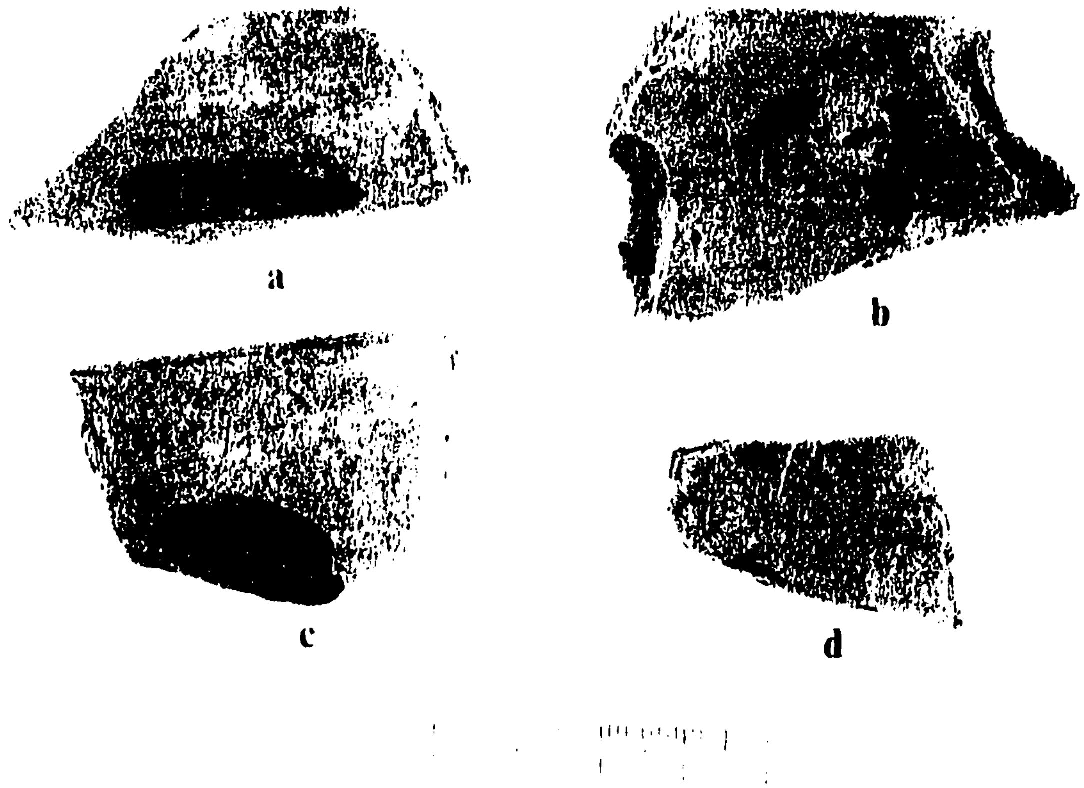

Figure 6.1 Usulutan-related sherds

Figure 6.2 Usulutan-related sherds

Estelí-Madriz[1] (Espinoza 1995a; Fletcher 1994; Fletcher et al. 1994; Wyckoff 1976). It has been suggested elsewhere that the latter region could be the source for some of the Usulutan-related pottery from Ayala (Salgado and Fletcher 1994). Nevertheless, at least some vessels were imported from Honduras. Approximately half of the Usulutan samples from Ayala submitted for compositional analysis grouped with those of the Ulua:Tenampua. This indicates a common region of manufacture in central Honduras.

Although Usulutan-related pottery is common in sites of northern Nicaragua, it is not possible to determine with certainty when it was first locally manufactured. The only radiometric dates associated to Usulutan pottery belong to strata of the Ayala phase. Nevertheless, in Rivas, Healy (1980:300-301) associated Usulutan pottery to components of the Tempisque period (500 B.C.-300 A.D.). These are dates roughly contemporaneous with the Late Preclassic (400-100 B.C. [Demarest and Sharer 1982, 1986]), the period of emergence and widespread distribution of Usulutan pottery in southeastern Mesoamerica (Andrews 1976; Demarest and Sharer 1982, 1986). The Usulutan tradition apparently extended to Nicaragua shortly after its emergence in El Salvador.

Tripod bowls with mammiform supports are numerous in Rivas Red, the most important monochrome of Siu. The form is

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[1] In this region, Usulutan constitutes up to 30% of the ceramic collection while in southern Pacific Nicaragua only up to 1% (Salgado and Feltcher 1994).

also present in bowls of Muerdalo Red and Tzuntulin Red (Baudez and Becquelin 1973:170-193), two types that are part of the Usulutan tradition of central Honduras (Baudez and Becquelin 1973:170-193). Healy also noted relations between the mammiform supports of Rivas Red and the Floral Park Horizon of the Maya lowlands (Healy 1980:211).

The Siu ceramic complex indicates a level of interaction with regions to the north, an interaction that will grow stronger during the Bagaces period.

San Antonio Phase (300/400-650 A.D)

Several types emerge at the onset of the San Antonio phase (Table 6.1). The new stratigraphic data show that Rosalita is nearly absent from Ayala phase components. Consequently, Rosalita (Fig. 6.3) is considered diagnostic of San Antonio, even when sometimes is recovered in Ayala phase components in reduced quantities (Salgado 1992, Salgado and Zambrana 1994).

Galo Polychrome is represented by two varieties: Lagarto (Fig. 6.4) and Belo (Fig. 6.5). The latter was previously defined as a separate type, but it was also noted that the "type is closely related to Galo Polychrome in surface treatment and forms... it could be the case that with further studies the type would be defined as a northern variety of Galo Polychrome" (Salgado 1992:59). Indeed, the sample now available supports the inclusion of Belo as a

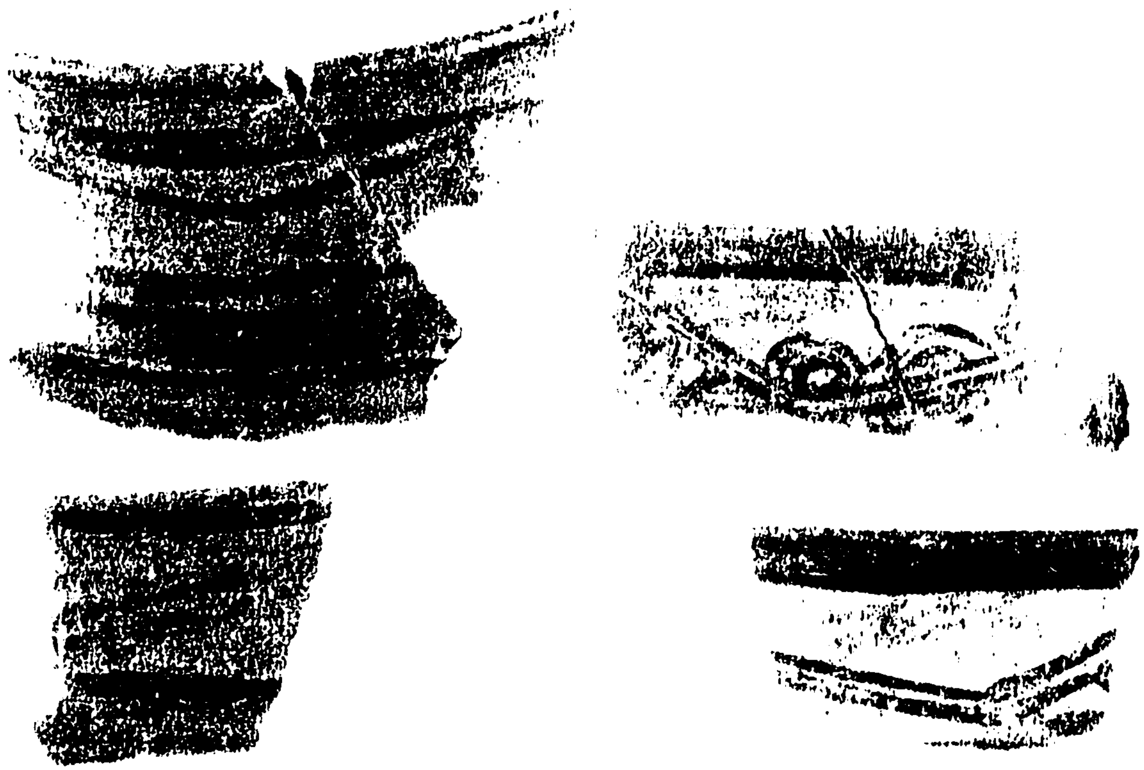


Figure 6.3 Rosalita Polychrome

Figure 6.4 Galo Polychrome: Lagarto variety

Figure 6.5 Galo Polychrome: Belovar

variety of Galo. Lagarto and Belo continue in the following phase, but Lagarto peaks during San Antonio.

Compositional data indicate Rosalita and Galo were manufactured locally (Bishop 1994). Recent excavations in sites of Managua did not yield these types (Lange 1995c). Nevertheless, I have identified Rosalita and both varieties of Galo in the collections of the El Cauce site (Acahualinca) classified by Goodstein (1989). The limited distribution of Rosalita and Belo in sites of Managua and of Rivas (Salgado 1992) supports the compositional data indicating a local manufacture in Granada (Bishop 1994). Lagarto is apparently well represented in Rivas and Managua, and perhaps it was manufactured as well as in these regions. Comparisons of pastes from different regions could provide a better idea of the pattern of manufacture and distribution of that variety.

Ceramic artifacts included re-worked sherds that had been ground down until their edges were smoothed and rounded (Fig. 6.6). These artifacts could have been used as smoothers or polishers in the manufacture of ceramic artifacts. Re-worked sherds also include rounded and perforated discs, probably used as spindle-whorls (Fig. 6.6).

San Antonio shares most types with the San Roque phase in Rivas. Nevertheless, some important San Roque types are absent, including Puchor Red-Slipped and Sapoa Black-on-Red

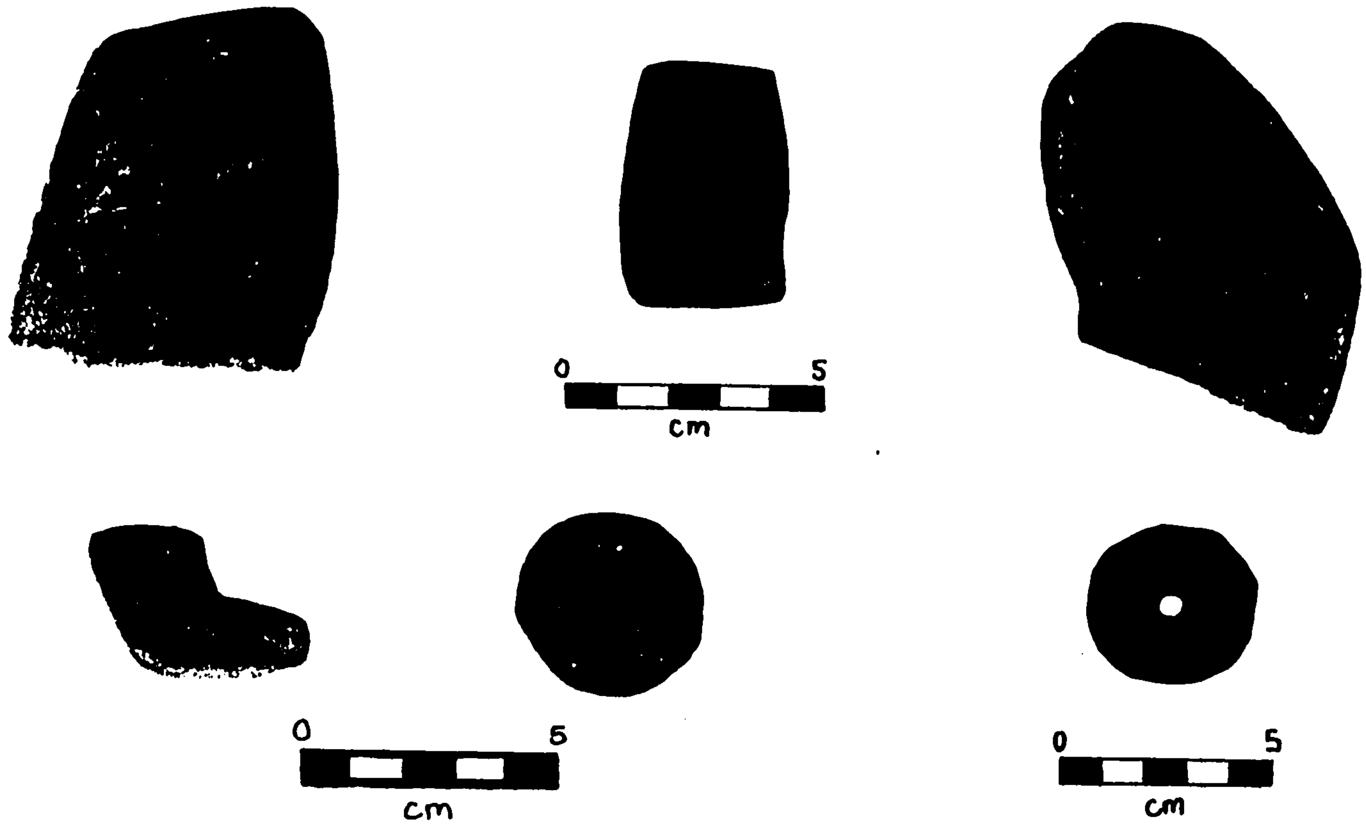


Figure 6.6 Reworked sherds

(Healy 1980:302). Two phases in Ometepe partially overlap with San Antonio: Manantial (1-500 A.D.) and San Roque (500-950 A.D.). The former specifically relates to San Antonio, and the latter only at a general level. The relations with the region of Managua are not well established. In Chontales El Cortezal B is roughly contemporaneous but to the San Antonio ceramic complex (Gorin 1990).

The initial date of the phase is established by cross-dating with the San Roque phase in Rivas. The emergence of Chavez White-on-Red, the variety Leon of Rivas Red, Tola Trichrome and Galo Polychrome, is associated with the beginning of Bagaces in Pacific Nicaragua (Healy 1980; Haberland 1992). This date is provisional and requires evaluation with absolute dates. The closing date is set against the opening date of the following phase.

Relations to Contemporaneous Phases of Northwestern Costa Rica. Types present in San Antonio are found also in the southern sector, but in lesser quantities. The shared types are Galo:Lagarto variety, and Tola Trichrome. The latter is represented in Nicaragua by the Tola variety and in the southern sector by the Lopez variety (Abel-Vidor et al. 1990). The forms, decorative motifs and even surface finish of both varieties are different. Indeed, what unites them is the use of the mode of decoration consisting of motifs painted in white over black.

Diagnostic types of Bagaces in the southern sector such as Zelaya Thrichrome, Guinea Incised, and Mojica are all absent in San Antonio. The ceramic complexes of San Antonio and the southern sector can be clearly differentiated as in the previous phase.

Imported Pottery and Foreign Connections. The phase marks the appearance of painted pottery with designs in black and red over a shiny tan surface. This pottery, which includes Rosalita and Galo Polychrome, has some chronological, technological and stylistic parallels with the polychrome tradition of western and central Honduras (e.g. Joyce 1993). In Honduras the polychrome tradition derives from the local Usulutan-related pottery. Red painted is first added around 200 A.D. (Joyce 1993:62), though some earlier dates have been reported for some regions (e.g. Joesink-Mandeville 1993:243). More colors are added later on to create a variety of bichrome, trichrome and polychrome types often with highly polished surfaces (Hirth et al. 1989:219; Henderson and Beaudry-Corbett 1993; Joyce 1993:62-68).

Although no specific links can be established among the polychromes of San Antonio and those contemporaneous in Honduras, they seem to follow a similar chronology of development. The shiny tan or orange surface is also a shared technological attribute. Significantly, the main decorated types of San Antonio, Chavez White-on-Red and Tola

Trichrome, blend the local tradition of red-slipped pottery started in previous periods, with a common painted motif in some Honduran bichromes and polychromes. This motif, the "profile silhouette monkey", is incorporated in Cancique Polychrome (Beaudry-Corbett et al. 1993:89-90), Chamelecon Polychrome of the Naco Valley and Gualpopa Polychrome of Copan (Joyce 1993:89 and Figs. 3.9, 3.10; Willey et al. 1994: Figs. 64 and 65).

Another link between Ayala and ceramics from Honduras is seen in a zoomorphic motif characteristic of Rosalita Polychrome (Fig. 6.3). This motif resembles some of the representations of the "Alligator Motif Type A" defined by Lothrop (Lothrop 1926:168-173, Figs. 71b, 72b, Pl. LXXVc). A similar representation is noted in some Ulua Polychromes particularly from central Honduras (e.g. Baudez and Becquelin 1973, Fig. 104 o, p; Joyce 1993, Fig. 3.19, upper frieze of vessel; Stone 1957:30, Fig. 18 a, c, d).

Imported ceramics are limited to some Usulutan-related sherds and one probable Sulaco Polychrome (Salgado 1992). The ceramic complex of San Antonio shows an increasing interaction with Honduras, at least as important as the interaction with the southern sector.

Ayala Phase (650-950 A.D.)

This is the later phase of the Bagaces period and it extends over 150 years into the Sapoá period. A number of new types appear defining the phase, among them Momta

Polychrome (Fig. 6.7), along with Agurcia Polychrome (Fig. 6.8) and Borgaña Striated (Fig. 6.9 [Salgado 1992, n.d.a; Salgado and Zambrana 1994]).

Changes in the decorated and monochrome pottery occur. Even when pottery with glossy surfaces continue, new polychrome types such as Momta and Agurcia show different technological attributes. Agurcia has a tan but matte surface, while Momta usually has a light cream slipped and badly preserved surface, a contrast with the well-preserved surfaces of Galo and Rosalita. The dominant form of Momta and Agurcia is composite-wall bowls with tripod truncated-conical supports. This is a new form in the region of Granada.

In addition to re-worked sherds, ceramic artifacts include numerous ceramic beads (Fig. 6.10), solid and hollow modelled figurines and ear spools (Fig. 6.10), and a zomorphic and anthropomorphic pendants made of clay or pumice (Fig. 6.10). Ceramic beads are plain or decorated with incisions, as are ear plugs that sometimes have transverse incised lines on the top and bottom lip. As mentioned in chapter 5, two fragments of green-stone beads (Fig. 6.10) were recovered in a domestic structure. Ceramic figurines are handmade either solid or hollow, painted or monochrome.

Looking at the distribution of types in table D.1, Appendix D, it is possible to divide the phase into an early

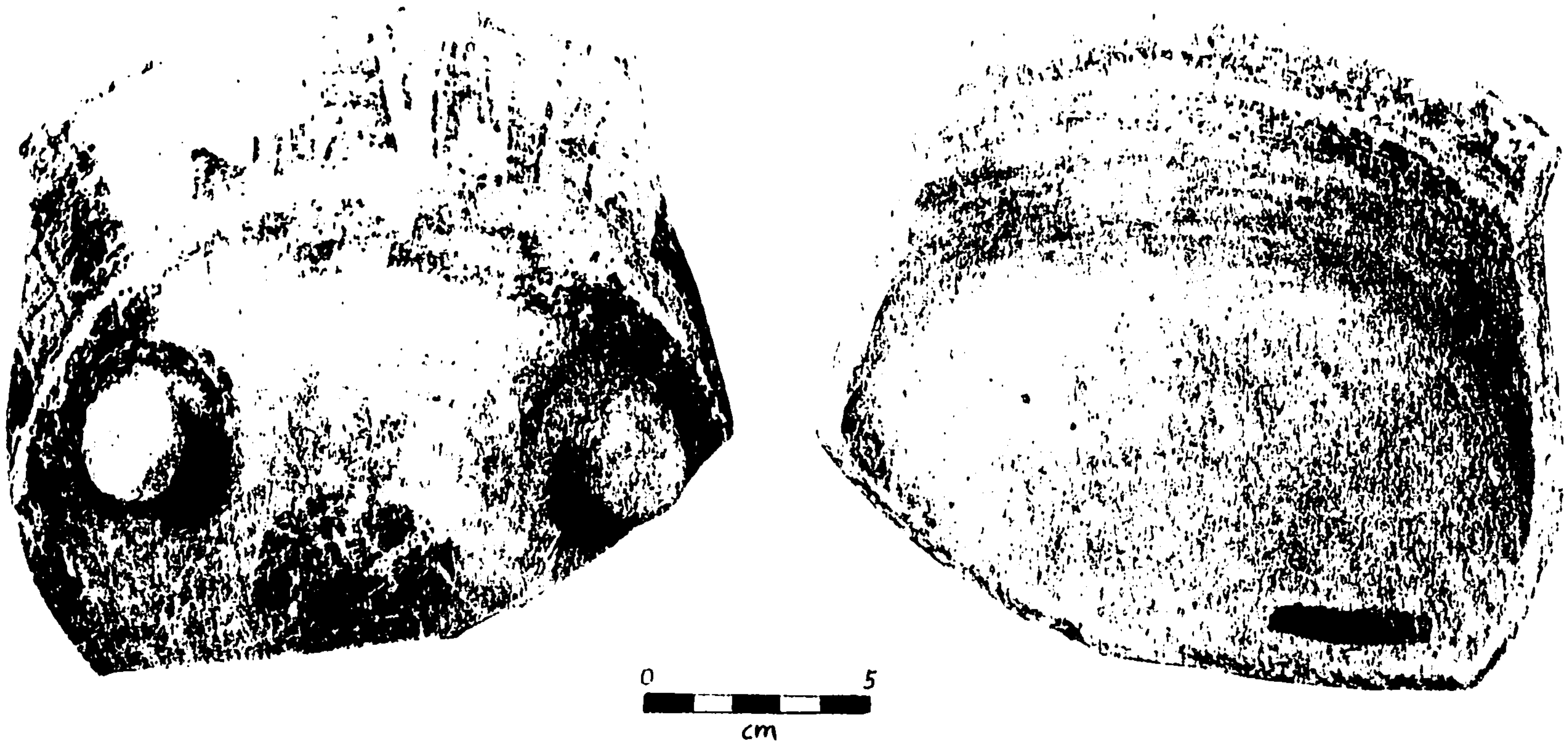


Figure 6.7 Momta Polychrome

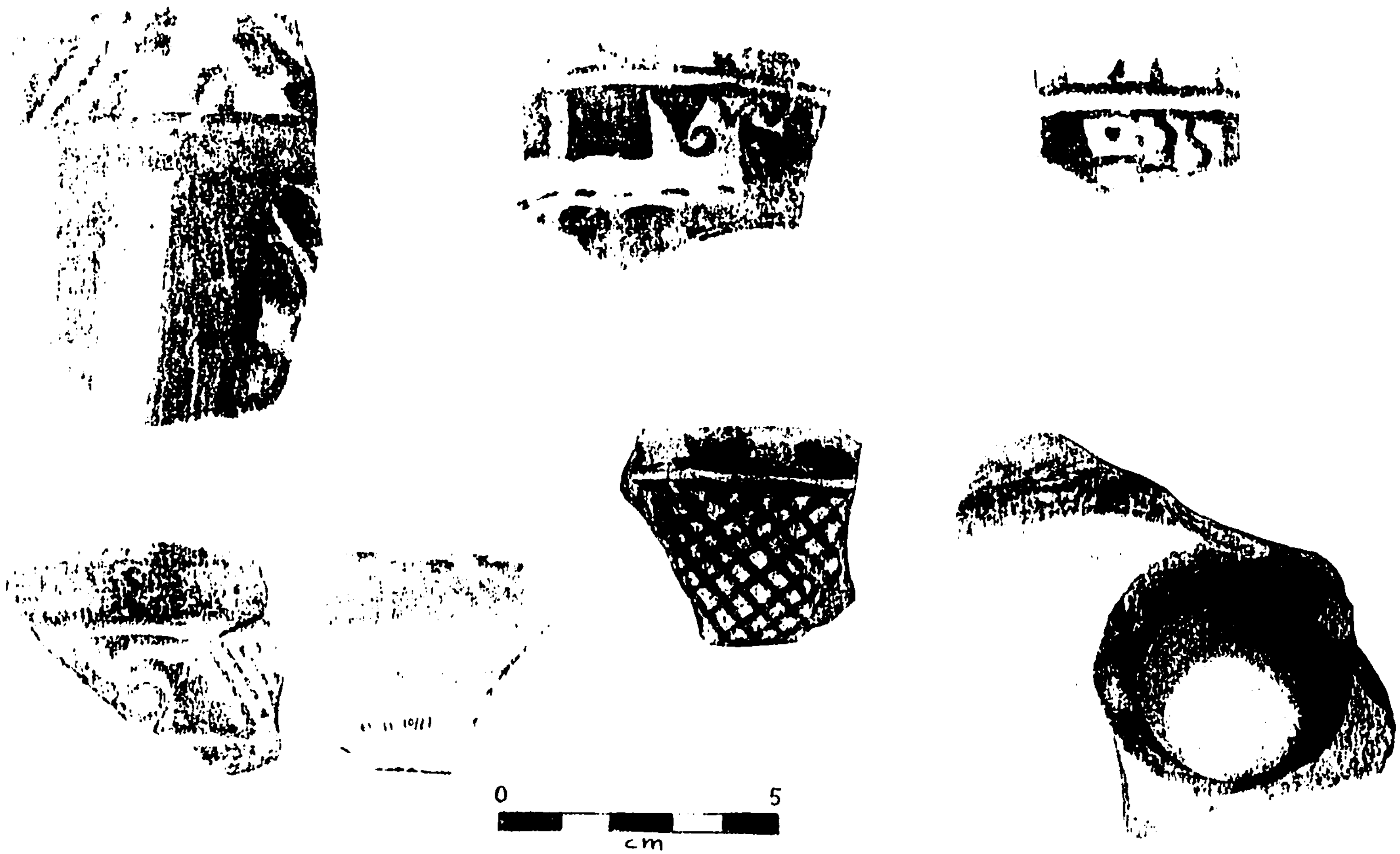
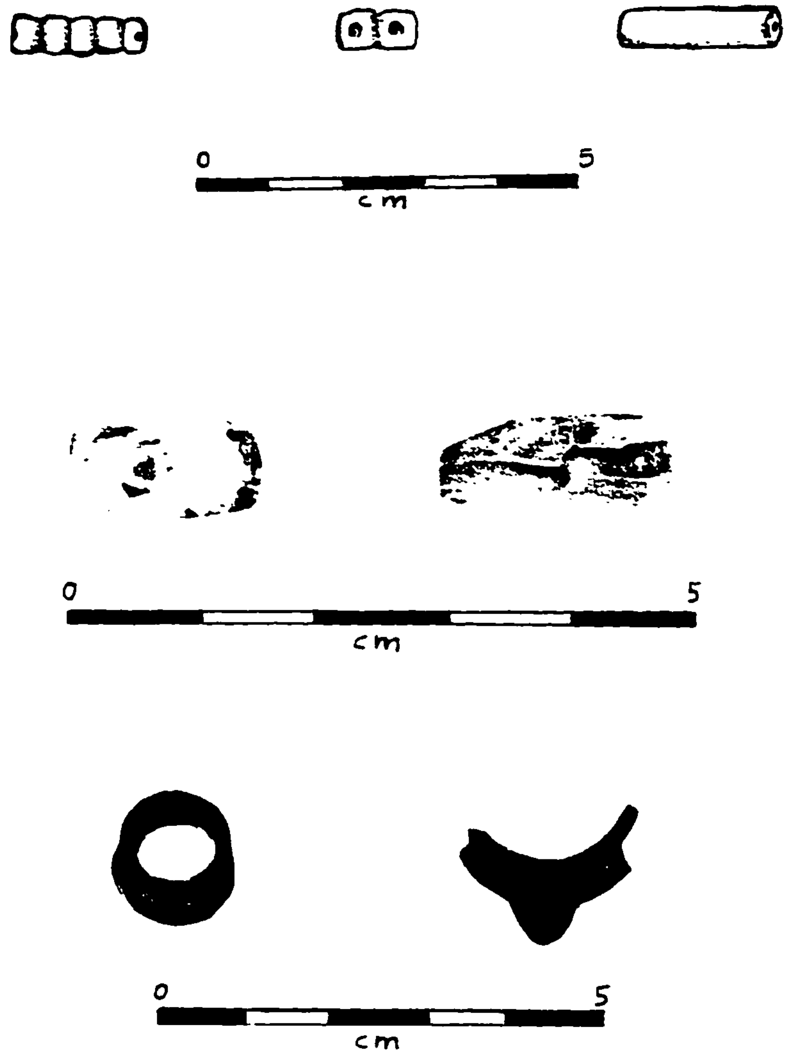


Figure 6.8 Agurcia Polychrome

Figure 6.9 Borgoña variety



Top row: ceramic beads
Second row: ceramic beads
Third row: ear spools
Bottom row: pumice pendant

Figure 6.10

facet and late facet. This probable division is based on the concentration of Momta and Agurcia, along with Tenampua and Delirio in the upper six levels. Nevertheless, it seems prudent to gather more data from other stratified deposits before deciding if this division is accurate.

Five radiocarbon dates are associated to Ayala serving to define its chronological range from 650 to 950 A.D. (Appendix D: Table D.3). This range alters the former dates assigned based on two radiocarbon dates obtained by Norweb (Healy 1980) and cross-dating with regional sequences of western and central Honduras (Salgado 1992:108). Delirio and Tenampua are associated with the Terminal Classic, approximately 830/850-950/100 A.D. (Braswell et al. 1994:176; Joyce 1986:313). These dates reinforce the terminal date of Ayala.

Chronologically Ayala overlaps the phases Palos Negros in Rivas, San Roque in Ometepe, Cuisala and Potrero in Chontales (Fig. 1.10). San Antonio shares most types with the Palos Negros but some of its important types are absent in San Antonio components, including Velasco Black-Banded, Sapoa Black-on-Red, and San Juano Beige (Healy 1980:302). On the other hand the diagnostic types of San Antonio are absent or present in lesser quantities in Rivas (Salgado 1992). The relations with San Roque are more general, as are those with the region of Managua (Goodstein 1989; Salgado 1992), and no direct relations are seen with the Chontales region (Gorin 1990). In northern Pacific Nicaragua contemporaneous phases are Santa Rosa and some overlap occurs with Pulpería La Cruz A (Table 1.11). Santa Rosa shows some general resemblances to the red-slipped ceramics present in San Antonio, but its ceramic complex reportedly shows stronger relations with Honduras.

Healy (1980:345) noted a developing regionalism in the ceramic complexes of Bagaces. In Granada this is specially noted in the ceramic complexes of the Ayala phase.

Relations to Contemporaneous Phases of Northwestern Costa Rica. The diagnostic types of Ayala were just recently defined and described (Salgado 1992). Consequently, it cannot be assessed whether or not they are present in northwestern Costa Rica. Nonetheless, these types are easily differentiated by their forms, surface finish and decoration. If they were present in significant numbers in Costa Rican sites they would have been easily set apart from established types. In my own research, on both scientifically recovered and private collections (e.g. Salgado and Calvo 1993; Salgado n.d.b; Abel-Vidor et al. 1990), I came across just one a vessel that I would now classify as Momta Polychrome. This was part of the collection of the Hacienda Tempisque (Day 1984), from the middle Tempisque valley.

The differences from southern sector complexes are more pronounced in Ayala than in the preceding phase. The contrast seems related to a stronger interaction with societies of Honduras than their counterparts in Costa Rica had.

Imported Pottery and Foreign Connections. Tenampua is a class of the Ulua Polychromes that was manufactured in the Comayagua Valley, where it has its most concentrated distribution. Viel specifically identifies the Tenampua site as the source for the type (Viel 1977:265). Most sherds recovered at Ayala belong to the sub-class Pentagone, and specifically to its Cinderella variety (Joyce 1993:262; Viel 1977:255). Sherds from this sub-class have also been found at Quelepa, and were formerly misidentified as Nicoya Polychromes (Andrews 1976:Fig. 152r-s).

Viel noted relationships between Tenampua and Papagayo Polychrome. It is my impression that some of the vessels of Tenampua vessels share formal and stylistic similarities with the earliest variety of Papagayo Polychrome: the Culebra variety dated to 800-1000 A.D. (Abel-Vidor et al 1990:187). These similarities include the use of a white/cream slip, black bands with geometric motifs painted on white (e.g. Joyce 1993: Fig 3.31), and periform vases with ring bases (Joyce 1993: Fig. 3.31). Although this relation needs to be explored in more detail, it is worth noting that Culebra is rougly coeval with Tenampua.

Culebra is absent from Ayala and the Granada region in general. Unless the chronologies of the Culebra variety are inaccurate, it seems that Papagayo Polychrome was not imported to or manufactured in Granada for at least 150 years after it emerged in Rivas and in the Bay of Culebra (Abel-Vidor et al. 1990:187-192). Nevertheless, the use of orange painting and a thin cream slip is present in Momta. Perhaps this is a local manifestation of the white-slip tradition developing at this time in Rivas, with a strong presence in and apparently in the Bay of Culebra too. Compositional data strongly supports the manufacture of Papagayo in the region of Rivas (Bishop et al. 1988; Bishop 1994).

Delirio Red-on-White is another white-slipped pottery imported to Ayala. Braswell and coleagues (1994:176) state that Delirio Red-on-White, apparently, was traded more frequently to regions south of Quelepa than to those west and north. A handful of Delirio sherds were recovered at the Vidor site in the Bay of Culebra (Fred Lange personal communication 1995). This is the only Costa Rican site where so far the type has been reported. Few sherds of Delirio were recovered in the region of Estelí/Madriz. To the best of my knowledge the sample of Delirio recovered at Ayala is the largest reported outside Quelepa.

A few vessels of Delirio have been reported in southern Maya sites such as Copan and Seibal (Joyce 1986:319-320), and sites located along the southeastern periphery such as Cerro Palenque and Travesia (Joyce 1986:319). The context in which the type is found in these sites suggests "the value of this ceramic [Delirio] as an elite status marker and the existence of an interelite exchange network" (Braswell 1994:176 [see also Joyce 1986:326]). As discussed in chapter 5, there are some hints the trade networks that reached Ayala could also be characterized as interelite exchange networks.

All the decorated types of Ayala show similarities, mostly, with central Honduras types (Joyce 1993, Salgado 1992). Ulua Polychromes are found throughout northern Pacific Nicaragua (Espinoza and Garcia 1995; Wyckoff 1976) and in Esteli/Madriz (Fletcher 1993; Salgado and Fletcher 1994). Nonetheless, it is not clear if the classes found in those regions are other than the Tenampua class found in Granada. On the other hand, it seems Delirio is not as frequent in other regions of Pacific Nicaragua (Lange 1995c:145; Lange et al. 1992: Table 2.1).

Rosemary Joyce shows how specific forms and motifs of Honduran pottery were incorporated in Nicaragua and northwestern Costa RicaJoyce notes also that the "Ulua Polychrome tradition incorporates elements of Central American ceramic groups in the same way it borrows from Lowland Maya sources" (Joyce 1993:89). She details specific links between the variety Jaguar of Galo, and the Nebla and Tenampua classes manufactured in the Comayagua Valley. Examples of Tenampua also represent double-headed stone benches. Joyce thinks that the "Nicoya anthropomorphic figurines seated on double-headed benches could have provided the model for this motif" (Joyce 1993:91).

The relation with Central Honduras, established as early as Siu, is expanded during the Ayala phase to include eastern El Salvador. This is especially interesting because it occurs alongside context of the consolidation of complexity in Granada, and the development of dynamic social processes taking place in the Comayagua Valley and Quelepa (e.g. Agurcia 1986; Andrews 1976; Dixon 1989). The characteristics of this interaction will be discussed in more detail in Chapter 7.

Cocibolca Phase (950-1150 A.D.)

The ceramic complex of this phase marks an abrupt change from the previous phase. The shiny and tan-slipped surfaces of Bagaces polychromes are lost. The polychrome types are now defined by different technological attributes. In addition to the introduction of new slip, orange becomes the main color in painted motifs. The surfaces are polished, but not shiny as in the previous period. Pastes are a little coarser and better oxidized. The frequency of painted pottery increases notably from the previous phase, from about 10% or less to about 20% (Tables D.1 and D.2). Although there is some continuity in the iconography, it is overriden by the introduction of a new set of motifs without precedent in the local tradition. These new motifs are associated with Mesoamerican traditions (e.g. Accola 1978b:90; Healy 1980:169; Leibsohn 1987:142; Stone 1977).

Papagayo Polychrome (Fig 6.11) is the main decorated type of the phase and Pataky Polychrome (Fig. 6.12) is present in smaller quantities (Table D.2). Sacasa Striated first appears at the onset of Cocibolca and is the most numerous monochrome type.

The only variety of Papagayo that could be considered diagnostic of the phase is Manta, though other varieties are present such as Alfredo, Mandador, and Casares. In Rivas, the varieties Manta and Mandador reach their peak in La Virgen (Healy 1980:304). Cocibolca and La Virgen are coeval, though there are some differences in the ceramic complex of each phase. The most notable is the limited presence of Granada Polychrome in Cocibolca deposits, since Granada Polychrome is an important type of La Virgen and Las Lajas complexes both in Rivas and in Ometepe (Healy 1980:126-129). This type constitutes up to 10% of the assemblages in Rivas, and up to 4% in Ometepe (Healy 1980: Tables 9, 12, 13). Granada was barely present in Cocibolca or Xalteva deposits. The distribution of the type suggests it was imported to Granada, probably from one of the two above mentioned regions.

Artifacts of the Cocibolca include notched-sherds probably used as net-sinkers (Fig. 6.13) and spindle-whorls, decorated or plain (Figs. 6.14).

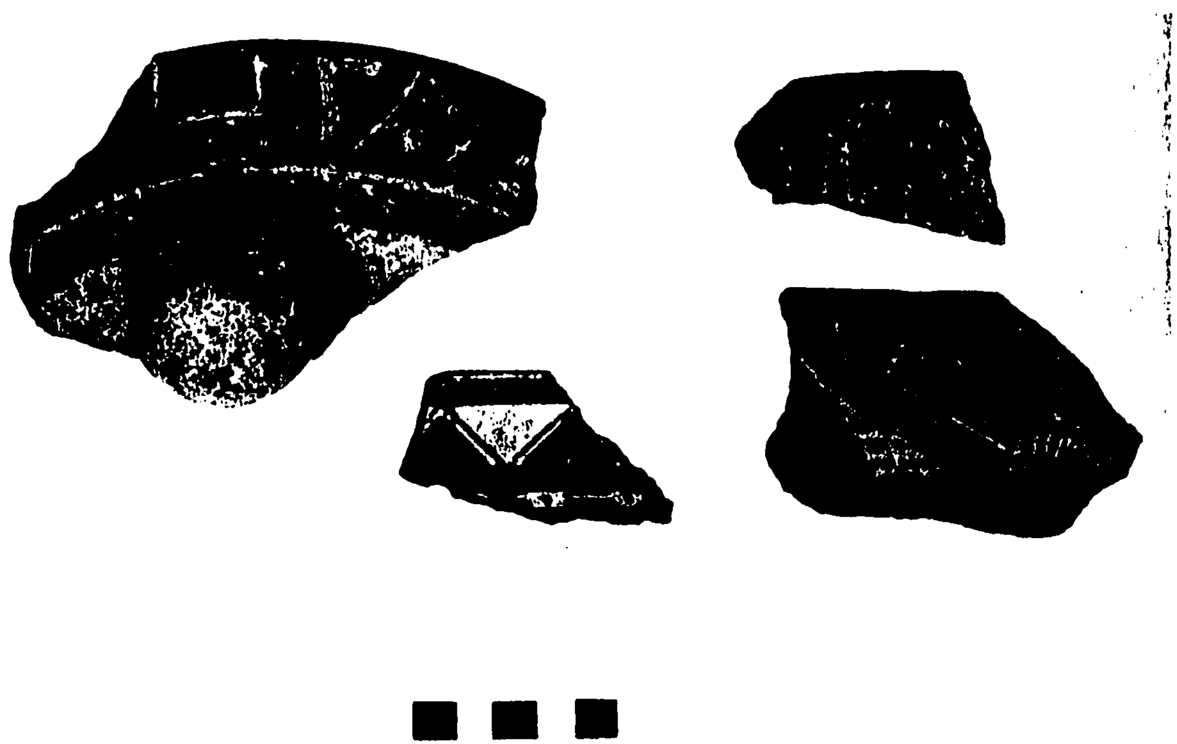


Figure 6.11 Papagayo Polychrome

Figure 6.12 Top row: Castillo Engraved
Bottom row: Pataky Polychrome

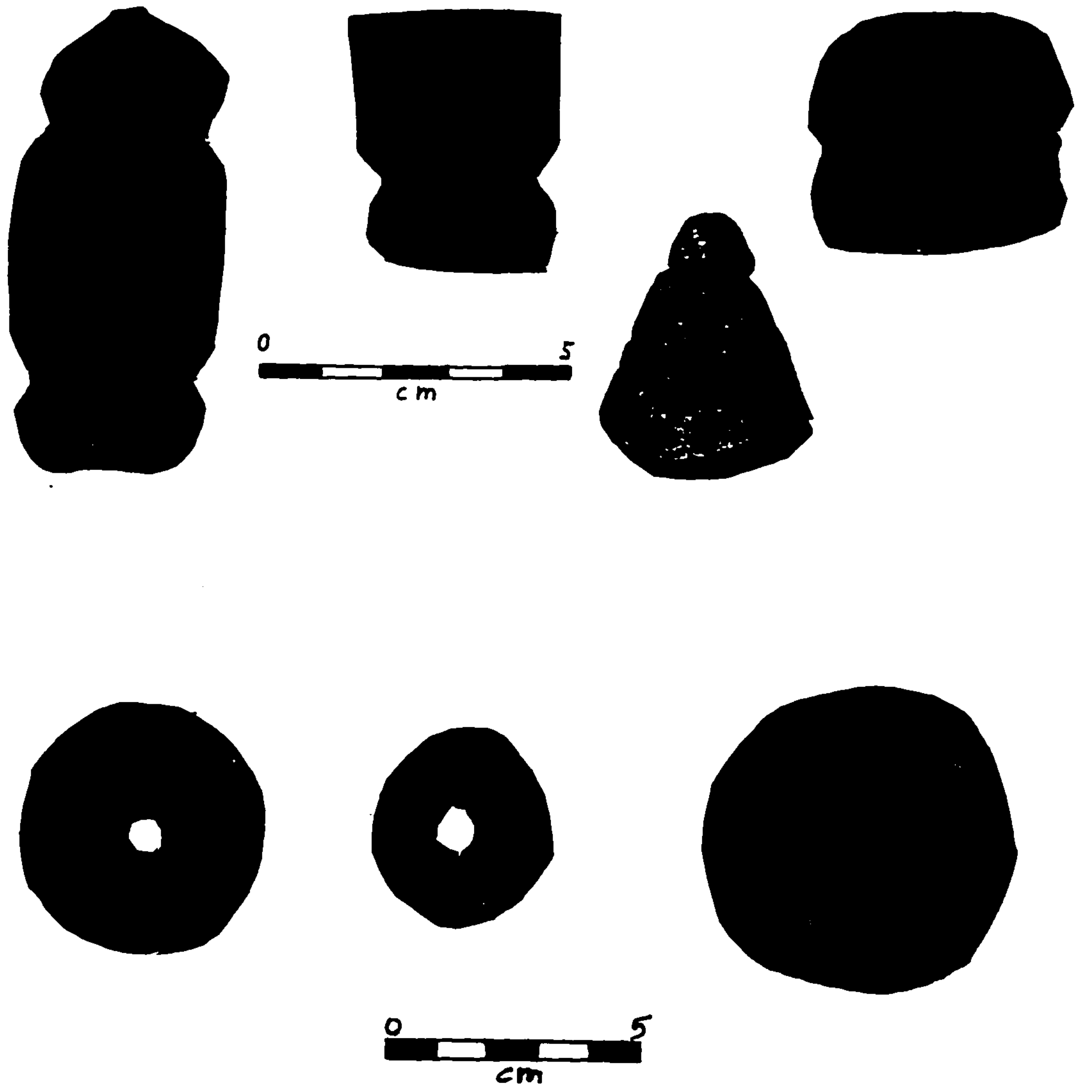


Figure 6.13 Top row: Notched sherds
Bottom row: Perforated and rounded ceramic discs

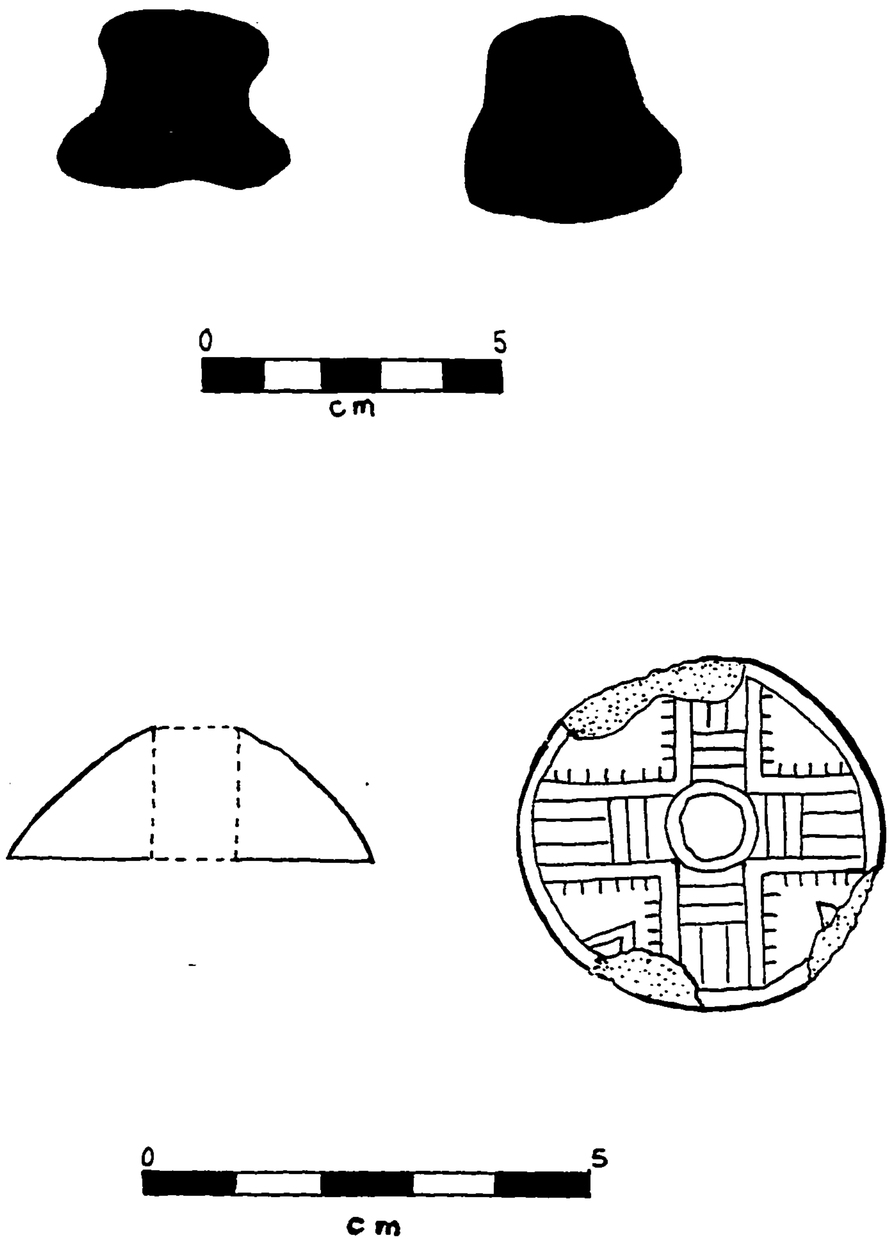


Figure 6.14 Spindle whorls

Relations to Contemporaneous Phases of Northwestern Costa Rica: As has already been reported for other regions of Nicaragua, the Cocibolca ceramic complex differs from that of contemporaneous sequences of northwestern Costa Rica. There is a marked contrast in the absence of Mora Polychrome and its varieties, not only in Granada, but other regions of Nicaragua as well. On the other hand, Papagayo is an important type in regions of Costa Rica as far south as the Bay of Culebra. South and east of the Bay, the type diminishes sharply. For example, the ratio of Papagayo to Mora in sites of the Tempisque Valley ranges from 1:3 to 1:10 (Baudez 1967). It is also significant that the distribution of Sacasa Striated does not reach northwestern Costa Rica, and no other striated type has been reported for that area.

In northwestern Costa Rica the change in ceramic complexes from Bagaces to Sapoá is less sharp than in Nicaragua. The tan-slipped polychromes constitute the majority of polychrome types in the southern sector (Abel-Vidor et al. 1990; Baudez 1967; Sweeney 1975), but they are absent in Nicaragua (Abel-Vidor 1990). The continuity of tan-slipped pottery in the southern sector is reinforced by compositional data. Samples of Costa Rican Galo and Mora Polychromes form a clearly defined compositional group (Bishop 1994:32, Table 2). Reportedly this indicates the use of common resources by the manufacturers of both types in the southern sector (Bishop 1994). Nevertheless, tan-slipped pottery of Sapoá no longer displays the glossy surfaces distinctive of Bagaces, which signals a technological change in their manufacture.

The significant presence of pottery manufactured in Nicaragua in most southern sector sites suggests an active trade network. The understanding of these dynamics is limited, since very few artifacts manufactured in northwestern Costa Rica have been recovered in Nicaragua. Perhaps perishable products were traded from the south to the north, and they have not been preserved in the archaeological record.

Imported Pottery and Foreign Connections: Pottery from regions located beyond Greater Nicoya was not recovered in Granada. Nevertheless, Papagayo Polychrome is part of a broadly distributed tradition of white-slipped pottery. The type has strong similarities with the Las Vegas Polychrome of the Comayagua Valley (Baudez 1970; Baudez and Becquelin 1976) and Papalon Polychrome of the Gulf of Fonseca (Baudez 1976).

The origins of this tradition are not well understood. Apparently the first white-slipped ceramics appear in Quelepa sometime between 750 and 850 A.D. (Braswell et al. 1994:176-177). In central Honduras, Las Vegas Polychrome reportedly evolves from the earlier Tenampua class of Ulua Polychromes of the Terminal Classic (Joyce 1986; Viel 1978).

In Greater Nicoya, Papagayo is dated as early as 800 A.D. (Abel-Vidor et al. 1990:178), and as discussed before the earliest variety of the type shows general resemblance to some features of Tenampua.

Several possibilities have been suggested for the development of this tradition. Viel (1993:18) sees relations between Tenampua and the Chama style polychromes. Joyce points out that the innovations seen in Tenampua and Las Vegas have no local precedent in Honduras (Joyce 1993:91). Papagayo shows some elements of continuity with local traditions, but as already discussed, it is overall a pottery with clear technological, formal and stylistic innovations (Leibhson 1987). Healy (1980) links the emergence of Papagayo to the arrival of the Chorotega to Pacific Nicaragua. Finally, Andrews (1976; Braswell et al. 1994:176) links the white-slipped ceramics of Quelepa to those of the Gulf Coast and Central Veracruz.

Smith and Heath-Smith (1980) discuss how white-slipped pottery of Pacific Nicaragua shares a series of formal and stylistic features with Early Postclassic pottery from West Mexico and Central Veracruz. Pyriform vases with pedestal or tripod supports, as well as specific symbols of the Postclassic Religious Style are shared by ceramics of those regions. Smith and Heath-Smith (1980:26) consider that the shared features are the product of a trade network that linked together the above mentioned regions.

Much work is needed to clarify the chronology and specific relations of the Central American white-slipped ceramics. Whatever its source, or sources of development, this pottery marks a clear break with previous ceramic developments from eastern El Salvador to Pacific Nicaragua. This change could be the product of the geographic expansion of interaction networks linking Mesoamerica and Lower Central America as discuused by Smith and Heath-Smith. It could also be the product of the immigration of Mesoamerican groups to Pacific Nicaragua or other regions of Central America (Abel-Vidor and Day 1981; Braswell et al. 1994; Healy 1980; Lothrop 1926; Stone 1966). I think that existing trade networks facilitated the immigration of groups from Mexico to Central America, and that the white-slipped tradition is a product of such migration.

Xalteva Phase (1150-1522 A.D.)

The emergence of Madeira Polychrome (Fig. 6.15), Castillo Engraved (Fig. 12) and Lago Modelled define the Xalteva phase. There is a very limited presence of other polychrome types such as Luna (Fig. 6.15), Granada and Bramadero, in addition to Ometepe Red Incised (Appendix D, Table 8). Vallejo Polychrome and its varieties peak during this phase (Fig. 6.16). Papagayo and Sacasa continue as important types.

I have dated Xalteva from 1150 to 1522 A.D. The initial date is assigned based on two radiocarbon dates (Appendix D,

Figure 6.15 Top row: Luna Polychrome
Bottom row: Madeira Polychrome

Figure 6.16 Vallejo Polychrome

Table D.4). No evidence of a differentiated ceramic complex later than Xalteva has been found at Ayala or at Tepetate (Salgado, ongoing research at the Peabody Museum). As discussed in chapter 1, the ethnohistoric information clearly indicates the occupation of the area at Contact (e.g. Werner n.d.). Therefore, provisionally, the closing date is set by the time of the first "entrada" of the Spaniards to the region.

Xalteva complex is similar to Las Lajas phase (1200-1350 A.D. [Bonilla et al. 1990; Healy 1980]) of Rivas, and San Lazaro (1300-1400 A.D. [Haberland 1992]) in Ometepe. Nevertheless, there are minor differences in the frequency of decorated types in each region that probably reflect center of manufacture, and/or patterns of exchange and trade. Types such as Madeira and Vallejo have higher frequencies in Rivas and Ometepe than in Granada.

The last phase of Rivas is Alta Gracia (Healy 1980). Nevertheless, it was mainly defined based on stratified components of La Cruz site, on the island of Ometepe. Alta Gracia is marked by the appearence of Luna Polychrome, and the continuity of most types emerged in Las Lajas. The distribution of Luna strongly suggests that it was manufactured in Ometepe, where it is more abundant than in any other region. Indeed, Luna was absent in the sites of Rivas studied by Healy (1980:137). In Granada very few examples (less than 5) were recovered in stratified deposits of Xalteva. Few Luna were found on surface collections in a handful of sites (Table B.1).

Healy considered Ometepe and Rivas part of a single region, and seriated the stratified levels of pits from both regions to build the sequence of Rivas. As a result, and due to the concentration of Luna in Ometepe, Alta Gracia appears as the last phase of the sequence preceded by Las Lajas. Norweb (1964) defined independent sequences for each region, defining Las Lajas as the later phase in Rivas contemporary to Alta Gracia as the last phase in Ometepe (Norweb 1964:553). In Ayala the few examples of Luna appear in Xalteva deposits, alongside other types considered typical of Las Lajas. I would argue the new data from Ayala and Tepetate support Norweb's original sequence, and Alta Gracia should be considered a local phase in Ometepe corresponding to the Santa Ana phase (1400-1550 A.D. [Haberland 1992:110-113]).

Relations with Contemporaneous Phases of Northwestern Costa Rica. The diagnostic types of Xalteva are found in several regions of Costa Rica, having been imported from Pacific Nicaragua (Bishop et al. 1988; Bishop 1994). The intensification of trade observed in the preceding phase continues in Xalteva. Again, there is a lack of evidence of goods imported from the southern sector to Granada.

As in Cocibolca, the division between the production of white-slipped pottery in Nicaragua and a tan or salmonslipped in Guanacaste is maintained. Jicote Polychrome, a popular type manufactured in the Tempisque region, shares some of the designs of Vallejo, Madeira and Luna, but they are clearly interpreted within the context of local traditions (Cannouts and Guerrero 1988). Moreover, some of the designs of Vallejo incorporating Mesoamerican iconography are not represented in Jicote (Cannouts and Guerrero 1988:244). The share formal and stylistic aspects of pottery complexes indicate a significant interaction among the southern and northern sectors. Nevertheless, differences also indicate the existence of regional distinctions, and these are perhaps related to diverse sociopolitical territories. I will discuss this possibility later.

Imported Pottery and Foreign Connections. Vallejo Polychrome displays some motifs with no clear antecedent in local traditions. These include the Earth Monster, Ehecatl, hummingbirds and "stylised serpents with a supraorbital plate and feathers" (Canouts and Guerrero 1988:247). The motifs reportedly recall the codices of the Mixteca Alta (Stone 1977:81, 1982).

This incorporation of Mesoamerican-derived iconography, a process already started in the preceding Xalteva phase, indicates the continued interaction with some regions located to the north.

THE LITHIC ARTIFACTS

The lithic complexes of the Ayala, Cocibolca and Xalteva phases are briefly considered here. Unfortunately, the sample from Cocibolca is small, and of poor interpretative value in terms of reconstructing the lithic assemblage of the phase. The discussion is based on the reports elaborated by Geoffrey Braswell on the obsidian artifacts (Braswell 1994), and by Wilson Valerio on the remainder of the lithic sample (Valerio 1994).

The only artifacts associated with the Siu and San Antonio phases were recovered by Norweb in his excavations at the Ayala site (Norweb 1961b) and described elsewhere (Salgado 1992). Our knowledge of the lithic assemblages of the latter phases is still very limited.

The Chipped-stone Industry

This is the dominant industry of the Ayala, Cocibolca and Xalteva phases (Braswell 1994; Braswell et al. 1995; Valerio 1994; Valerio and Salgado 1995). It represents about 96% of the materials in all phases (Table 6.2). The raw materials utilized were mainly local, but obsidian was imported making up about 14% to 19% of the sample (Table 6.2).

Chert and Porphyry Artifacts. Most artifacts were manufactured using simple core-flake techniques and local materials (Valerio 1994). The raw materials were abundant

Table 6.2 Distribution of lithic artifacts by phase

	Ayala		Cocibolca		Xalteva	
	N	%	N	%	N	%
Chipped-stone	1124	96.0	147	95.4	166	98.2
Chert	938	80.1	40	81.6	134	79.3
Drill	34	3.6	2	5.0	9	6.7
Notched scraper	16	1.7	0		7	5.2
Side scraper	8	0.9	0		4	3.0
Cutting implement	3	0.3	0		6	4.5
Biface	2	0.2	0		2	1.5
Core	41	4.4	1	2.5	6	4.5
Flake	649	69.2	26	65.0	88	65.7
Angular fragment	185	19.7	11	27.5	12	9.0
Obsidian	186	15.9	7	14.3	32	18.9
Nodule	2	1.0				
Flake	129	69.3	6	86.0	15	46.9
Projectile point	1	0.5				
Small perc. blade	2	1.0				
Prismatic blade	6	3.2			12	37.5
Chunks	46	7.1	1	14.0	5	15.6
Ground-stone	47	4.0	2	4.1	3	1.8
Metate[1]	21	44.7			2	66.7
Mano[2]	23	48.9	1	50.0	1	33.3
Celts	3	6.4	1	50.0		
Total sample	1171		49		169	

[1] Of these, 14 were plain metates and 7 were carved.
[2] This category includes other grinding artifacts such as pestles.

and accesible as shown by the pattern of use and discard of artifacts. The first stages of manufacture were carried out at the quarry since the artifacts rarely retain cortex.

A percussion-flake unifacial technique was applied to produce cutting-edges throughout the sequence. Thermal treatment and bipolar or core-blade techniques were rarely applied. The simplicity of the manufacturing techniques indicates that the production could have been carried out at the household level (Lange et al. 1992:175; Valerio and Salgado 1995). This needs to be tested in future research by the reconstruction of the pattern of distribution of manufacturing areas in each phase.

Commonly produced artifacts were drills, notched scrapers, side scrapers and cutting implements (Table 6.2, Fig. 6.17). The same type of implements were produced in the Ayala and in the Xalteva phases. They were probably used in the manufacture of wood, leather and bone artifacts. Although drills have been reported in sites of Chontales (Rigat 1992), it is only in the Ayala site where they have been found in abundance.

Bifacial percussion was applied to the manufacture of projectile points and axes (Fig. 6.17q, 6.23 bottom). Few bifacial artifacts were found in the collection. Nevertheless, artifacts recovered during the survey as well as in excavated collections of the Tepetate site (Salgado, ongoing research in collections of the Peabody Museum,

Figure 6.17

a-d: Drills
e-h: Side scrapers
i-l: Notched scrapers
m-p: Cutting implements
q: Biface

Harvard) indicate that the production of bifaces became important during the Cocibolca and Xalteva phases. This was reported by Lange and colleagues in their reconnaissance of Pacific Niacaragua (Lange et al. 1992).

Obsidian Artifacts. In contrast to sites of Managua were obsidian artifacts have been dated as early as 2,000 B.C. (Espinoza 1995a), in Granada they are dated not earlier than 300 A.D.

Compositional analysis (Asaro and Stross n.d.; Glascock 1994; Appendix E) indicates that Güinope, located in southern Honduras (Fig. 6.18), provided the raw materials for the manufacture of all core-flake artifacts. On the other hand, practically all prismatic blades were manufactured from Ixtepeque obsidian (Fig. 6.18). The importance of Ixtepeque grew over time as prismatic blades became more numerous in the lithic assemblage of the Ayala site (Braswell 1994; Braswell et al. 1995). It doubled from the Ayala phase (11.8%) to the Xalteva phase (23.6%). In a previous analysis it was determined that one prismatic blade matched the compositional characteristics of the Río Pixcaya source in Guatemala (Asaro and Stross n.d.; Salgado 1992).

Only one green obsidian artifact was found in the entire collection of the Ayala site. Surprisingly, this prismatic blade was made of obsidian from the Mexican source of Zacualtipan (Fig. 6.18; Appendix E). This was a marginally exploited source even though the quality of the

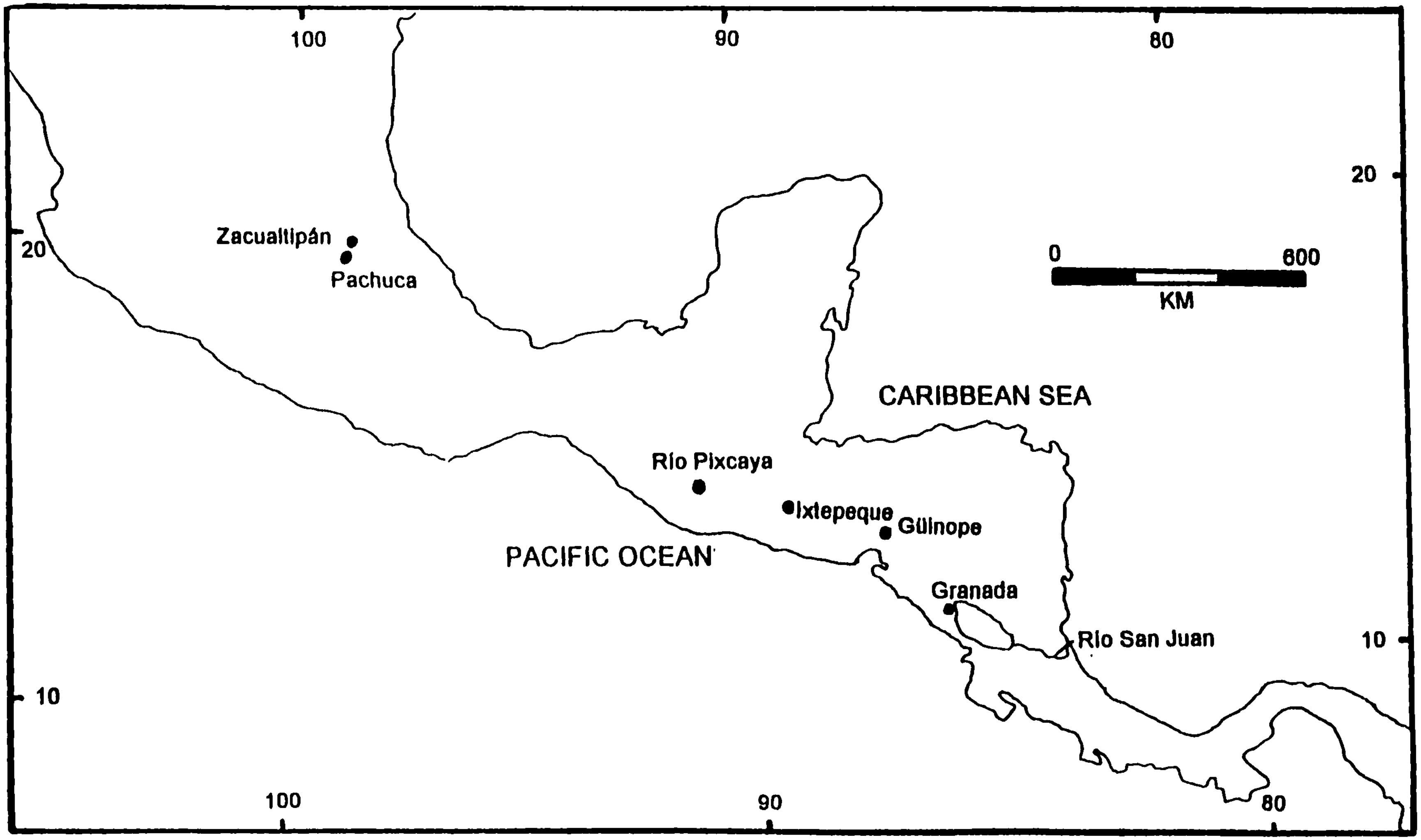


Figure 6.18 Location of obsidian sources mentioned in the text

cores is comparable to those of the Pachuca source (Michael Glascock, personal communication 1995). The blade was probably manufactured in Mexico since no Zacualtipan cores have been found in Central America, and at Copan only few Zacualtipan prismatic blades have been recovered (Braswell 1994).

The compositional analysis performed by Michael Glascock (1994) strongly supports the results from prior analysis (Sheets et al. 1990; Stross et al. 1992). The Nicaraguan core-flake artifacts were made of Güinope´s obsidian and the core-blade artifacts mainly from Ixtepeque´s with minor contributions from other sources.

Most obsidian artifacts were manufactured by simple core-flake manufacturing techniques throughout the sequence (Table 6.2). Casual percussion and bipolar techniques were applied to the production of casual and bipolar flakes. The nodules and chunks identified in the sample are associated with the core-flake industry (Fig. 6.19 d-i).

Products and byproducts of biface production are rare and chronologically limited to the Ayala phase. Eight thining flakes are probably by-products of this production. A fragment of a biface was also identified (Table 6.2, Fig. 19a).

Significantly, the core-flake industry decreased whereas the core-blade industry increased elevenfold from Ayala (3.2%) to Xalteva (37.5%, Table 6.2). The cutting edge

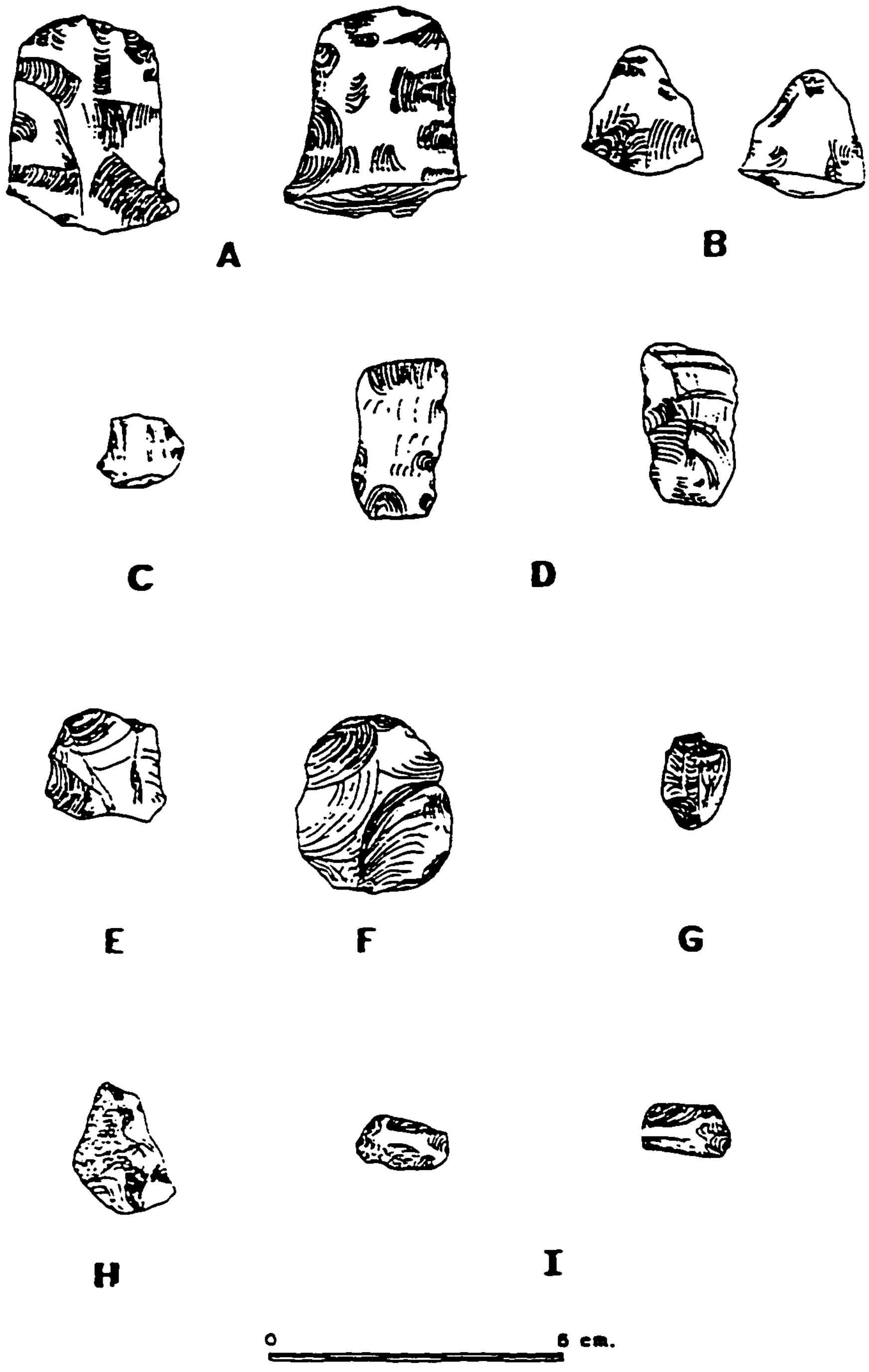


Figure 6.19 Obsidian artifacts. a. biface; c. prismatic blade; d. macro blade; e-g. flakes; h. nodule; i. chunk

to mass ratios of the prismatic blades of the Ayala phase indicate they probably were manufactured at Quelepa and imported in their finished form to the Ayala site (Braswell 1994; Braswell et al. 1995). This inference reinforces the strength of the interaction with Quelepa noted by the presence of Delirio pottery.

In the region of Granada local production of prismatic blades started during the Cocibolca phase. Although the sample from the Ayala sample lacks prismatic blades associated with Cocibolca contexts, my ongoing analysis on the collections excavated by Norweb (1959) at Tepetate shows they were present. Whether or not that represents the emergence of a local core-blade industry cannot be determined at this point.

Braswell (1994) estimates that both the significant increase of prismatic blades as well as changes in the cutting edge to mass ratio in the Xalteva phase demonstrates local production. He thinks these blades were probably manufactured in other sites of Pacific Nicaragua since no macrocores were recovered at the Ayala site. During the course of the survey pot-hunters described findings of macrocores at the site of Tepetate. This makes this site one of the probable centers of manufacture, but this identification awaits archaeological confirmation.

The Ground-stone Industry

Grinding instruments constitute only a small portion of lithic complexes, and most of them are metates and manos (Table 6.2).

In the Ayala phase ground-stone artifacts constitutes a 4% of the lithic complex (Table 6.2). Almost 94% of all ground-stone artifacts are manos and metates (Fig. 20). Carved metates (Figs. 21-22) are abundant, and as mentioned in Chapter 6, they were recovered in the domestic structure of operation 13 and associated to the Ayala phase. Few pestles were recovered as well as polished celts (Fig. 23 top).

Metates and manos have been commonly associated with processing, especially of maize. Carved metates have also been associated to ritual linked to agriculture (Snarkis 1984). Lange (1984) hypothesized that some of these metates could have served as seats to upper status individuals. Finally, celts were recovered in a small number.

All the categories of ground-stone and polished artifacts mentioned here are represented in other sites of Pacific Nicaragua (Haberland 1992; Healy 1980; Lange 1984; Lange et al. 1992).

The Lithic Complexes of the Ayala Site and Adjacent Regions

Reports on the lithic complexes of Pacific Nicaragua or northwestern Costa Rica are scanty. This is perhaps due to a

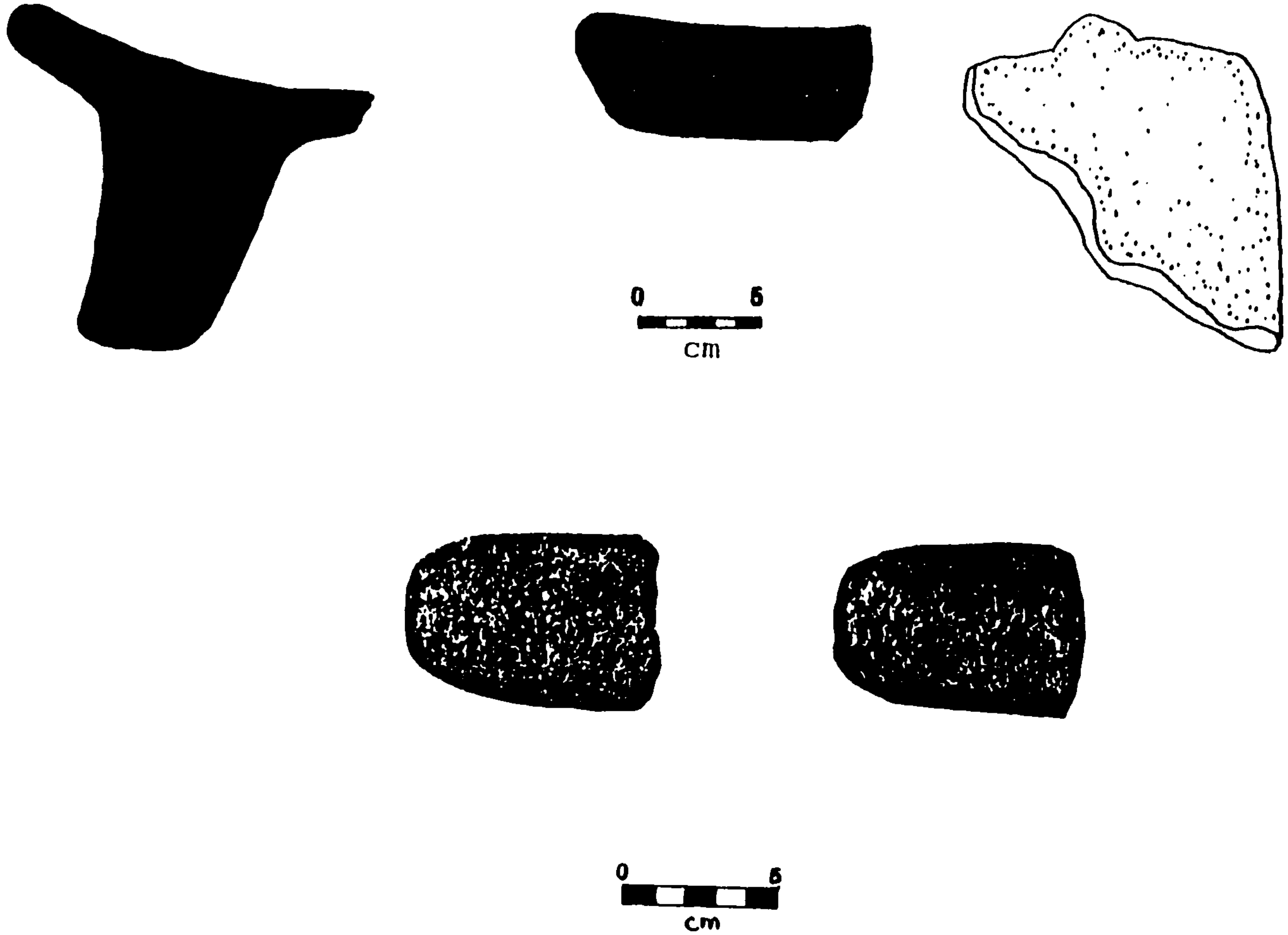


Figure 6.20 Top row: Plain metates
Bottom row: Manos

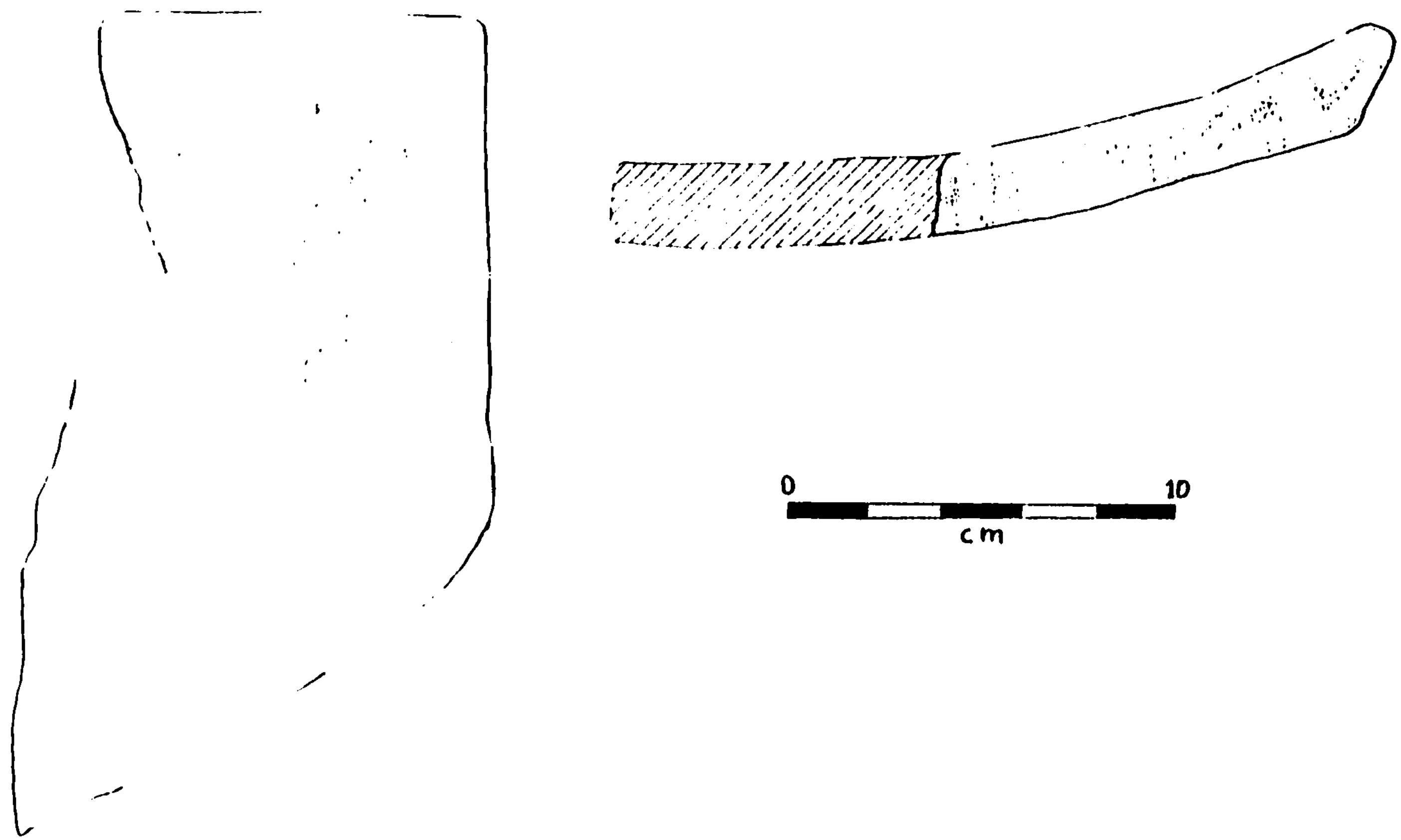


Figure 6.21 Carved metate

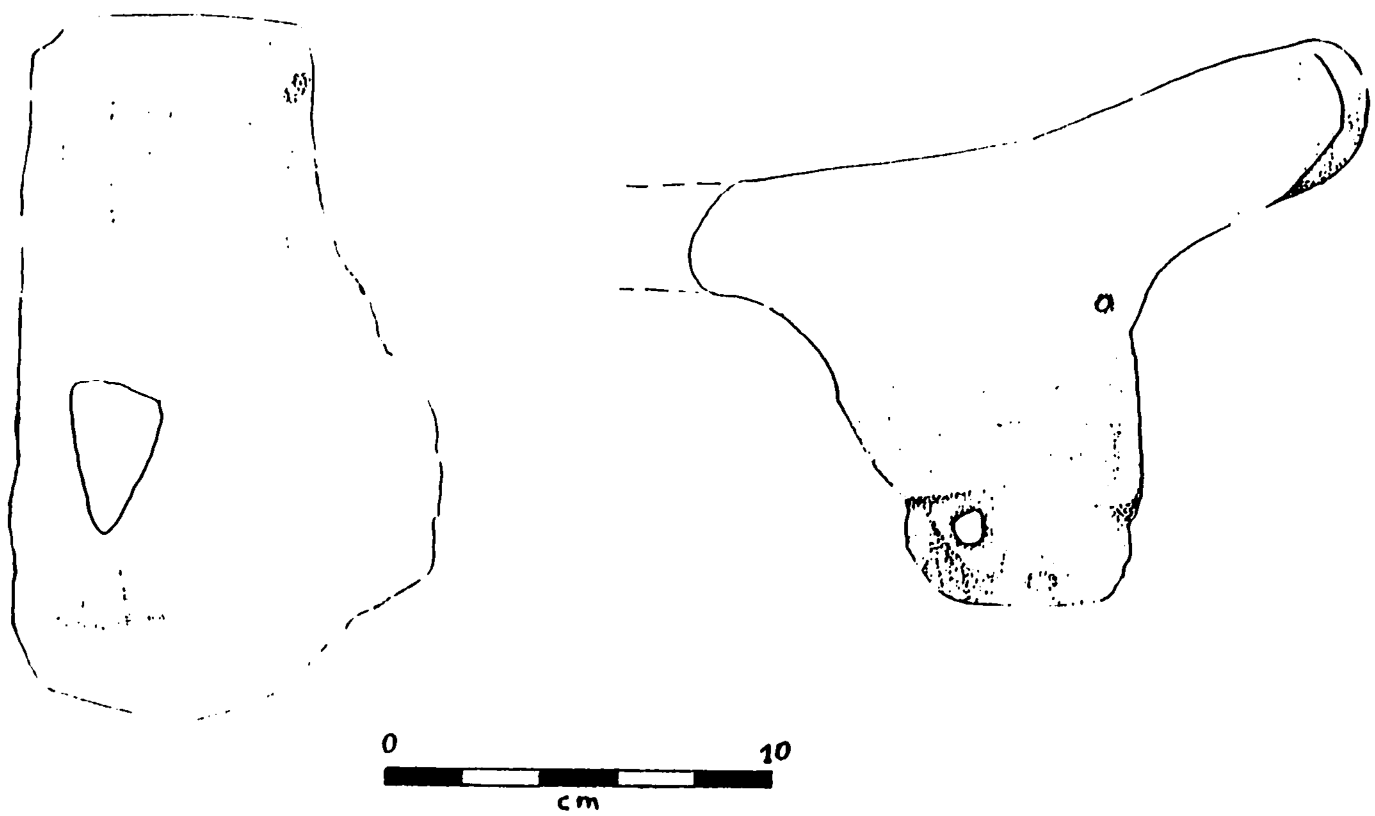


Figure 6.22 Carved metate

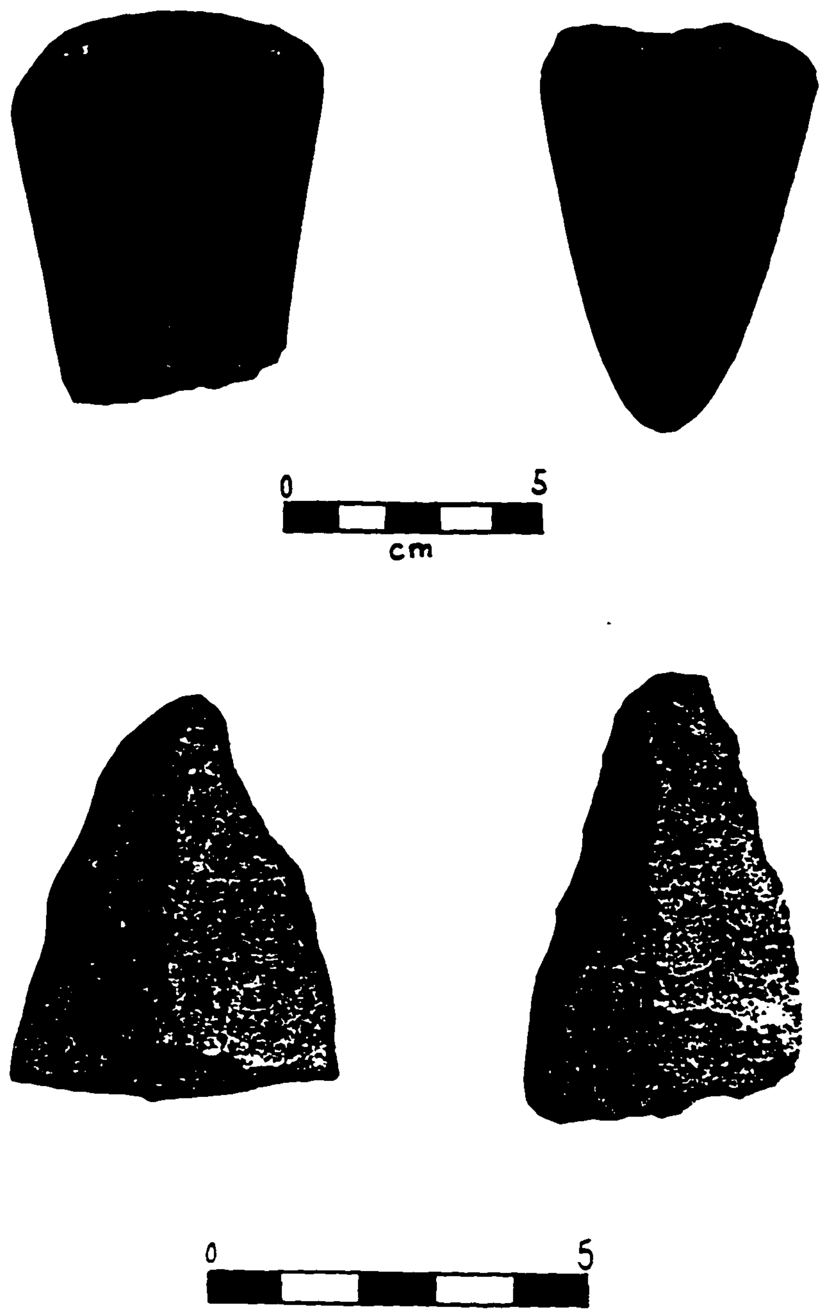


Figure 6.23 Top row: Celts
Bottom row: Bifacial artifacts

lack of interest in the study of these materials, their limited presence in some regions, the methods and techniques applied in the excavations of sites, or a combination of these factors (Valerio and Salgado 1994). Nevertheless, a handful of reports show differences in the utilization of materials as well as in some manufacturing techniques (e.g. Braswell 1994; Chenault 1984; Gerstle 1976; Rigat 1990; Lange et al. 1992; Sheets 1994; Valerio 1994).

There is a marked contrast between the presence of obsidian artifacts in Pacific Nicaragua and their near absence from Costa Rican sites. As already noted by Lange and associates (Lange et al. 1992), within Pacific Nicaragua obsidian artifacts increase steadily from south to north. Whereas in Granada they constitute between 15.9% to 18.9% of the chipped-stone artifacts (Table 6.2), in the northernmost region of Pacific Nicaragua they make up 80% (Lange et al. 1992:54), and in the Esteli-Madriz region nearly 100% (Salgado and Fletcher 1994).

The core-blade industry emerged and became important in several regions of Pacific Nicaragua in the last seven centuries of precolumbian occupation, but it never became significant in northern Nicaragua (Lange et al. 1992). Contemporaneous to this industry is the widespread distribution of biface artifacts across Pacific Nicaragua, especially the stemmed round-based biface. This class of artifact probably indicates interaction with the southern

Maya area, where it is common during the Classic and Postclassic periods (Lange et al. 1992). The changes in the lithic complexes of Sapoá and Ometepe point out the intensification of the interaction with Mesoamerican regions and/or the arrival of Mesoamerican groups (Lange et al. 1992).

The comparison between the lithic complexes is limited by the lack of stratigraphic and chronological control of some of the artifacts reported, as well as the unequal study of stone-tools in Nicaragua and Costa Rica. Overall, the data from Granada support the interpretation provided by Lange and colleagues (Lange et al. 1992). Local raw materials were used to produce most artifacts. Obsidian was the main material only in northern regions perhaps due to the geographic proximity of the source of Güinope. Core-flake rather than core-blade manufacturing techniques dominated the production of lithic artifacts in all studied phases.

FAUNAL AND BOTANICAL REMAINS

A very general picture of subsistence practices is discussed here. Most botanical remains were recovered in components of the Ayala phase, and the faunal analysis is, so far, limited to that phase. Taking into account these limitations, the interpretation of the data provides hints of the general characteristics of the environment, and the interaction of humans with floral and faunal populations.

MACROBOTANICAL REMAINS

The preservation of macrobotanical remains in the archaeological record of the region is affected by the conditions imposed by a tropical environment, as well as cultural factors such as patterns of food processing, consumption and discard. Furthermore, a full reconstruction of the wild and the cultivated vegetation requires recovery of pollen and phytolith samples.

Taking into account those limitations, macrobotanical remains recovered at the site provide at least some hints of the cultivated, the encouraged and the gathered resources consumed and utilized by the population. As shown in table 6.3, most remains were recovered in components of the Ayala phase, consequently data for later phases are more limited.

Although earlier direct evidence for agriculture has not been recovered prior to the Ayala phase, future research could prove that agriculture has been practiced in Granada since the Orosi period. Blanco and Mora (1994) recently reviewed the available macrobotanical, pollen and phytolith data of precolumbian Costa Rica. As discussed in chapter 4, maize phytoliths and macrobotanic remains have been identified as early as 2,000 B.C. (Mahaney et al. 1994; Piperno 1994), and Blanco and Mora mantain that at least by 1,000 B.C. agriculture was a well-developed and established

Table 6.3 Macrobotanical remains identified at the Ayala site

Taxon	Ayala		Cocibolca		Xalteva	
	N	%	N	%	N	%
Anacardiaseae						
Spondias sp	98	21.0			2	4.9
Palmae						
Acrocomia vinifera	22	4.7				
Unidentified	46	9.9	1	10.0		
Sapotacea						
Unidentified	35	7.5				
Leguminosae						
Mucuma	1	.2				
Unidentified	30	6.4			2	4.9
Bignoniaceae						
Cresentia sp	8	1.7				
Gramineae						
Zea mays	4	.9			3	7.3
Lauraceae						
Persea americana	1	.2				
Malpighiaceae						
Byrsonima	1	.2				
Meliaceae						
Unidentified	1	.2				
Malvaceae						
Gossypium	1	.2				
Sterculiaceae						
Theobroma Cacao	1	.2				
Unidentified						
Wood	200	42.8	8	80.0	29	70.7
Seed	7	1.5	1	10.0	3	7.3
Epicarp	11	2.4			2	4.9
TOTAL	474		10		41	

practice (Blanco and Mora 1994:60). Further south in Panama, maize pollen and phytoliths have been identified in deposits of the Late Preceramic Period (Cooke and Ranere 1992:263). The consolidation of agriculture at an early date in adjacent regions offers no proof that the same happened in Granada, and the development of this process in Granada remains an open question. Nevertheless, as discussed in chapter 4, Orosi/Tempisque settlements are situated in areas with fertile soils. Since no paleoindian or archaic sites were found, perhaps the settlement of the region could have been made by expanding groups of agriculturalists.

The cultigens so far identified include *Zea mays* (maize), *Theobroma cacao* (cocoa), and *Gossypium cf. hirsutum* (cotton). It is probable that some of the Leguminosae are *Phaseolus vulgaris* (beans), and some of the unidentified epicarps could be *Cucurbita* sp. (squash, [Blanco 1994]). Other resources could have been either cultivated or encouraged, including *Persea americana* (avocado), *Spondias Purpurea* (jocote), *Byrsonima crassifolia* (nance) and some members of the Sapotaceae taxon. The relatively numerous specimens of *Acrocomia vinifera*, indicate an environment of savannas similar to that found today, although, as will be discussed later, faunal remains point to a richer presence of of animals relative to the present. *Acrocomia vinifera* is a palm usually found in disturbed environments of low humidity (Blanco 1994). Its fruit is edible and from it a fermented drink is produced, "vino de coyol"; this is a common drink in Nicaragua and northwestern Costa Rica.

There is no evidence of the exploitation of new cultigens or gathered resources in the latter two phases of occupation. The sample is less diverse (Table 6.3), perhaps due to the smaller volume of excavations.

The relatively large number of metates (N=20) found at the excavated domestic structure contrasts with the small percentage of *Zea mays* specimens recovered from components of the Ayala phase (Table 6. 4). It is a possible that metates were used to grind a variety of materials, as documented in other cases (Chenault 1994:276). Stable carbon isotope analysis of human and faunal skeletal remains is being conducted by Dr. Lynnette Norr, and should provide some information about the contribution of maize to the diet of the population during the Ayala phase. So far, no maize-based diet has been identified among coeval populations of northwestern Costa Rica. Nevertheless, these results only include populations located on the coast and the cordillera, while data from the Tempisque Valley have not been gathered. In this region and in the Gulf of Nicoya, maize-based diets have been determined for the periods of Sapoa and Ometepe (Norr 1990).

It is worth noting that the percentage of maize for Sapoa and Omepete components increased eightfold

(Table 6.3). Unless differential preservation or changing patterns of food processing could account for the increase, it seems plausible to hypothesize a higher contribution of this cultigen to the diet of the latter periods.

The type of cultigens identified in the Ayala phase, are broadly the same described in the ethnohistorical sources. In spite of this correspondence it cannot be determined if agriculture was as important at that earlier phase as it was for the indigenuous populations at Contact. Nonetheless, agriculture was a well-establish practice at that point (Blanco 1994).

FAUNAL REMAINS

Table 6.4 shows the fauna so far identified; all of it derives from Ayala phase components (Cooke and Espinoza 1993; Gutierrez 1995). Fish constitutes about 30% of the identified fauna, with no marine fishes recognized in the sample. Terrestrial fauna accounts for the remaining 70%.

The small size of the specimens[2] suggests the use of fine nets or poison in fishing, while the recovery of pharingeal plaques indicates that the cleaning of fishes took place at the village (Cooke and Espinoza 1993). As discussed earlier, net-sinkers were found only in stratified

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[2] In the small sample analyzed by Cooke and Espinoza fish specimens weighed ,150 g live (Cooke and Espinoza 1993).

Table 6.4 Archaeological Fauna present at the Ayala site

Mammals	Common name
Odocoileus virginianus	White-tailed Deer
Masama americana	Brocket Deer
Dasypus novemcinctus	Armadillo
Tayassu tajacu	Collared Peccary
Tapirus bairdii	Tapir
Sylvilagus spp.	Rabbit
Reptiles and amphibians	
Ctenosaura similis	Garrobo
Iguana Iguana	Iguana
Unidentified	Snake
Rhynoclemmys?	Turtle
Birds	
Unidentified	
Fishes	
Unidentified	
Mollusca	
Spondylus princeps	Spiny oyster
Strombus galeatus	Conchshell
Fasciolaria princeps	Conchshell

deposits of Cocibolca and Xalteva, indicating perhaps an innovation in fishing practices.

Not surprisingly *Odocoileus virginianus* is the dominant faunal species (Gutiérrez 1995). This cervid dominates the archaeological faunal samples of different periods in both Pacific Nicaragua and northwestern Costa Rica (e.g. Gutiérrez 1993; Kerbis 1980; Pohl and Healy 1980), and Central America in general (e.g. Pohl 1994; Cooke and Ranere 1989). Armadillos and turtles are also well represented in the sample. A few specimens of tapir have been found. It seems it was not a significant dietary resource, in spite of being the largest mammal found in Central America. The tapir and the brocket-deer, both poorly represented, are the only animals in the sample whose habitats are not clearly related to savannas (Kerbis 1980:126; Gutierrez 1995).

Felids are not represented in the faunal sample, but they are displayed in some of the imported ceramics found at the site, both in the variety Jaguar of Galo and in some examples of the Tenampua class of Ulua Polychrome (Fig. 5.13 top left).

Felids are either absent or barely represented in domestic contexts of other sites from Pacific Nicaragua and northwestern Costa Rica (e.g. Kerbis 1980; Pohl and Healy 1980). It is commonly assumed that the habitat of the jaguar is the lowland rainforest. Nevertheless in "areas where human predation is of low intensity this species and other

Neotropical felids can be found in a variety of habitat types.(Cooke 1993:175)", including savannas and forest clearings. It is, therefore, probable that jaguar and other felids were available to the population, and present-day inhabitants report occassionally spotting felids while hunting in forested areas of the Mombacho volcano.

Felids are not a common dietary resource, and when they are utilized it is "usually by groups that live in marginal habitats are under nutritional stress" (Cooke 1993:176). The absence of felids in the archaeological fauna could indicate that the above mentioned conditions were not faced by the population during the Ayala phase. This assumption is reinforced by the lack of evidence of overexploitation of faunal resources in the sample (Maritza Gutiérrez, personnal communication 1995). Another possible explanation for the lack of representation of felids could be their association with special powers, including supernatural powers, and therefore, as in other documented societies of Central America their remains are restricted to symbolic, ritual and/or elite contexts (e.g. Cooke 1993; Pohl 1994:469-470).

Outside the workshop described in chapter 5, very few faunal remains show any traces of being submitted to fire (less than 6%). Thus, animals were first defleshed before the meat was cooked, and/or methods of cooking did not include the direct use of fire.

As mentioned in chapter 1, ethnohistorical chronicles picture a less impoverished environment than that found today in Pacific Nicaragua. The abundance of resources seen in the Ayala phase is no longer available in the present, at least in terms of the terrestrial fauna. Data recovered in components of Cocibolca and Xalteva have not been analyzed. Consequently, it cannot be determined whether the situation changed at some point during those phases due to an increasing population and/or more intensive clearing of land for agriculture.

GENERAL COMMENTS

Diverse activities were carried out by the villagers during Ayala. Among them, the manufacture of pottery, lithic, and bone artifacts. It cannot be determined at this point whether or not all production was for consumption at the village. The notable presence of imported ceramics and obsidian suggests that part of the production was destined to be exchanged or traded. Agriculture, gathered resources, game and fish provided the subsistence base, but the percentage of contribution of each of these resources to the diet is unknown.

A significant interaction with the site of Quelepa in El Salvador and with the Comayagua Valley of central Honduras is noted. This interaction apparently grew out of incipient interaction that began as early as Siu.

The regionalism noted in the ceramic complex of the Ayala phase is probably related to the development of more clearly defined sociopolitical territories. This is consistent with the emergence of a regional hierarchy and the intensification of long-distance trade networks. As already discussed these networks extend throughout Pacific Nicaragua and the region of Esteli/Madriz.

Cocibolca is a poorly represented phase in all artifactual complexes. Nonetheless, important changes occurred both in lithics and pottery. These include the introduction of new technologies and iconographic representations. Mesoamerican lithic industries are introduced both in the form of core-blade technology, as well as in some aspects of a bifacial industry. The higher quantity of obsidian imported from Ixtepeque shows an increasing dependency from Mesoamerican sources, though Guinope is the main source. Interaction with central and southern Honduras continues to be significant, as shown by the similarities in the main decorated type of the phase with white-slipped ceramics of that region.

Xalteva artifactual complexes show a continued interaction with Mesoamerican societies. A wider distribution of obsidian artifacts is indicated by their numerous presence in a third-level settlement. Perhaps this growth is related to a more dynamic economic organization, since the artifacts were manufactured somewhere else in the region and distributed to other sites. Iconographic motives in main types of Xalteva are supposedly related to Mesoamerican deities, some of it supposedly related to religious representations. It seems also probable that maize cultivation increased, as provisionally interpreted from macrobotanical remains.

The artifact complexes defined in Granada show important changes throughout the phases discussed. Not only local factors were involved in these changes. The consolidation of complex polities both in Lower Central America and the southern periphery of Mesoamerica, and the expansion of long-distance trade networks, were both significant in some of the changes observed in the region. I will expand on the nature of these dynamics in the following chapter.

Chapter 7

GENERAL DISCUSSION

In this chapter, regional processes are placed in a broader geographic and sociopolitical context. First, I examine when and how local and macroregional processes were intertwined, and when these processes were incorporated into world-systems. Second, I discuss how regional data strongly support the arrival of Mesoamerican groups to Pacific Nicaragua around 900 A.D. In the context of the first two topics I consider some of the theoretical issues discussed in chapter 2. A third aspect treated is the relevance of concepts such as Greater Nicoya in light of the regional data. Finally, I consider the need for future research in Granada.

LOCAL PROCESSES AND MACROREGIONAL DYNAMICS

At Contact most Central American societies were integrated into world-economies (Carmack 1993c). Mayan societies were part of the Mesoamerican world-system. In the south the regions of Naco, Nito and Ulua in Honduras, as well as Pacific Nicaragua and northwestern Costa Rica formed the periphery of that system. The remaining eastern and southern regions of the isthmus were structured in several world-economies, as well as in tribal mini-systems (Carmack 1993c).

Interaction among precolumbian Central American societies has been demonstrated in many studies (e.g. Benson 1968; Bray 1984; Day 1984; Graham 1981, 1993b; Hosler 1994; Ibarra 1994; Joyce 1993; Lange et al. 1992; Salgado and Fletcher 1994; Sharer 1984; Snarskis and Ibarra 1987; Stone 1982; Viel 1977). In spite of it, scholars disagree on the significance, intensity and direction of such interaction through time. For some authors processes of macroregional interaction had frequently a systemic effect in local processes (e.g. Carmack 1993c; Graham 1993b, 1996). Others maintain that this type of interaction was marginal to local dynamics (e.g. Lange et al. 1992).

Was Granada part of a world-system at any point in precolumbian times?. The data presented in this dissertation suggest an affirmative answer to this question. Macroregional dynamics were relevant in shaping local processes at least after 300 A.D. My interpretation is hampered by the limitations of the available data. The lack of an extensive program of excavations in Granada impedes a fine-grained reconstruction of social processes, including a more precise understanding of their chronology. Another limitation is the lack of equivalency in the data available in many regions engaged in networks of macroregional interaction. In addition, certain types of interaction are difficult to derive from the archaeological record, especially those involving "non-material" aspects of culture.

The acquisition of esoteric knowledge probably was an important process of macroregional dynamics of precolumbian societies (Helms 1979, 1988). This aspect may only partially and indirectly be reconstructed through aspects such as iconography and sacred paraphernalia, especially in areas like Granada, where there is no preservation of native documents. Perishable items were commonly exchanged or traded throughout Middle America, including textiles, cacao, honey, wax, feathers and animal furs, worked woods and tobacco (e.g. Creamer 1987; Piña Chan 1978:40-42; Edwards 1978:205; Gasco and Voorhies 1989; Hicks 1994; Ibarra 1984, 1995). In the tropical environment of Pacific Nicaragua most of these items would not be recovered by archaeologists.

The above mentioned problems make the interpretation presented in this chapter a preliminary one. More research is required to achieve a detailed and solid reconstruction of the precolumbian sociopolitical processes.

Early Macroregional Interaction, Orosi Period 2,000-500 B.C.

In Central America, with the exception of Panama,[1] the earliest known pottery manufacturing societies appear during the second millennium before Christ. It is commonly assumed

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[1] In Central Panama small sedentary communities could have emerged in the third millennium before Christ (Cooke and Ranere 1992). Nevertheless, the consolidation of sedentary societies occurred in the second millennium before Christ (Cooke and Ranere 1992; Fonseca and Cooke 1993).

that pottery production was associated with the emergence and/or consolidation of sedentary life.

Early pottery in Central America, from coastal Chiapas in Mexico to Monagrillo in Panama, shares general features (Hoopes 1995:187). Nevertheless, regional complexes can be clearly differentiated (e.g. Cooke and Ranere 1992; Hoopes 1994). This is the case of the earliest pottery complexes of Pacific Nicaragua and northwestern Costa Rica that can be set apart from ceramic complexes of surrounding regions (Hoopes 1995:187).[2]

The social and cultural dynamics that shaped similarities and differences in the ceramic traditions of Formative Nuclear America are not well understood. The earliest pottery in Mesoamerica apparently was produced in coastal Soconusco by societies organized as chiefdoms (Blake 1991). These societies were contemporaneous with the earliest pottery-manufacturing societies in Costa Rica and Nicaragua (Hoopes 1994a), whose social and political organization is poorly known.

A general level of interaction could explain similarities of formative complexes in Nuclear America. Some

[2] The closest stylistic similarities of these regional complexes can be traced to the Ocos phase ceramics of southern Mesoamerica (Hoopes 1994a:25). Hoopes sustains that, even when recognizing this distinctive regionalism, Early Formative ceramics in northwestern Costa Rica are far more similar to Ocos materials than to contemporaneous complexes of Panama (Hoopes 1994a:22).

ideas and technologies were shared and incorporated in different regions through this interaction. In some regions more intense interaction took place. Obsidian was imported to the region of Managua as early as 2,000 B.C., probably from the source of Guinope in southern Honduras (Espinoza 1995a). It cannot yet be determined if those data reflect an emerging world-economy incorporating regions of Pacific Nicaragua and southern Honduras. It is nevertheless interesting that some form of exchange was already in place. This demonstrates a long-standing relation between precolumbian societies of Pacific and northern Nicaragua with those of southern and central Honduras.

In western and central Honduras complex societies emerged between 800 and 400 B.C. (Healy 1984, 1992). In Los Naranjos and Yarumela large mounds were built, and these reportedly were the result of public works directed by the rulers of chiefdoms[3] (Healy 1992:89). In addition, imported artifacts of obsidian and jadeite are found at the above mentioned sites, as well as in contemporaneous sites of northeast Honduras such as Playa de los Muertos (Haseman and Lara Pinto 1993; Healy 1992). The findings have been linked to the expansion of the Olmec trade networks (Baudez 1986:333; Haseman and Lara Pinto 1993:159; Healy 1992:93-94;

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[3] In Los Naranjos, in addition to large mounds a ditch was also built, and Healy thinks it was perhaps created as a fortification (Healy 1992:87).

Sharer 1984:73). Certain stylistic and formal aspects of the Honduran pottery show similarities with coeval complexes of the Olmec homeland (Healy 1992). Healy states that the relation of Honduran chiefdoms with the Olmec should be seen "not as Olmec (and therefore early Mesoamerican) hegemogy but of a gradually increasing economic relationship." (Healy 1992:100) If we accept this interpretation[4], it follows that some Honduran societies were incorporated in a world economy whose center was probably constituted by the Olmec society (Blanton et al. 1981:250). Preciosities made up the main items exchanged through the networks of the system, controlled and manipulated by the regional elites.

Granada was integrated in a mini-system with no evidence of economic or political specialization. Granada remained in the external arena of the emerging world-economies whithin which other regions of Central America could have been integrated.

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[4] This interpretation is not shared by all the scholars who have analyzed the interaction networks of Formative Mesoamerica. Some authors (e.g. Flannery 1968; Grove and Gillespie 1992) see the Olmec as just one more participant in an extense exchange network that linked several Formative chiefdoms. For these scholars the Olmec should not be seen as the powerful center of that network, but as a member of a multicentric system.

World-economies in Pacific Nicaragua? The Tempisque Period(500 B.C.-300 A.D.)

The reconstruction of the sociopolitical dynamics in Granada during the Tempisque period remains problematic, as already discussed in previous chapters. The available information does not sustain the existence of politically centralized societies. The regional sociopolitical pattern is basically a continuity from the preceding period.

This occurs while in neighboring regions there is evidence of important macroregional interaction in which Granada's participation was marginal, if any. The widespread distribution of the Usulutan ceramics, as discussed in chapter 6, has been grouped in different ceramic spheres. For the highlands of Guatemala and western El Salvador during the Late Preclassic, the ceramic spheres[5] have been interpreted as reflecting "ideological, economic and perhaps even political networks" (Demarest and Sharer 1986:221). Pottery and obsidian were the main non-perishable items exchanged through these networks. Kaminaljuyu and Chalchuapa reportedly controlled the exchange networks (Demarest and Sharer 1986:223). The dynamics described above could be characterized as typical of a world-system, and specifically a world-economy. It seems that eastern El Salvador and

[5] These are the Providence Ceramic Sphere (400-100 B.C) and the Miraflores Ceramic Sphere (100 B.C.-250 A.D.). (Demarest and Sharer 1986).

western Honduras, included in another ceramic sphere, where nevertheless closely tied to the interaction networks of the highlands. Andrews and colleagues state that Quelepa, the main center in eastern El Salvador, had strong ties with sites located to the west manifested in the trade of ceramics and obsidian (Braswell et al. 1994).[6]

Data from some regions of central Honduras indicate that obsidian was obtained from the sources of La Esperanza and Guinope, both located in southern Honduras (Hirth 1988: Table 2). In northern Nicaragua the obsidian was obtained almost entirely from Guinope. The ample distribution of Usulutan-related ceramics in northern Nicaraguan shows a close interaction with Honduras, and the distribution of obsidian shows that this interaction was stronger with groups of central and southern Honduras.

In northwestern and central Honduras societies were integrated in complex sociopolitical forms characterized as chiefdoms (Dixon 1989:57; Haseman and Lara 1983; Hirth 1988:302). Trade was an important component of the dynamics of these polities. In the valley of Comayagua the site of Yarumela reached its climax as the primary center (Dixon 1987:60). Dixon states that "The position of the Valley of Comayagua on a potential transcontinental route would have

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[6] Compositional analysis from La Entrada region in western Honduras show that most obsidian came from Ixtepeque, though the Honduran source of La Esperanza was also exploited (Aoyama 1994).

been ideal for fostering prestige good exchange through its involvement in larger networks already established by the Olmec in this area" (Dixon 1989:58). The control of an interregional exchange network could have been the mechanism that helped local elites to rise to power (Dixon 1989:58).

We cannot yet determine the sociopolitical characteristics of northern Nicaragua during the Tempisque period. There is no clear evidence to postulate the existence of politically centralized societies, but this could be the result of the insufficient data available. The widespread distribution of Usulutan pottery may be indicative of a general interaction in which ideas and technologies were shared, or it may be the result of the world-economy or economies discussed before. More research is needed both in northern Nicaragua and in southern Honduras to reconstruct how the interregional dynamics were structured, and to what degree these dynamics had a systemic effect in local developments.

To the south of Granada, in northern Costa Rica, there is some evidence of ranked sociopolitical system (Lange 1984; Snarkis 1984). It has already been mentioned how ceramic complexes from Granada varied from those of northern Costa Rica. In the latter area jade[7] artifacts are found in

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[7] I use the term jade to designate what Lange terms social jade as defined by Lange. He states the term jade refers "to any cultural object that has the same general shape of the smaller percentage of objects made from what is

certain cemeteries. At least in some contexts jade appears to represent a high status material,[8] and therefore associated with the elites of northern Costa Rica (Guerrero 1993:202; Lange 1993b:272). The geographic characteristics as well as the distance between Costa Rica and Nicaragua could not account for the almost complete absence of jade artifacts in southern Nicaragua.[9] Sociopolitical factors more likely could explain this differential distribution. Assuming that Costa Rican groups were organized in ranked systems, it could be hypothesized that if jade had a high symbolic and economic value then the elites controlled the movement of jade as a sociopolitical marker both internally and externally (Salgado 1993). Jade was not transferred to southern Nicaragua perhaps because its people were not considered allies, and therefore were not worthy of sharing this precious material. Since we know so little of the Costa Rican or Nicaraguan societies of this period it is impossible to understand the details of their social dynamics. One thing seems certain, their external relations

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mineralogically identified as jade" (Lange 1993b:270).

[8] Lange makes the distinction between low intensity and high intensity jade artifacts. A series of geological and cultural features of high intensity artifacts suggest that they were associated with the elite (Lange 1993b).

[9] Recently looters found a site with jade artifacts near the border with Costa Rica on the Pacific coast. This is the only site of this nature located in Pacific Nicaragua.

were different, and perhaps they were integrated into different world-systems.[10]

Granada remained in the external arena of the Central American world-economies during the Tempisque period. Usulutan-related pottery could have been acquired by general processes of exchange of ideas and limited material items between Granada and societies located to the north. Nevertheless, it is important to note that there is an increasing presence of pottery that could have been imported either from northern Nicaragua and/or Honduras. Social groups in Granada were being exposed to interaction, even if weak, with people from other regions, and also to the dynamics of exchange and/or trade and its potential implications for building a base of power for such groups that could take advantage of such transactions.

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[10] Graham maintains that the development of the jade industry in Costa Rica should be understood as part of world-system dynamics (Graham 1993b:27). He sustains, for example, that in Costa Rica "The local re-employement of such key representations of Mesoamerican ruler regalia as axes, celts and spoons suggests a series of horizons during wich Costa Rican polities received and integrated artifact traditions associated with power in Mesoamerica, and the weight of the collective evidence cannot reasonably be understood as the accidental acquisition and coincidental imitation of things that were not understood" (Graham 1993b:26). Although it is recognized that the jade tradition in Costa Rica was locally developed, most authors agree on the existence of important iconographic and stylistic ties between the Costa Rican jade artifacts and those from the Olmec and Maya areas (e.g. Day 1993; Easby 1968; Garber et al. 1993).

The Emergence of Politically Centralized Societies during the Bagaces Period (300-800 A.D)

Social complexity emerged in Granada during Bagaces, a period rougly coeval to the Mesoamerican Classic period. The latter was a dynamic period when important sociopolitical processes took place in many regions and sites from Teotihuacan in the north to Copan in the south.

In eastern El Salvador, Quelepa´s florescence occurred after the eruption of the Ilopango volcano ca. 250 A.D. This eruption caused the depopulation of large areas of western El Salvador, halted important sociocultural developments in the highlands of western El Salvador and surrounding areas of Guatemala, and dislocated established trade networks (Demarest 1986, 1988:340; Sharer 1978; Sheets 1984). As a result of these changes Quelepa began to build stronger ties with lower Central America during the Classic period[11] (e.g. Demarest 1988:340; Joyce 1993:92; Sheets 1984:103-104).

Several regions in Honduras witnessed a quick development of social complexity stimulated directly or indirectly by the dynamics of a macroregional system, a system in which Mesoamerican as well as Central American groups participated in with varying degrees of intensity

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[11] Braswell and associates mentioned how during the Shila Phase (A.D. 200-750) "A few carved legs of metates or seats, pecked-stone balls in sets of three, and small carved jade beads showing stylized human faces, similar to beads found in Costa Rica, indicate contacts with lower Central America." (Braswell et al. 1994:175).

over time (e.g. Haseman and Lara Pinto 1993:162-163; Healy 1984; Hirth 1988; Joyce 1988; Urban and Schortman 1988).

Local proccesses in Granada were influenced by the dynamics of the macroregional system. In the first three centuries of the Bagaces period, the interaction with central and southern Honduras increased. An incipient chiefdom-type polity emerged with the Ayala site as its main center. This development was consolidated by 650 A.D., the opening date of the Late Classic in the Maya area (e.g. Joyce 1986).

Joyce (1993:92-93) sees Quelepa as an intermediary between Comayagua, western El Salvador and different regions of Greater Nicoya during the Late Classic.[12] Our data support the important role of Quelepa in interaction networks of Lower Central America. Delirio Red-on-White apparently has not been reported in the Comayagua Valley. The type is relatively common in Granada and also present in northern Nicaragua (e.g. Salgado and Fletcher 1994). On the other hand, the Tenampua class of the Ulua Polychromes is found both in Quelepa, in Granada and in northern Nicaragua. It seems that Tenampua was traded to Quelepa, and from there it was sent to Pacific Nicaragua along with Delirio and

[12] Joyce sees clear stylistic relations between the varietes Guapote and Mono of Mora Polychrome and Copador polychrome of Copan and Arambala Polychrome of western El Salvador (Joyce 1993:92). Through this relation, Joyce also sees a relation between western El Salvador and Greater Nicoya, mediated by Quelepa.

obsidian prismatic blades manufactured very likely in Quelepa (Braswell 1994).

The interaction between Quelepa and Lower Central American regions was complex and is still poorly understood. Agurcia (1986) sees a series of parallels in the layout and other aspects of the material culture of Tenampua and of Quelepa (Agurcia 1986). In turn, both sites have a series of elements that suggest a close relationship with the Mesoamerican cultures (Andrews 1976; Agurcia 1986). Tenampua emerged as an important center in the Late Classic, though it reached its maximum development during the Terminal Classic (Dixon 1989:150; Joyce 1986:324). It was the central place of the Comayagua Valley, a region that had an important role as an interface in the interaction networks of the Mesoamerican Late Classic and Terminal Classic periods (Joyce 1986). Moreover, as the site of Yarumela in the preceding period, Tenampua's location probably enabled its inhabitants to control of the passage from Tenampua to the drainage of the Choluteca flowing into the Gulf of Fonseca, Pacific Ocean (Dixon 19889:150).

The network dominated by Quelepa was a regional sector of a large scale world-economy. Indeed, it has been suggested that during the Late Classic Quelepa "may have been a colonial enclave established for economic purposes." (Braswell et al. 1994:188) This is associated with the intrusion of a population from the Gulf Coast of Mexico, and the concomitant change in almost every aspect of Quelepa's material culture (Andrews 1976). The newly arrived population reestructured the interaction networks. The utilization of obsidian increased notably, and most came from Ixtepeque, the same source that provided the bulk of obsidian to Copan and other southeastern Mesoamerican sites. On the other hand, the presence of pottery and other artifacts from Lower Central American regions also increased, whereas pottery produced in Copan or sites of western El Salvador is rare or absent at Quelepa (Braswell at al. 1994:176,188). The site connected regions of Mesoamerica and Lower Central America participating in different trade networks.

The sytemic nature of the interaction networks discussed above is shown in the decline of several regional polities in Honduran, that occurred at the time of the decline of the great Maya center of Copan Maya. North Central Nicaragua also was directly affected by the changes in these dynamics, experiencing a process of isolation from macroregional exchanges (Salgado and Fletcher 1994). In Granada, the decline of Ayala as a central place ocurred shortly after the decline of Copan and roughly at the same time of the decline of Quelepa.

It has been suggested elsewhere that a process of regionalization and definition of sociopolitical territories in southern Pacific Nicaragua occured during Bagaces (Healy

1980; Salgado and Zambrana 1994). This process of regionalization can also be observed in what has been called the southern sector of Greater Nicoya (Lange 1984). This regionalization was perhaps the product of the competion for resources and control of long-distance networks by regional elites.

It would be interesting to determine whether the decline of the interaction networks discussed above was somehow related to the abandonment of large areas in the piedmont of the Cordillera of Guanacaste by the end of Bagaces. This could have been a totally independent phenomenon, but it is noteworthy that chronologically there seems to be a correspondance with the decline of the southeastern Mesoamerican centers and their periphery.

The Consolidation of World-system Dynamics in Pacific Nicaragua. The Sapoá (800-1350 A.D.) and Ometepe Periods (1350-1522 A.D)

By the mid second century of the Sapoa period (950 A.D.) important changes ocurred in Granada. The sociopolitical organization was restructured with the emergence of new centers and significant changes in all aspects of material culture.[13] All the parameters for the

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[13] As has pointed out in previous chapters there are changes in the micro and macro settlement pattern, there is a significant growth in the number of settlements and consequently the population, the replacement of themain

determination of migrations discussed in chapter 2 show dramatic changes. I linked these changes to the historically documented inmigration of Mesoamerican groups to Pacific Nicaragua, something already pointed out by Healy in his study of Rivas (Healy 1980).

The movement of Mesoamerican groups to Nicaragua is explained in terms of world-system dynamics. In the first place Pacific Nicaragua was known to Mesoamerican groups through the trade networks that connected Central American groups in previous periods. Second, the inmigration of these groups was at least partially wrought by the desintegration and reestructuration of entire macroregional system during the Late Classic and Early Postclassic (Fowler 1989:274). Included in these processes were the fall of Teotihuacan, as well as the emergence and the fall of the Toltec empire (Fowler 1989:274).[14]

Chronologically the Sapoa and Ometepe periods are contemporaneous with the Mesoamerican Postclassic.

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settlement of Bagaces by new centers, and the notable occupation of the coast of Lake Nicaragua. Funerary practices, pottery and lithic complexes also change.

[14] Fowler explains the movement of Mesoamerican groups in terms of world-systems dynamics. For him the movement of Nahua groups to central America "were a reaction to core state expantion and contraction. First as a reaction to the collapse of the Teotihuacan state, then as a part of the expantion of the Toltec state, and later as a response to the demise of the Toltec empire, Nahua groups moved into the southeastern periphery to seize prime agriccultural lands and other important resources" (Fowler 1989:274).

Historical and archaeological sources reveal how several exchange netwoks linked Mesoamerican and Lower Central American regions. The transference of metallurgy technology from South and Central America to West Mexico in the Early Postclassic was part of these dynamics (Hosler 1988). Sharer (1984) discusses the shift in the Mesoamerican/Central American trade networks that ocurred after the decline of the southeastern Maya centers. Two main macroregional networks operated after this event. The Putun Maya controlled the network that extended along the Caribbean Coast from Yucatan down south at least to Nicaragua[15] (Feldman 1987:15). Ports of trade in this route were Cozumel, Campoton and Nito in Yucatan, and Naco in northeastern Honduras.

The other network operated along the Pacific Coast and was probably controlled first by the Toltecs and later on by the Aztecs. Goods from Lower Central America found in Postclassic Mesoamerican sites include tumbaga artifacts in Chichen Itza (Piña Chan 1980:148, Figs. 109, 110) and other

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[15] Feldman (1978:15-17) cites Torquemada account of how Maya merchants travelled to Nicaragua by sea canoes and enter the Rio San Juan to exhange feathers for cacao. Feldman thinks it is very likely the feathers came from Verapaz in central Guatemala. He states that Verapaz was "the place of origin of major a major article of prehispanic commerce, the locality where goods from places as distant as Central America and Nicaragua in lower Central America were received, and the region where at least four major routes met, truly one of the most important crossroads of trade in protohistoric Mesoamerica" (Feldman 1978:16-17).

Maya sites (Sharer 1984:79-80). Pottery vessels of the Papagayo and Las Vegas Polychrome types have also been recovered at Chichen Itza, the Central Peten and other Maya sites (Boggs 1944:66; Fox et al. 1992:182; Longyear 1952:43; Sharer 1984:80; Woodbury and Trick 1953, I:194-195, Fig. 99, II:Fig. 295r), as well as in Tula, Hidalgo (Diehl, Lomas and Wynn 1974). Mesoamerican artifacts found in Pacific Nicaragua are limited to obsidian, although in northwestern Costa Rica copper bells and plumbate vessels have been recovered (e.g. Lange 1984).

At the local level pottery was exchanged among regions of Pacific Nicaragua. Numerous ceramic figurine molds recovered at Tepetate suggest that figurines were traded to other regions of Pacific Nicaragua and to northwestern Costa Rica. The transference of pottery is also noticed by the wide distribution of white-slipped pottery in the eastern regions of Lake Nicaragua and Lake Nicaragua.

The trade networks of Pacific Nicaragua extended to regions of Costa Rica. Sites along the Tempisque river in northwestern Costa Rica reportedly were nodes in a trade route leading to the Gulf of Nicoya (Day and Abel-Vidor 1981). This would explain the important distribution of Nicaraguan pottery along this hypothetical route. Moreover, the trade networks extended to the central highlands of Costa Rica where pottery from Nicaragua and northwestern Costa Rica has been reported in numerous sites (e.g. Arias

Costa Rica has been reported in numerous sites (e.g. Arias and Chavez 1985; Arrea 1986; Corrales 1994; Salgado and Blanco 1985; Snarskis and Blanco 1978; Snarskis and Ibarra 1987).

Interaction with central and southern Honduras continues at least during the Sapoá period. This is evidenced by the parallel development of the white-slipped polychromes Papagayo Papalon and Las Vegas. The weak presence of this ceramic in the northcentral region of Nicaragua indicates it probably did not participate in the interaction with the regions in Nicaragua and Honduras that produced these types (Salgado and Fletcher 1994).

Pacific Nicaragua participated in multiple interaction networks during the Sapoá and Ometepe periods. I believe that the archaeological pattern of these networks strongly support the incorporation of Nicaragua as a periphery of the Mesoamerican world-system. The specific networks in which Granada participated and its role in the system cannot be fully determined at this point. Only future excavations at sites of the Sapoa and Ometepe periods will provide data for the a detailed reconstruction of these networks and its s significance in local developments.

DEVELOPMENTAL PROCESSES

A Model for the Development of Complexity in Granada

No indication exists that social complexity and political centralization were triggered by population pressure or circumscription. The available data do not indicate any serious depletion of the natural environment, although a final assessment of this situation will require pollen and phytolith analysis, as well as the completion of the analysis of the archaeological fauna.

The process of sociopolitical differentiation very likely involved a process of population nucleation that started just before or at the beginning of Bagaces. Alongside this was an improvement of the productive base[16] to the point where surplus was produced with certain regularity. This enabled occasional exchange or trade of goods, as seen first in the limited presence of Usulutan-related ceramics. One social group started controlling the accumulation of surplus, and used it to raise their status in the community or/and the region.

The consolidation of complexity took place in the context of the expansion of macroregional networks. The long time spans of the regional phases makes difficult to determine if trade was a main force in the development of

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[16] This does not necessarily imply technological improvement. It could just have involved the aggregation of population and therefore improved the availability labor.

complexity, or if it was a by-product of it. It was certainly important in the consolidation of complexity during the Ayala phase (650-950 A.D.).

Following Helms' ideas (Helms 1979, 1988, 1993) I would suggest that the emergent elites in Granada actively sought association with ideas, goods and elites of distant places; in this case, with the sites of Quelepa and Tenampua and the regions controlled by them. Granada elites controlled trade networks, and particularly the exchange of preciosities. As already discussed, the exchange of preciosities has a systemic effect on the reproduction of the participating social entities: the ability of the elites to monopolize these exchanges and all long-distance associations, is, frequently, an important source of stability or change in local-level political structures (e.g. Blanton and Feinman 1984; Friedman 1992; McGuire 1989; Schneider 1977).

The Nicaraguan elites, similar to elites in other regions, actively sought to participate in macroregional systems and use these systems to acquire goods to negotiate and legitimaze their political power. This was not the product of a process of adaptation of a system to more complex tasks that required differentiation and specialization. It took place by the action of specific groups searching to build power and legitimize it. It was the product of human agency in the context of macroregional processes. It is impossible at this point to determine the role of the different social and political groups in the process of negotiation and legitimation of local power. This should be one of the major tasks of research in the future.

Some Considerations on the Structure of Migration

It seems secure to date the arrival of a Mesoamerican group to Granada by 950 A.D. It is very likely that this was a Chorotega group, since the historical sources indicate that Chorotegas inhabited Granada, Masaya and at least parts of the department of Carazo at Contact. Since the material culture of the Sapoá and Ometepe periods does not seem to differ significantly, I assume there was a continuity in the population of both periods.

Nonetheless, the chronology of the migration to Granada cannot be extended to those regions of Nicaragua, Honduras and northwestern Costa Rica were Chorotegas where settled at Contact. In chapter 6 it was discussed how the variety Culebra of Papagayo Polychrome, a type reportedly associated to arrival of the Chorotega (Healy 1980), is dated to 800 A.D. in the Bay of Culebra and Rivas. Guerrero and associates (Guerrero et al. 1994:96) argue that typological associations and calibrated dates open the possibility that 900 A.D. is a more accurate date for the opening of the Sapoá period and therefore for the emergence of Culebra. In any event, if Papagayo is a good indicator of the arrival of the first Mesoamerican groups to Pacific Nicaragua, then it is likely they settled in Rivas first expanding their occupation to other areas later on.

Following Anthony's ideas (Anthony 1990), I would suggest that most migrations had a stream migration structure. This could explain the sudden and significant changes seen in the material culture of those areas occupied by the migrants such as Granada. This case could be similar to that of Quelepa where, reportedly, groups from the Gulf Coast moved along the Pacific Coast "avoiding parts of Chiapas, Guatemala and western El Salvador" (Braswell et.al 1994:176). As I stated in chapter 6, it is likely that the Chorotegas and other groups followed a trade route on the Pacific of Mexico and Central America. They could have take advantage of the existing ports of trade to avoid territories that represented possibilities of conflict until they reached their final destination in Pacific Nicaragua. They probably battled with the local inhabitants to displace or subordinate them.

One of the main arguments against an important presence of mesoamerican culture in Pacific Nicaragua is the lack of monumental architecture, or clearly defined urban centers (Lange et al. 1992; Lange 1993a). It should be remembered at this point that Mesoamerican culture was hierarchical, the product of a hierarchical society. These aspect of Mesoamerican life were characteristics of Mesoamerican societies that were highly stratified. In such societies there were cultural and material traits exclusively associated with the elites. Since only specific social groups of entire sociocultural systems migrate, the questions arises as to the nature of the sociopolitical structure of the first Mesoamerican migrants to Pacific Nicaragua. Were they commoners or members of the elite, or a mixture of both? I would suggest that the absence of clear manifestations of the culture of Mesoamerican elites in Nicaragua suggests that the groups that migrated were mainly commoners, or perhaps members of the lower levels of local elites. Once settled in Nicaragua, they started their own process of reconstitution and redefinition of the sociopolitical structure of their society.

Lange and associates (Lange et al. 1992; Lange 1993a) sustain that even when Mesoamerican groups moved into Nicaragua they were not incorporated into a Mesoamerican sphere. According to these authors migrants such as the Chorotega "were greatly removed from their ancestry to the north. It is unlikely that they perceived any cultural affinity with Mesoamerica" (Lange et al. 1992:269). In the case of the Nicarao, Lange thinks they "adapted to local indigenous patterns more than local people were influenced by Mesoamerican practices" (Lange et al. 1992:271).

It is not a goal of the present research to determine if the Mesoamerican groups felt culturally linked to their homeland. Nevertheless, it is hard to ignore the fact that linguistically an important number of Nicaraguan people spoke Mesoamerican languages. Leon-Portilla (1972) also points out the clear relation in the religion of the Nicaraos and groups from central Mexico. At Contact economic institutions such as markets were common, as they were in the homeland. These institutions had links to Mesoamerica.

In any event, the significance of the economic relations to people of Mesoamerica and Central America discussed before is what concerns me here. These economic relations could have facilitated the development of political and cultural relations. The growth during Sapoá and Ometepe of the obsidian core-blade technology provides at least a hint of permanent exchange networks with Mesoamerican polities. It also implies a greater dependence on exchange with regions of Mesoamerica than in previous periods.

IS THE CONCEPT OF GREATER NICOYA RELEVANT FOR THE STUDY OF SOCIOCULTURAL PROCESSES IN GRANADA?

In chapter 1 I discuss some of the theoretical limitations of the concept of culture area. Bishop (1994) states that the distribution of artifacts, or other cultural elements, has helped to defined the cultural boundaries and their changes in Greater Nicoya. Nevertheless, the definition of these patterns does not explain the processes that created them.

In the same manner I think the definition by Fonseca of the Area de Tradición Chibchoide (Fonseca 1992, 1994) suffers from conceptual and empirical problems. This area is considered a self-contained historical region where endogenous factors account for its cultural characteristics. Fonseca extends a proven biological and linguistic genetic relation among Chichchan groups of the southern sector to the northern sector, where the empirical data do not provide at this point any definitive indication of such relation.

I think the main factor that unifies the Area de Tradición Chicbchoide is the lack of clear indication of the cultural and social features associated with the civilizations that emerged in Mesoamerica and Andean areas. That in itself does not explain the complex social and political history of the societies of Lower Central America. Societies of the northern end of that area from the first known occupations show a stronger link with societies located among the confines of what is known as Mesoamerica than they do with those located in most of Costa Rica and Panama. The process of interaction and diversification of Lower Central American societies was influenced by processes that took place in geographic spaces that transcend the boundaries of the Area de Tradición Chibchoide.

From the point of view of a world-systems analysis, a concept such as Greater Nicoya or the Area de Tradición Chibchoide are of limited use. Its emphasis on "cultural" aspects and lack of attention to economic and political dynamics goes against the world-systems approach. In a recent article Kowalewski (1996) examines the trajectory of the Northwestern, Southwestern and Southeastern areas of the United States, and explains them as world-systems rather than as culture areas (see also McGuire 1989). He looks at underlaying political and economic processes to explain similarities and differences in the cultural traits in each of these areas.

In a similar manner, I believe that a world-systems analysis could explain the processes of political and cultural integration and fragmentation observed in the archeological record of Greater Nicoya (Bonilla et al. 1990). The similarities found in the ceramic complexes of the southern and northern sector of Greater Nicoya contrast with the growing evidence of significant differences in other aspects of the material culture. Macro and micro settlement patterns, mortuary practices and lithic complexes can be clearly differentiated between known regions of the southern and northern sectors. In other words, if a list of cultural traits is defined it is likely that more differences than similarities will be found among the different regions. In addition, the external relations of many regions often had distinct orientations (Guerrero et al. 1994; Salgado 1993; Salgado and Zambrana 1994). This pattern of differentiation could be perhaps explained by the emergence, consolidation and decline of polities in several regions of Greater Nicoya at different points in time. Neighboring groups, in times of competion over resources, would tend to reinforce their ethnicity or distinctiveness from other groups through material culture (Hodder 1987). The homogenization of certain cultural aspects would serve to define sharper boundaries with neighboring group. At the same time, even when this differentiation takes place, the inevitable interaction between neighbors also produces at least few similarities in the culture of such groups.

FUTURE RESEARCH

The archaeology of Nicaragua is still in its infancy. Basic research such as the construction and refinement of chronological frameworks is still needed. But this should not be divorced from the task of reconstructing social processes.

This study is a modest step in that direction, but as has been stated in other section of this work a detailed reconstruction of regional processes requires extensive excavations. It is neccessary to study sites with Orosi and Tempisque period components to define the artifactual complexes and their possible subdivision in phases. At the same time, an effort should be made to define the spatial organization of the sites and its relation to the regional social organization.

More excavations at Ayala are required to expand our understanding of the communal and regional organization of the Bagaces period. Attention to domestic spaces is basic to reconstruct the social organization in detail. Dating of primary contexts both domestic and funerary could help refine the sequence of occupation.

Finally, excavation in the Sapoá and Ometepe periods is indispensable to reconstruct the changes in the regional organization. Tepetate, San Ignacio and El Rayo are minimally the sites that require research. Tepetate, even when badly damaged, still offers areas with potential to define the sequence of occupation, the activities and the social organization of the people who inhabited it. The research of Tepetate should include testing of areas in the city of Granada to determine its extention with accuracy. San Ignacio and El Rayo have great potential to explore all aspects of their role in the regional hierarchy, as well as social and political differentiation of their inhabitants.

Research in Rivas, Masaya and Carazo will be instrumental to enable sound and solid reconstructions of the precolumbian processes in southern Pacific Nicaragua. Then not only regional histories could be reconstructed but also their articulation and contribution to the broader macroregional social systems of Central America.

The possibilities of world-systems theory to explain the social dynamics in Pacific Nicaragua ought to be tested with further research. Among the issues that require explanation is the structure of the world-systems in which Nicaraguan societies were engaged, and the changing position of these societies in them. What was the specific role of different social groups in the communal, regional and macroregional political and economic processes? How was the division of labor organized in these systems? Were these systems always structured with cores and peripheries? If so, did they have one or multiple cores? What was the role and contribution of peripheries to changes in these systems? What role did the interaction with societies placed in the external arena play, and when and how did some of these societies became part of the world-system? Is it possible to define clear cut boundaries to these systems? How did these mcroregioanl dynamics contributed to processes of differentiation or homogenization of the cultural systems of participant groups?

In the coming years the joint effort of Nicaraguan and foreign researchers will increase our understanding of precolumbian social processes. Hopefully this will result in a new evaluation of the contribution of past Nicaraguan populations to the historical processes of the New World.

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APPENDIX A
SURVEY FORM

1. Site name and code

2. Location
Map reference   Coordinates

3. Approximate Area

4. Chronological periods

5. Artifacts: Pottery
   Lithics
   Other

6. Surface density: High
   Medium
   Low

PHYSICAL FEATURES
7. Altitude

8. Proximity to: River
   Lakes
   Lagoons
   Other water sources

7. Topography:

8. Vegetation: Forest
   Savannah
   Bushes
   Agriculture
   Other

9. Fauna: Birds
   Mammals
   Reptiles
   Fishes
   Other

10. Other features (e.g. proximity to sources of raw materials)

CULTURAL FEATURES (include general description including number and dimensions)

11. Mounds

12. Tombs

13. Dwelling foundations

14. Petroglyphs

15. General comments on site (including preservation)

16. Owner

17. Recorders

17. Date

APPENDIX B

SITE DESCRIPTION

A summary of the sites located in the research region was presented in figure 4.1. Here a more detailed description of each site is provided.

Table B.1 shows the diagnostic ceramic types collected at each site. These types were used as the bases for the chronological assingment of the settlements.

N-Gr-2 Ayala

Location: Latitude 11° 51' 10"- 11° 52' 55" N, Longitude 85° 59' 30"- 86° 20' 30" W

This site was described in detail in Chapter 6. It is located in the Comarca San Antonio, and it was excavated by Norweb (1961b), who registered three different sites: Caña de Castilla, Ayala and González, all included now in Ayala. Lange and colleagues (Lange et al. 1992) made a surface collection, recording the site as San Antonio. The Museo Nacional de Nicaragua registered the site as Caña de Castilla.

It is located on flat terrain with a slight inclination that runs from east to west. Rolling hills surround the site to the north and east. Soils are fertile according to information given by land-owners. The site is divided into small parcels in which several families grow maize, beans,

Table B.1 Ceramic types collected in site survey

SITE	CERAMIC TYPE																												
N-GR	LUNA	BANDA	MADEIRA	CASTILLO	SACASA	COMBO	VALLEJO	GRANADA	PATAKY	PAPAGAYO	ROSALITA	GALO	MOMTA	AGURCIA	BORGOÑA	CHAVEZ	TOLA	POTOSI	AYALA	RIVAS	CHARCO	ESPINOZA	GARCIA	ROSALES	BOCANA	USULUTAN*	ULUA**	TENAMPUA	DELIRIO
2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5					X		X			X																			
7	X		X		X		X			X									X	X									
8					X		X			X																			
10		X			X		X	X	X	X			X																
13										X															X				
14					X					X																			
15		X	X		X		X		X	X						X								X	X	X			
16			X		X					X																			
17					X					X																			
18			X	X						X																			
20	X	X	X	X	X	X	X		X								X		X	X									
22			X		X					X							X			X	X			X					
23			X		X					X							X							?	?				
24					X	X	X			X							X			X									
26					X					X																			
27					X		X			X																			
28					X					X									X										
29					X																								
30							X			X																			
31					X					X																			
32					X		X																						
33				X	X					X																			
34										X																			
35					X		X			X																			
36					X					X																			
37					X																								
38		X	X		X					X																			
39	X				X		X		X	X																			
40					X					X				X			X	X	X	X									
41					X					X									X										
42					X		X																						
43					X	X				X																			
46					X					X																			
47					X																								
19					X					X		X	X	X	X	X	X	X	X	X		X				X	X	X	X
21					X		X			X							X								X				
44																			X	X									
48			X		X					X																			

chiles and squash. Fruit trees are also important. No permanent water source is found presently on the surface, as noted by Norweb (1959b), and inhabitants now draw it from wells. Two seasonal rivers descending from the Mombacho volcano reach the site.

Looting has taken place in Ayala for a period of at least 35 years disturbing important sectors of the site. In addition, agriculture has displaced surface materials as have natural agents. Nevertheless, the site still has great potential for exploration of social organization, particularly during the Bagaces period.

The boundaries were well-defined during the survey, with perhaps the exception of a small sector in the southwestern portion where coffee orchards limit surface visibility. The area with the denser occupation is situated in the Comarca San Antonio, where approximately 10 knolls are found. These knolls were used in precolumbian times and continued to be used, frequently, as the base for domestic structures. Surface remains diminish steadily from this core to the periphery, where they are very scattered.

<u>N-Gr-5 La Chuscada</u>

Location: Latitude 11° 51' N, Longitude 85° 59' W

The site is located in Hacienda La Chuscada - owned by Dulio Baltodano - in the northern slopes of the Mombacho volcano. N-Gr-5 was located while examining the profiles exposed by one of the penetration roads of the hacienda. Cultural stratified deposits up to 1 m below the surface were observed, showing both low and medium density.

The soil is fertile. No permanent surface water source is known in the environs of the site, though there is a river bed where water runs when rainfall is sufficient. The terrain has a marked slope to the north.

The boundaries were not well-defined, since the terrain is covered by coffee trees impeding surface visibility. There was no evidence of looting. The site was left unclassified.

N-Gr-7 Laguna Azul

Location: Latitude 11° 53' 55"-11° 54' 40" N, Longitude 85° 59' 20"-86° 00' 30" W

The site was previously recorded by personnel of the National Museum of Nicaragua in 1983. They visited it at the request of the police personnel of the farm-penitentiary "La Granja", wherein the site is located. The guards had accidently uncovered a funerary feature of the Ometepe period while digging a military trench (Report on file, National Museum of Nicaragua).

It extends from the northeast edge of the Laguna de Apoyo to the road Granada-Nandaime. The terrain has an slope from west to east in the western section where soils show signs of erosion. In the eastern section, located on flat terrain, soils are fertile. The visibility is very limited with grass covering most of the terrain. Surface density is low.

N-Gr-8 La Joya Basurero

Location: Latitude 11° 53' 46"- 11° 54' 06" N, Longitude 85° 58' 13"-85° 58' 40" W

N-Gr-8 is located to the southeast of the caldera La Granja, which contained a lagoon until few years ago. The soils are fertile and common crops are maize and beans, yucca and squash. Part of the site is covered by the remains of the Basurero of the municipality of Granada.

The site was first visited by personnel of the National Museum of Nicaragua in the early 1980's. A burial of the Sapoá/Ometepe period was uncovered during relocation of garbage under the direction of Mr. Hugo Sanchez from Masaya.

The density of materials is low to medium, and no special feature was observed on surface. The site is a dispersed village during Sapoá and Bagaces.

N-Gr-10 Tepetate

Location: Latitude 11° 56' 10"-11° 57' 40" N, Longitude 85° 56' 43"-85° 57' 10" W

It extends north of the city of Granada alongside the coast of Lake Nicaragua. The terrain is covered by grass, limiting surface visibility. Sorghum and vegetables are planted in some areas, and there is some cattle-ranching.

The extension of the site is 224 hectares, but it possibly extends under the city of Granada to the south. Tepetate has been looted for several decades and is well known by the inhabitants of Granada. The site was visited by Gordon Willey and Albert Norweb in 1959, and by Lange and colleagues (Lange et al. 1992) in 1983.

In the central part of the site Willey (1959) recorded at least 5 ovoid mounds or platforms, varying from 1 m to 1.5 m in height and an average size of 15 m by 8 m. Norweb (1959b) observed at least 12 mounds. He dug three stratigraphic pits, one of them on top of a mound. I briefly reviewed the materials, currently stored at the Peabody Museum, and identified ceramic types diagnostic of Sapoá and Ometepe, placing the occupation of the site from A.D. 1000 to A.D. 1524 (Salgado 1992:16).

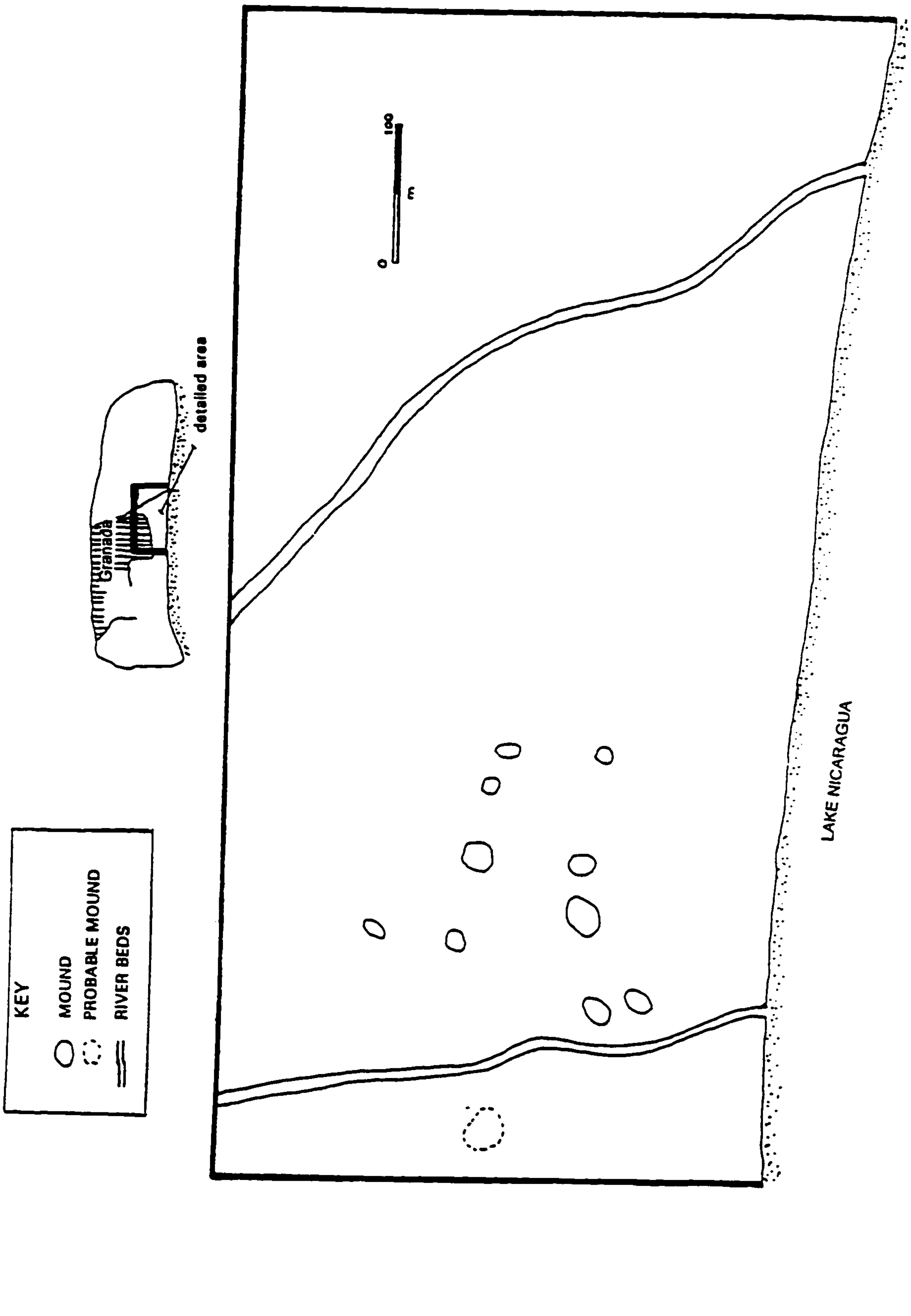
In the early 70's the central section of the site was almost totally destroyed by the construction of a low-income housing project, known as La Villa. The World Bank financed the project and hired Jorge Espinoza to conduct a salvage archaeological project. Espinoza dug several stratigraphic pits from November of 1973 to May of 1974 (Neil Hughes, personal communication 1993), but no report is available on the research.

With the aide of aerial photographs taken before the construction of La Villa and Norweb's fieldnotes I partially reconstructed the layout of the area destroyed. I identified a total of 10 mounds located around an open space, possibly a plaza (Fig. B.1). They have dimensions that range from and 30 by 20 m to 10 by 10 m. During the course of our survey we observed the only two remaining mounds. These are slab-stone faced mounds, that are located at the northeastern boundary of La Villa, on land owned by Timoteo Centeno. Though disturbed, they still could yield information on its construction and function.

Areas with high density of materials could still be found in the environs of La Villa, where some profiles show the original level of the soil. The maximum observed depth in these profiles was 1.65 m. The rest of the site has a low density of materials on surface.

The main occupation of the site happened during the Sapoá and Ometepe periods (99% of the ceramics). Only 1% of the ceramic collection belongs to the Bagaces period. During Sapoá and Ometepe, Tepetate was the main center of

Figure B.1 Reconstruction of central area of the Tepetate site.
Map based on aereal photograph 1:20,000.



the region, and has been classified as a town. Edgar Espinoza (personal communication 1993) of the National Museum of Nicaragua, noted numerous Papagayo figurine molds recovered in materials from the excavation conducted by Jorge Espinoza. This evidence suggests craft specialization. An important amount of prismatic blades were observed in surface, more than in any other site of Sapoá or Ometepe.

It is possible that the site was at least closely associated, or was part of the town of Xalteva, mentioned in the ethnohistoric sources as the capital of the Chorotega province of Denocherri (Incer 1991). There is now a neighborhood called Jalteva in Granada, its name is derived from the precolumbian town. I could not determine if Jalteva is seated on a precolumbian site, since it is heavily populated. Test pits in house yards will be required to assess this problem.

N-Gr-13 El Capulín 1

Localization: Latitude 11° 57' 46" N, Longitude 85° 59' 10" W.

El Capulín is located on a plain. The soils are eroded and oxidized. Surface visibility was good, and very low density of materials was observed. No permanent water sources are found close to the site. The only diagnostic sherds collected were badly eroded sherds, some of which had traces of white slip, presumably Papagayo Polychrome. Nevertheless, no typological assigment was made due to the bad preservation. The site was left unclassified.

N-Gr-14 Veracruz Abajo

Localization: Latitude 86° 01' 13" N, Longitude 11° 52" 22" W.

The site was located through information provided by Mr. Carlos Sirias Pérez. He states that artifacts had been accidently uncovered during agricultural activity. He also mentions that in the hills close to the site there are other archaeological sites, but due to thick vegetation we were unable to confirm it.

This site is located on a plain delimited to the north and east by rolling hills. No water source is available nearby. The visibility was poor to good in different sectors, and surface remains have a low density. Coffee, vegetables, maize and beans are common crops, and the soil is fertile.

N-Gr-15 San Ignacio

Localization: Latitude 11° 51' 32" to 11° 52' 32" N, Longitude 85° 57' 34" to 85° 59' 04" W.

Located by information provided by Mr. Carlos González of the Comarca San Antonio. San Ignacio is located on a plain in the lower slopes of the Mombacho volcano. The visibility is good in the areas of the site cleared for agriculture. Small sections are covered by grasses and bushes.

A peasant cooperative owns most of the land on which the site is located. Common crops are beans, maize, plantains, squash and chile, and the soils are fertile. No surface water source was found and no river bed or semipermanent current were found. Nevertheless, an informant stated that until few years ago, water was obtained all year round from a spring. Currently, the inhabitants obtain their water from wells.

Surface remains varied from high density to low density. The area with high to medium density occupies approximately .70 square kilometer, in the northwestern-most section of the site. Looting has taken place in the past, mainly limited to the area of highest density.

Four earthmounds were observed in an area approximately located between Latitude 11° 51' 54"- 11° 52' 03" N, and Longitude 85° 57' 43" - 85° 57' 54" W. They are located close by to a well with an air-propelled motor, indicated in the INETER's map 3051-IV, scale 1;50,000. Possible dimensions were between 8-15 m in diameter and less than 2 m in height, though vegetation impaired assessment of dimensions and characteristics of construction.

Reportedly a statue now found in the house of the "Hacienda El Pachón", two kilometers west of the site, was removed and transported from San Ignacio. This statue is similar to those found in the islands and coast of Lake Nicaragua.

Petroglyphs are located in the northeastern corner of the site, but the area was covered by bushes and we were unable to record the number or the motifs engraved in the petroglyphs.

The site has been classified as a hamlet during Orosí/Tempisque (6% of collected ceramics), turning into a disperse village (small) during Bagaces (9 % of collected ceramics), and a nucleated village during the Sapoá (75% of collected ceramics) and Ometepe (10% of collected ceramics) periods. Obsidian was the only long-distance trade item found.

N-Gr-16 San Diego

Localization: Latitude 11° 50' 30" N, Longitude 86° 02' 42"

The site was located through Mr. William Mena from Diria. The site is located on a small plain surrounded by hilly terrain. Soils are fertile and there is a seasonal river running close by the site.

Due to poor visibility the boundaries were not well defined. Justo Suazo, owner of the terrain, had accidently found ceramic urns while digging holes to built a fence. The site is tentatively classified as a cemetery.

N-Gr-17 La Conquista

Localization: Latitude 11° 54' 00" N, Longitude 86° 00' 50" W

Mr. José Rodrígez Alvarado of Laguna Azul informed us of this site which is located on a plain in the walls of the Apoyo Lagoon, in terrains property of the Cooperative Miguel Angel Bonilla. The terrain is planted with yucca, beans, maize and tomatoes. An earthmound of 10 m in diameter and 1.5 m in height was observed. Surface density ranges from medium to low density. The site is a nucleated village of the Sapoá period.

N-Gr-18 El Tulito

Localization: Latitude 11° 51' 24" - 11° 51' 33" N, Longitude 85° 54' 32" - 85° 54' 40" W

The site was located by information provided by the owner of the terrain, José Solís of Granada. El Tulito is located on a small plain on the shore of Lake Nicaragua, surrounded by rolling hills to the west. The archaeological remains are not visible on surface, with the exception of a series of petroglyphs that surround the site. Motives in the petroglyphs are "smiling faces", zoomorphic geometric, and crossed rhomboid designs (Figs. B2, B3).

Ceramics were recovered under surface during the construction of a small structure. The preservation of the site is good, and the only apparent damage has been caused by the construction of the structure. Ceramic net sinkers are abundant among the remains uncovered. The site is defined as a hamlet of the Sapoá and Ometepe periods.

N-Gr-20 Evert Silva

Location: Latitude 11° 55' 10"- 11° 56' 23" N, Longitude 86° 02' 44" - 86° 03' 44"

This site is situated in the west coast of the Apoyo Lagoon, and it was located with the aide of informants. Part of the terrain is owned by Edison López.

Just north of the road that leads to Masaya an area of high to medium surface density was recorded, the rest of the site has a low surface density. The visibility is limited since most of the terrain covered with grass and bushes. Very limited agricultural activity was being carry on. No special features were recorded.

The site apparently was firt occupied in Bagaces when it was a disperse village (6% of the ceramics). Nevertheless, one badly eroded sherd could be related to an Orosí/Tempisque occupation, but this needs further research. In Sapoá (66% of the ceramics) and Ometepe

Figure B.2 Petroglyphs at El Tulito site.

Figure B.3 Petroglyph at El Tulito site.

(28% of the ceramics) the site developed into a nucleated village.

N-Gr-22 Arlen Siu

Location: Latitude 11° 52' 22" - 11° 52 40 N, Longitude 85° 57' 24" - 85° 58' 22" W

The site was first located by information provided by Mr. Carlos Sirias Pérez. Soils are fertile and common crops are coffee, maize, beans, and vegetables. No permanent surface water source was found around the site.

Surface visibility is good in some sectors, and limited in those sectors with coffee orchards. In a sector located in the terrain of Mr. Rufino Palacios, east of the "Colegio Ricardo Rivera" of Diriomo, two earthmounds badly eroded were observed. It is in this sector where medium surface density was noted, the rest of the site presenting low density. Obsidian was the only long-distance trade item found.

The site was a hamlet during Tempisque (1% of ceramics), and developed into a disperse village during Bagaces (19% of ceramics). During Sapoá and Ometepe it grew into a nucleated village (80% of ceramics).

<u>N-Gr-23 Mena</u>

Location: Longitude 11° 53' 12"- 11° 53' 50" N, Latitude 86° 02' 4" - 86° 03" 44" W

Located between the town of Diriá and the plains that overlook the Apoyo Lagoon. It was located through information provided by Mr. Manuel Mena of Diriá, who uncovered a tripod metate while carrying on agricultural activities. Soils are fertile and permanent water is available 300 m below of the site, in the Apoyo Lagoon. There is a trail that leads from the site to the Lagoon, and it is frequently used by women who go down to the Lagoon to wash clothes.

The plain wherein the site is located is broken in some sectors by small hills. The visibility was sometimes limited by grass, but it could be observed surface remains were of low density. The site extends to the northern edge of the town of Diriá, and probably is partially covered by it. Archaeological remains have been accidently found within Diriá during public construction.

The site is a hamlet during Tempisque (2% of the sample) and Bagaces (2% of the sample), and developed into a dispersed village during Sapoá (94% of the sample) and Ometepe (2% of the sample).

N-Gr-24 Cutirre 1

Location: Latitude 11° 53' 12" - 11° 53' 50" N, Longitude 85° 54' 55" - 85° 55' 11"

Cutirre 1 is located in the southeastern lower slopes of the Mombacho volcano, and was found with the aide of an informant. He uncovered some artifacts while planting the terrain. Looting has taking place, affecting approximately .25 hectare in the northeast portion of the site. Cutirre extends in terrains both of the Hacienda Cutirre and the Cooperative Santa Isabel.

The site lays on a plain covered with bushes and grasses. Four mounds were located, but the vegetation impeded the determination of the dimensions or characteristics of construction. One of those mounds was approximately 15 m in diameter. Where it could be observed, surface density was high. The boundaries of the site are not well-defined, and the site has been left unclassified.

The occupation starts in Bagaces and continues until Ometepe. Obsidian was the only long-distance trade found.

N-Gr-26 Instituto Rafaela Herrera

Location: Latitude 11° 52' 34" - 11° 52' 49" N, Longitude 86° 03' 10" - 86° 03' 22" W

The site was located by systematic survey. It is a hamlet located in the plain terrains located in the northeastern edge of Diriomo, adjacent to the "Instituto Rafaela Herrera." Soils are fertile and cultivate with coffee trees. No surface water current is found nearby. Visibility was limited and low density surface remains were observed.

The site has been classified is a dispersed village of Sapoá. This classification is tentative, since it is possible that the urban area of Diriomo covers part of the site; testing will be necessary to determine it.

N-Gr-27 Cementerio Diriá

Location: Latitude 11° 53' 01", Longitude 86° 03' 40" W

The site was found by intentional survey. It is located southwest of the cemetery of the town of Diriá. The terrain is undulating and soils are fertile. A seasonal river bed crosses the site.

Visibility was limited and both medium and low density were recorded. The site has been classified as a hamlet of Sapoá and Ometepe. This is the only site classified as such where obsidian has been found.

N-Gr-28 Tepeyac

Location: Latitude 11° 57' 00"-11° 57' 38" N, Latitude 85° 56' 43" -85° 57' 06" W

The site was located by systematic survey. Tepeyac is located in an undulating terrain, east of the Ayala site. No permanent surface water source is available, and the soils are fertile, and currently cultivated with beans, maize and vegetables The visibility was impaired in some sectors by grass, and surface density is low. The site is classified as a dispersed village of Sapoá.

N-Gr-29 La Chanchera

Location: Latitude 11° 53' 02" - 11° 53' 30" N, Longitude 85° 59' 05" - 85° 59' 32" W

The site was located with the aide of an informant who had looted the site. It is a cemetery located on the top of hills within the Hacienda La Chanchera. The terrain is covered with grass and no remains are visible on surface. Sherds were recovered from some of the holes left by the looters, though the damage does not seem to be extensive. The boundaries of the site were determined according to the information provided by the informant, and therefore are tentative.

This is a cemetery of Sapoá.

N-Gr-30 La Zopilota

Location: Latitude 11° 52" 33" - 11° 52' 40" N, Longitude 86° 03' 32" - 86° 03' 44" W

La Zopilota was found by systematic survey in the western boundary of the survey area, on an undulating terrain. A seasonal river bed cuts across the site, and precolombian and colonial or modern made ceramics were found in the river bed. These materials have been carried by the current from a non determined point, and include china fragments, as well as pottery fragments of vessels similar to those still manufactured in the region.

The soil is fertile, and it was covered with grass as well as coffee orchards, limiting surface visibility. Surface density was low, in general, though in few spots medium density was observed. Boundaries were not well defined, and the site is tentatively classified as a hamlet during Sapoá and Ometepe.

N-Gr-31 Rafael Joya Arana

Location: Latitude 11° 52' 31" - 11° 53' 10" N, Longitude 85° 57' 22" - 85° 57' 52" W

Located by systematic survey. The site lies on a fertile plain, bordered to the south and east by rolling hills. The terrain is owned by the cooperative Rafael Joya Arana. Visibility was limited since grass covered the terrain in different sectors. Surface density ranges from medium to low. Modern china and pottery, as well as glass, were collected in addition to precolombian materials. The site is a dispersed village of Sapoá and Ometepe.

N-Gr-32 El Diamante

Location: Latitude 11° 54' 30" N, Longitude 85° 54' 51" W

This site was found by systematic survey. It is located on anundulating terrain bordered by small rolling hills. A permanent water source is provided by the El Charco Lagoon. The visibility was good and surface materials range from medium to mostly low density. The site is a hamlet od Sapoá.

N-Gr-33 San Rodolfo

Location: Latitude 11° 54' 32' - 11° 54' 32" N, Longitude 85° 54' 32" W

The site is located in the Hacienda San Rodolfo, on a plain in the Peninsula de Asese in coast of Lake of Nicaragua. It was found by intentional survey.

Workers of the Hacienda informed us that funerary urns were uncovered during construction of a house. The visibility was limited since the terrain was covered by grass and bushes. Observed surface density was low to medium, and materials pertain to Sapoá and Ometepe. Boundaries were not well defined, and the site was not classified.

N-Gr-34 Chavarría

Location: Latitude 11° 54' 34" N, Latitude 85° 54' 00" W

The site was located by intentional survey in the coast of Lake Nicaragua. The boundaries were not well defined since the terrain is covered with bushes and grasses. Surface density when observed was low. The site is tentatively classified as a hamlet of Sapoá and Ometepe.

N-Gr-35 Argüello

Location: Latitude 11° 53' 42" - 11° 54 04" N, Longitude 85° 56' 13" - 85° 56' 54" W

The site was located with the aide of an informant who hadlooted the site. The terrain is undulating and no permanent surface water source is available nearby.

The terrain is covered with grass and no remains are visible on the surface, with the exception of pottery fragments found in old holes made by looters. The boundaries were approximately defined with help from our informant, who showed us the extent of the area he had looted. The site is classified as a cemetery of Sapoá and Ometepe.

N-Gr-36 La Calera

Location: Latitude 11° 52' 04" - 11° 52' 15" N, Longitude 85° 35' 48" - 85° 55' 32" W

The site was found through an informant who had uncovered pottery vessels while carring on agricultural activities. It is located on a plain planted with plantain trees and surface visibility is limited. High density of surface remains were observed in a few areas where visibility was good, revealing a Sapoá/Ometepe occupation. The boundaries are not well defined, and the site has not been classified.

N-Gr-37 Punta La Calera

Location: Latitude 11° 52' 00" - 11° 52' 14" N, Longitude 85° 55' 04" - 85° 55' 22" W

It was located during intentional survey on the coast of Lake Nicaragua. Surface visibility was limited but when observed the density of archaeological remains was low. Boundaries are not well defined. The site is classified as a dispersed village of Sapoá and Ometepe.

N-Gr-38 El Arenal

Location: Latitude 11° 54' 15" N, Longitude 85° 54' 15" W

The site was located during intentional survey on undulating terrain in front of Lake Nicaragua. The visibility was limited since the terrain is covered with bushes and dense vegetation. In a sector of the site where water current has eroded the soil, medium density deposits were observed. Boundaries are not well defined and the site remains unclassified.

N-Gr-39 El Rayo

Location: Latitude 11° 52' 51" - 11° 53' 24" N, Latitude 85° 53' 30" - 85° 54' 03" W

Danilo Román, a worker of Hacienda San Roberto in the Peninsula de Asese, provided the information of the location of this site. El Rayo is located in the southern end of the Peninsula de Asese, in front of Lake Nicaragua, in an undulating terrain owned by the Cooperative Claudia Chamorro II.

The visibility was limited in those sectors of the site covered by grass. An area of about 4 hectares presents a very high density of surface materials. There knolls and probably stone-faced mounds are found. One circular mound of 6 m in diameter and 2 m in height was apparently faced with slab stones, though we could not accurately determined this since the mound was covered with vegetation. Among the materials recovered was a large core of chert, from which blades were obtained.

A decapitated statue stands in the entrance of the Cooperative, near a small harbor (Fig. B.4). Members of the cooperative informed us that it had been moved from the area where we found the knolls and mound. It measured approximately 1.75 m from the base up, and it is similar to those statues found around Lake Nicaragua. In the back the statue has very eroded carved designs (Fig. B.4).

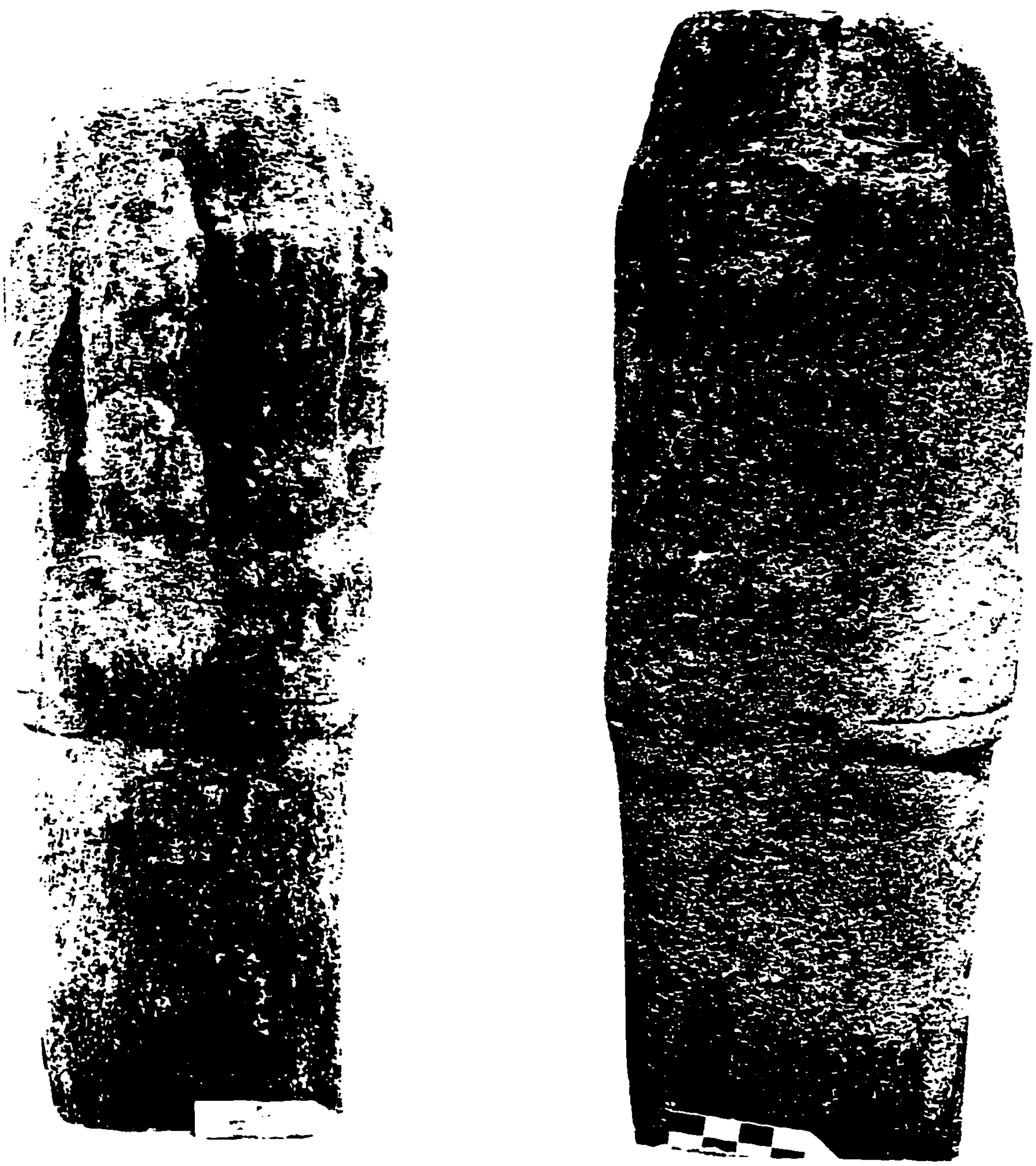


Figure B.4 Front and back of statue, El Rayo site.

The boundaries to the north were not clearly defined due to dense vegetation, but it is very likely that the site does not extend much on that direction since density was low. The site is classified as a nucleated village of Sapoá and Ometepe.

N-Gr-40 Isla La Marota

Location: Latitude 11° 55' 00" N, Longitude 85° 55' 14" W

This is an island of Lake Nicaragua visited after receiving information from personnel of the National Museum of Nicaragua. Looters have uncovered funerary urns though the damage has not been extensive. The visibility was limited because most of the island is covered with dense vegetation. When observed surface density ranged from medium to low. The site is a hamlet during Sapoá and Ometepe.

N-Gr-41 Isla La Venada

Location: Latitude 11° 55' 00" N, Longitude 85° 54' 32" W

It was located through informants. Dense vegetation greatly limited surface visibility and only low density surface remains were observed. The site has been looted, though the damage is not extensive. It is a hamlet during Sapoá and Ometepe.

N-Gr-42 Isla La Concha

Location: Latitude 11° 52' 40" - 11° 52' 50" N, Longitude 85° 53' 21" - 85° 53' 44" W

The island is a property of the Institute of Tourism of Nicaragua. It was located by information provided by Mr. Teodoro Jarquín. The vegetation was dense in general and surface density limited. When observed surface density was medium.

Two petroglyphs were recorded approximately 1 m in height. The designs are spirals measuring between 10 to 25 cms. The site is classified as a hamlet during sapoá and Ometepe.

N-Gr-43 Justina Vázquez

Location: Latitude 11° 50' 54" - 11° 51' 04" N, Longitude 86° 03' 04" - 86° 03' 23"

Located by systematic survey. The site is on a plain with fertile soils planted with beans and maize, and cut from south to north by a seasonal river. Three knolls ranging from 5 to 10 m in diameter are found in the site. Surface density is medium. The site is classified as a disperse village.

N-Gr-45 Petroglifos

Location: Latitude 11° 53' 04" N, Longitude 86° 00' 05" W

Located by systematic survey. The site is located on the lower slopes of the "Cerro El Pelón", on the southeastern edge of the Apoyo Lagoon, only a 100 m from the site N-Gr-7. Since diagnostic material was not collected I did not define the chronology, but it is probably related to N-Gr-7 and perhaps the chronology is the same.

The vegetation was dense and 10 petroglyphs were recorded bearing carved geometric or zoomorphic designs Figs. B.5-7). The largest of all was 1.5 m in height and about the same in width, and was totally covered with geometric designs (Fig. B.8).

N-Gr-46 Méndez

Location: Latitude 11° 50' 50" - 11° 51' 02" N, Longitude 85° 55' 14" - 85° 55' 33" W

The site was located by systematic survey, on a plain with a slight decline to the east. It is largely covered by bushes and other vegetation. A spring is the only surface water source available in the environs of the site.

Portions of the site are cultivated with plantain trees, and there fragments of pottery, metates and manos have been uncovered. In the yard of Mr. Méndez's house, owner of the terrain, surface density is low, and in the

Figure B.5 Petroglyphs with zoomorphic designs at N-Gr-45 site.

Figure B.6 Petroglyphs at N-Gr-45 site.

Figure B.7 Petroglyphs at N-Gr-45 site.

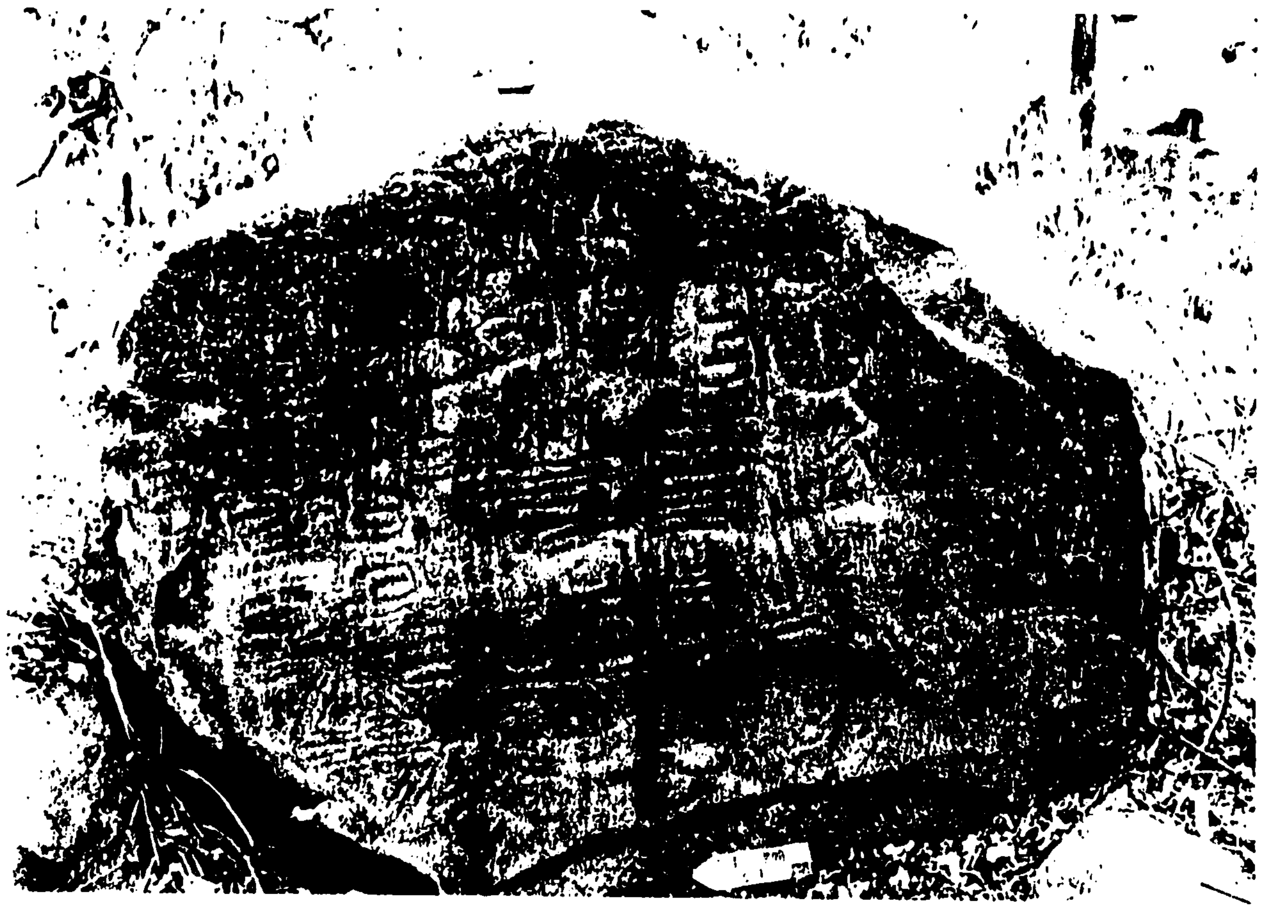


Figure B.8 Petroglyph at N-Gr-45 site.

rest of the site is difficult to determine because of poor visibility. Three stone-faced mounds are partially destroyed, and average dimensions are 15 m by 9 m. The site is a dispersed village of Sapoá.

N-Gr-47 El Elequeme

Location: Latitude 11° 50' 41" - 11° 51' 00", Longitude 85° 54' 23" - 11° 54' 50" W

Located through systematic survey, on a plain near the coast of Lake Nicaragua. The terrain has not been planted, at least during the last decades, and is covered with bushes and grasses. Visibility is poor and surface density low. A total of 6 stoned-faced mounds were observed, three of them cut by a road and badly eroded. Diameter ranges approximately from 15 to 22 m. The site is a hamlet of Sapoá.

N-Gr-49 Toro Venado

Location: Latitude 11° 50' 41" - 11° 51' 00" N, Longitude 85° 56' 52" - 85° 57' 03" W

The site was located by systematic survey on a plain bordered in the east by rolling hills. The terrain is owned by the Cooperative Carlos Fonseca and it is dedicated to cattle ranching. The visibility was limited because the terrain is covered by grass. In sectors where the visibility was good surface density was low. The site has been classified as a hamlet.

Isolated findings

Three isolated findings were recorded. None can be dated since the material was badly eroded. We interpret these areas as the product of occasional activities, and not as settlements.

SITES LOCATED ADJACENT TO THE SURVEY AREA

N-Gr-19 Playas Verdes

Localization Latitude 11° 51' to 11° 52' 03" N, Longitude 85° 56' 34" to 85° 57' 35" W.

The site is located on an extensive plain southwest of the town of Diría and Diriomo. The Cooperative Bernardino López Ochoa owns the land wherein the site is located, and the soils reportedly are fertile. A seasonal river runs on the southern edge of the site. Common crops are maize, beans and different types of vegetables.

The land was cleared when we visited the site and the visibility was good. High to medium density is found in the southern sector of the site, where about 8 knolls or perhaps earthmounds were recorded.

Foreign artifacts included not only obsidian but sherds of the Tenampua class of Ulua Polychrome. In addition to ceramics, both ground and chipped lithic artifacts were abundant. The site was a nucleated village during Bagaces (80% of ceramics) and the intensity of the occupation or its duration decreased during the subsequent periods (20% of the ceramics).

N-Gr-21 Catarina

Location: Latitude 11° 54' 33" N, Longitude 86° 04' 12" W

The site was located by accident while visiting the town of Catarina. It lies on the southeastern edge of the town of Catarina, overseeing the Apoyo Lagoon. The terrain was covered by grass and visibility was limited but surface density was low to medium. Very likely the site extends under the town of Catarina. The boundaries were not defined and neither the site type. The site was occupied during all the periods so far defined in the region.

N-Gr-44 El Capulín II

Location: Latitude 11° 57' 40" N, Longitude 86° 00' 24" W

The site is located just south of the road Granada-Masaya on a plain. The soils are poor. No surface water is available nearby the site. Visibility was good and surface density was low. The boundaries are well defined and the site has been classified as a hamlet.

N-Gr-48 Cutirre II

Location: Latitude 11° 49' 05" 11°- 49' 20" N, Longitude 85° 54' 57" - 85° 55' 11" W

The site is located in the Hacienda Cutirre, on a plain on the lower eastern slopes of the Mombacho Volcano. It was found with the aide of an informant. The soils are fertile and maize, plantain trees, and tomatoes are cultivated. No surface water current is available in the environs of the site. Surface visibility was limited but when observed density was medium to high, and the occupation is associated to Sapoá. Boundaries remain to be defined, the site has tentatively been classified as a village.

Appendix C

GENERAL DESCRIPTION OF STRATIGRAPHIC OPERATIONS

AYALA SITE (N-GR-2)

The soil matrix from all the operations was sifted using 1/8 inch screens. In some instances, other screens were used including 1/4 inch and 1mm. It is indicated in the description of each operation when variations to the 1/8 inch occurred.

All cardinal locations are given with reference to the NW corner of the operation, using the magnetic north as reference.

It was noted that a yellowish sandy layer precedes the appearance of a sterile grey sand layer throughout the site's stratigraphy. This marks the end of any trace of occupation, and under the sterile gray sand several layers of volcanic derivations are found. Less than two kilometers from the Comarca San Antonio, there is a quarry. It shows the exposed profile of a hill where the yellow and grey sandy layers observed at Ayala can be seen at the top of the profile. Under them perhaps 20 to 25 m of strata formed by materials of volcanic origin were observed (Fig. C.1). No fossil soil was seen between these layers. Therefore, the yellowish sand is the last stratum where cultural remains are found at the site.

Figure C.1 Quarry profile showing volcanic layers

Operation 1

It is located next to the bed of a seasonal stream enlarged and deepened by the passing of hurricane Juana (Fig. 5.4). The exposed profile shows layers of fossil soil alternating with layers of sand, a product of many alluvial episodes. The strata contained cultural remains, and I thought good stratigraphic information could be obtained from the "sealed" fossil soils.

The operation was subdivided into three sub-operations (Fig. C.2). The SO-1 E2-3 was a stratigraphic pit excavated at levels of 10 centimeters down to a depth of 6 m (Fig. C.3). The SO-1 E2-3 was excavated dividing each stratum into levels of 10 centimeters to a depth of 3.20 m. Finally, the SO-3 EO-2 was also excavated as the previous sub-operation, but matrix was not screened, since the goal was to locate cultural features in occupation floors, unfortunately without success.

All strata reported small quantities of cultural material. Culturally formed deposits are found in strata A, O and R. The latter two had the highest concentration of fauna recovered at SO-1 E 2-3. The sample was analyzed by Richard Cooke (1993), and he interprets this concentration as the product of a cultural occupation in strata O and R. All other strata were formed by alluvial episodes, and cultural materials found in those strata were carried by a stream from their original depositional contexts.

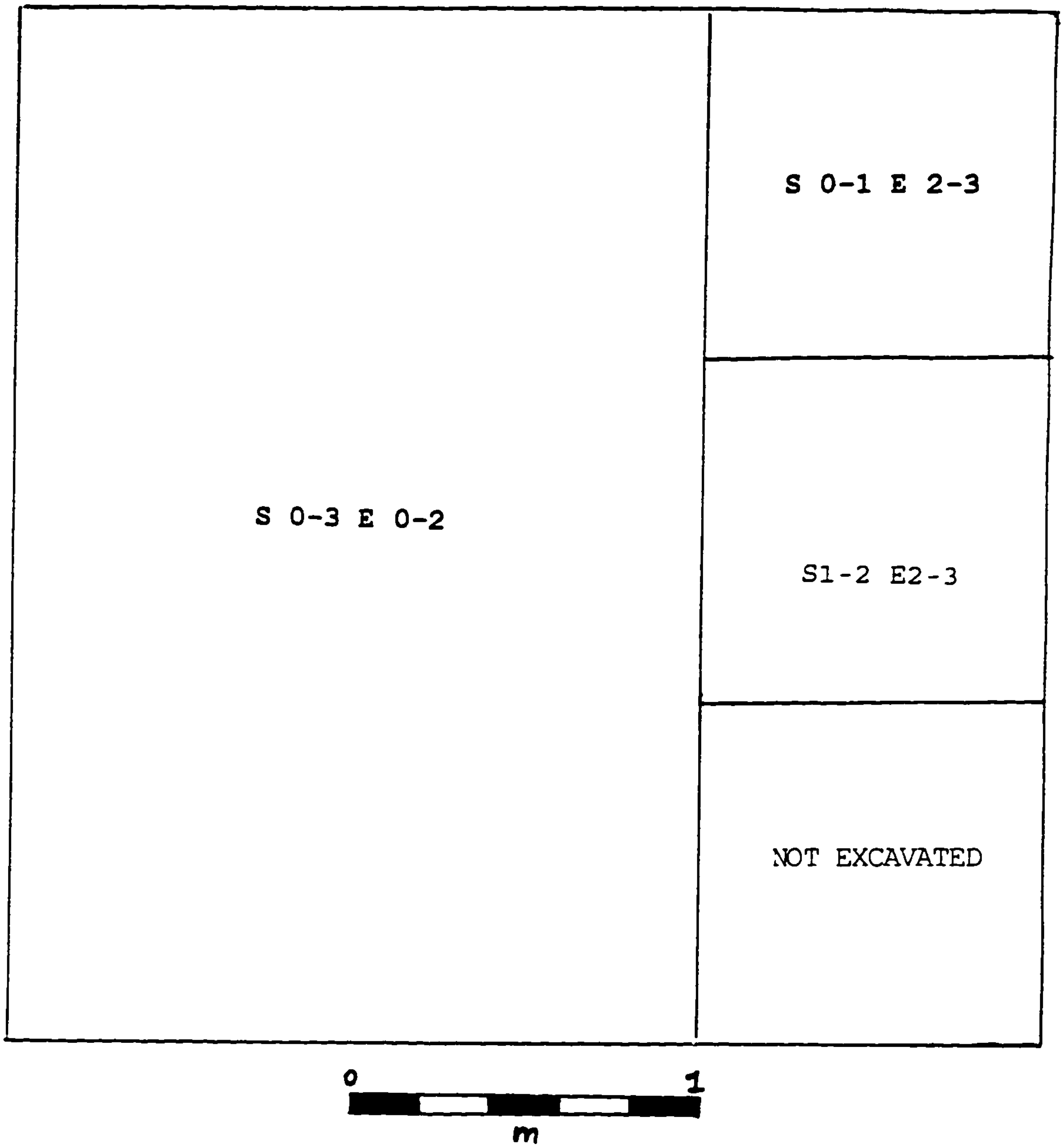


Figure C.2 Operation 1, Suboperations

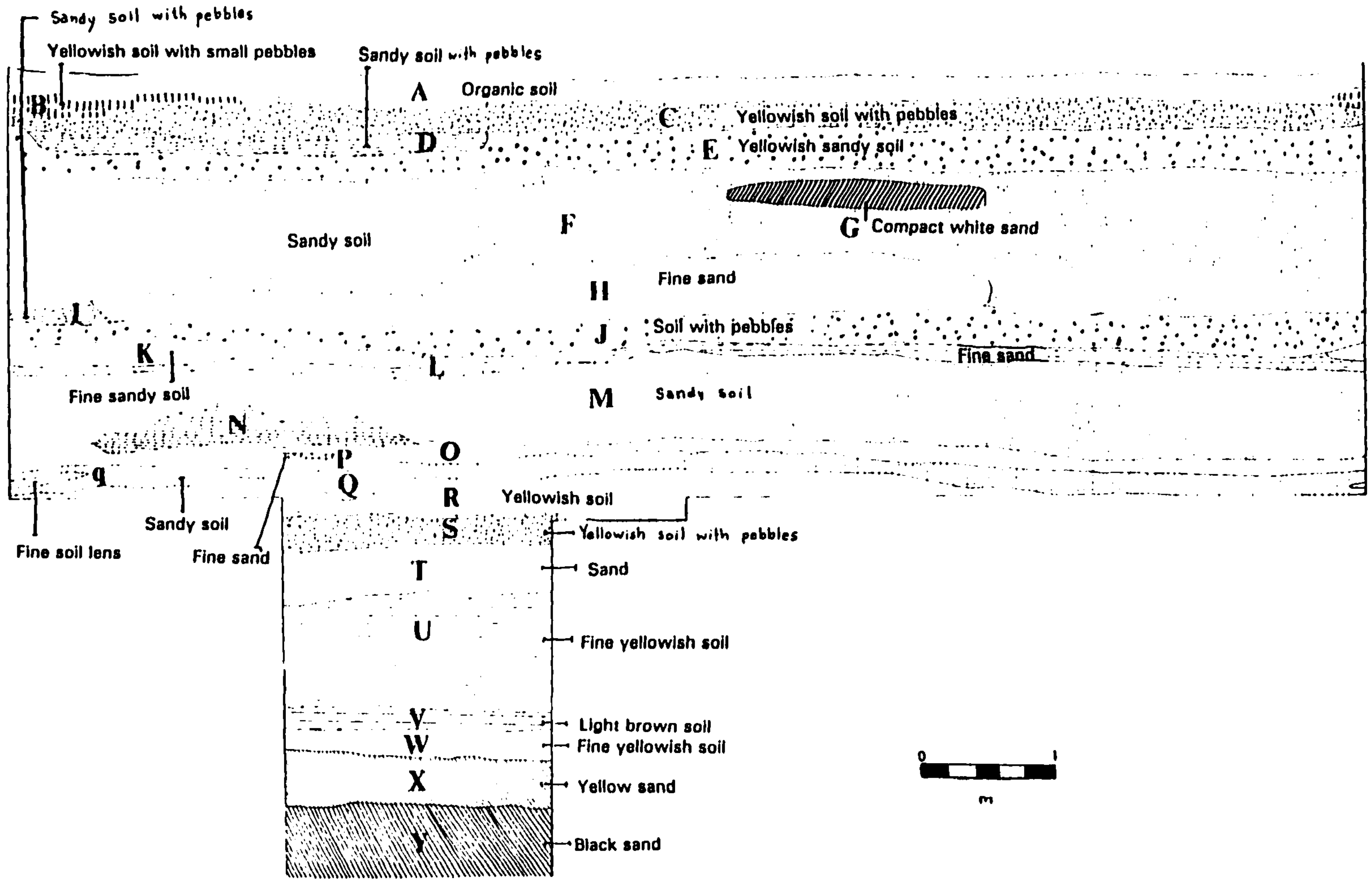


Figure C.3 Operation 1 profile

Mixed materials from Ometepe and Sapoá were found in strata A to E. The stratum indicated as F presents mixed materials of Ometepe, Sapoá, and Bagaces. All other strata contained Bagaces materials, except for W, X and Y that were sterile.

Operation 2

This was a small operation located 50 m to the north of the Granada-Nandaime highway, between this and a quarry located to the south. The goal pursued was to identify strata from Orosi and/or Tempisque. Surface materials were of low density, but it was the only terrain with early components where we were authorized to excavate.

This stratigraphic pit was a 1x1 m. Arbitrary levels of 10 centimeters were excavated until a final depth of 1.10 m. The soil from surface to 50 centimeters is loose and dark brown. In this stratum were recovered few ceramic fragments (16 pieces in the 5 levels). They were undiagnostic pieces apparently from Rivas Rojo, and a fragment from Bocana Inciso at the 5th level (40-50 cm).

Below 50 cm the soil is sandy and at 60 cm it turns clayish. From 50 cm down the strata contain no cultural materials. The operation did not render data for the definition of the Orosí or Tempisque ceramic complexes.

Operation 3

This operation is a 3x3 located on the property of Mr. Pedro Flores (Fig. 5.4). Initially we wanted to work on the adjacent land, whose proprietor is Mr. Eduardo Franco. However, Mr. Franco's wife asked for payment as her conditions for permission. She explained to us that her husband was working in Costa Rica, and that he had arranged with some Costa Rican to come and pot-hunt in his land in exchange for money.

The operation was designed to gathered information on the stratigraphic sequence in this sector of the site. We also hoped to locate some area of domestic activity. The northeastern corner is found at 9.95 m to the north of a electricity pole which is located in the terrain. The operation was divided into S2-3 EO-1, SO-2 EO-1 and SO-3 E1-2 (Fig. C.4).

S2-3 EO-1 was a stratigraphic column excavated in levels of 10 cm down to a depth of 3 m. At 40 cm a large quantity of angular stones began to appear, and we amplified the operation first including square SO-2 EO-1, and finally including SO-3 E1-3.

The layer of stones appear throughout the entire operation, from a depth of 25 to 75 cm. Most are concentrated between 30 and 45 cm. Cultural remains diminish rapidly after the stone appear.

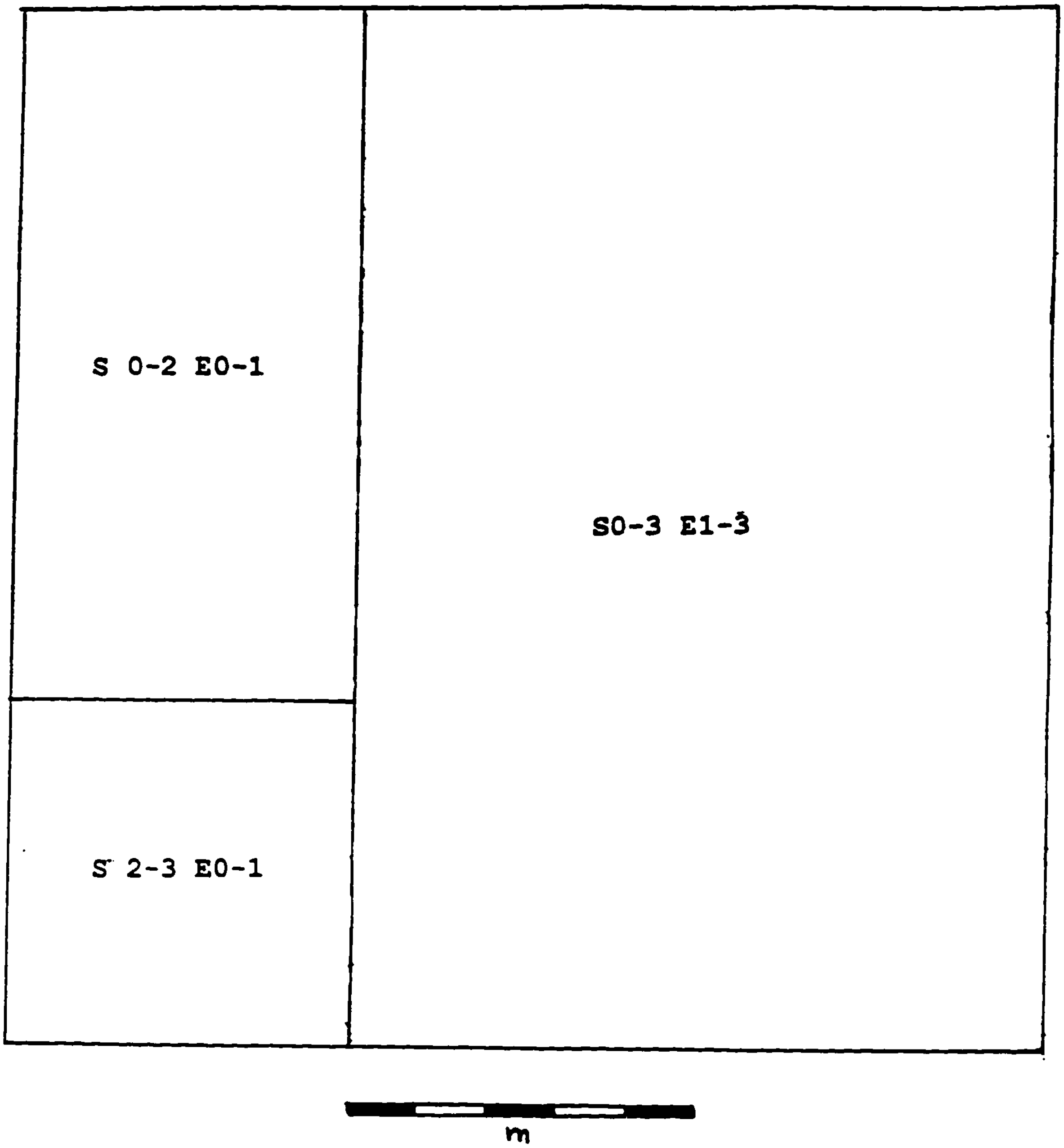


Figure C.4 Operation 3, Suboperations

The retrieved remains were very scarce and limited to layers A and B of the stratigraphic profile (Fig. C.5). The first two levels (0-20 cm) contain ceramics from Ometepe, Sapoá, and Bagaces. Below a depth of 20 cm, materials from Bagaces are found, although at level 3 (20-30 cm) two examples of Bocana Inciso were discovered. Beyond 30 cm, materials are limited to 20 ceramic pieces per level. Level 7 (60-70 cm) of the sub-operation S2-3 EO-1, reported only one undiagnostic sherd.

From C, all layers are sterile and product of the deposition of volcanic remains (Fig. C.5). The stone layer (Fig. C.6) was caused by a lava bomb, according to geologist Mario Zamora.

Some sondage pits were dug to determine the extension of the layer, and apparently it is found throughout the entire property of Mr. Pedro Flores.

Operation 4

Operation 4 consists of 5 sub-operations positioned at the summit of natural elevation, on the land of the Francisco Reyes family.

In figure 5.4, the operation which appears as 4, is sub-operation 4 SO-2 E0-2, the first to be excavated. The top six levels were each 10 cm, and from there the following levels were each 20 cm. In the first 25 centimeters the soil is humic. At 40 cm the soil is composed of a light brown clay material. Below 40 cm a soft, loose, yellowish sand is

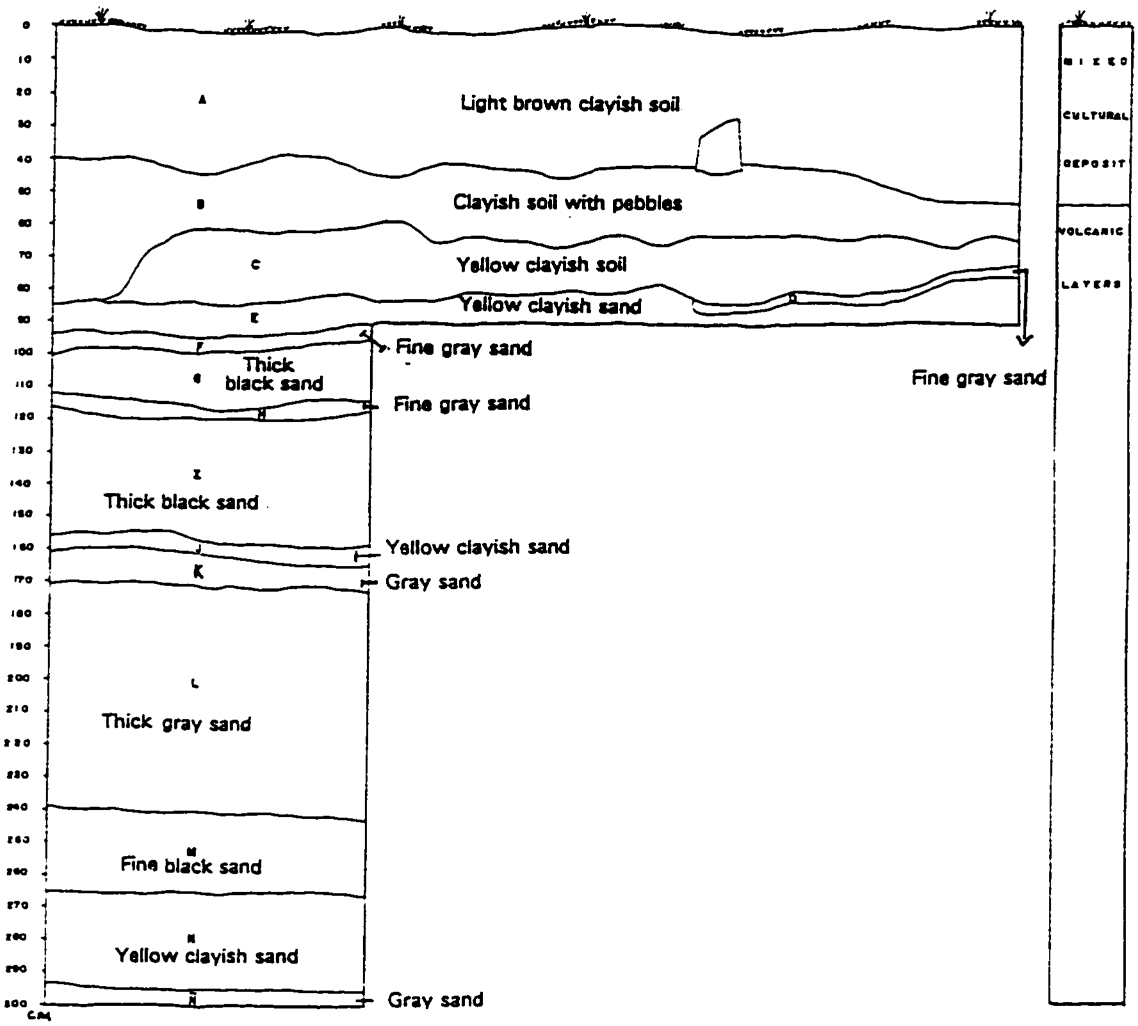


Figure C.5 Operation 3 profile

Figure C.6 Layer of volcanic rocks

found and cultural remains are scarce, and between 60 to 80 cm only two ceramic fragments were recovered. Beyond 80 cm all strata are sterile. Between 80 to 120 cm, a layer of thick grey sand is found. A stratum of thick grey sand with many small pumice stones (1-2 cm) was found between 120 and 160 cm.

Cultural stratigraphy at the first level is composed of mixed materials from the Sapoá and Bagaces periods, and below 10 cm materials are of Bagaces. The quantity of materials is very scarce, not exceeding the twenty ceramic pieces in each of the first 3 levels. From 30 to 80 cm the quantity did not exceed 10 pieces per level.

After this operation, three trenches of 1x2 m were located to the east with the goal of searching for cultural remains.

SO-1 E10-12: Was located 10 m to the east of SO-2 E0-2, and excavated in levels of 20 cm.

At a depth of 30 cm, the first artifact of a funerary feature from Bagaces appears. This artifact, a figurine of the Tola Trichrome type (Fig. C.7a), was found on the north wall, therefore we made an extension of 25x50 cm (N 0-.25 E 10.50) to locate possible other related artifacts. Here again at a depth of 30 cm four ceramic vessels were found. One of them monochrome pot of undetermined type (Fig. 7a), the other a tripod grater of Leon Punctuated and two bowls of the Momta Polychrome type (Fig. 7b), below one of them, a

b

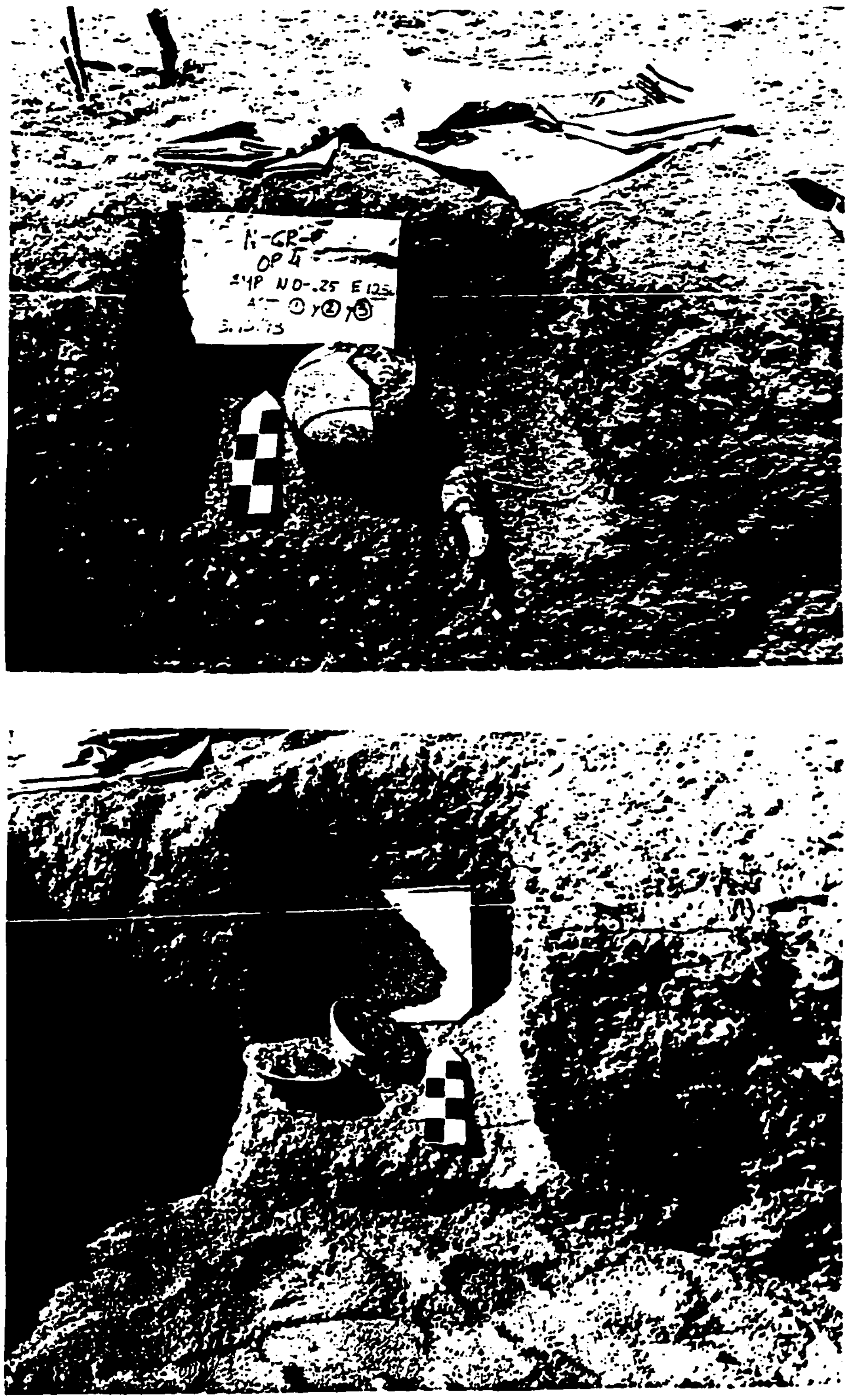


Figure C.7 Funerary offerings

the teeth of an infant approximately 6 months old were found. The age identification was done by archaeologist Ricardo Vázquez, of the National Museum of Costa Rica. The vessels of the Momta type were smaller than average, therefore they could have made especially for the child, either during his life or upon his death. This burial site is dated in the Ayala phase (650-950 A.D.).

To determine if there were more associated artifacts or traits the extension was enlarged to 1x2 m (N0-1 E10-12). It was dug with a trowel trying to observe any change that allowed the definition of the tomb, and also to avoid damaging any other artifact or other remains associated with the funerary feature.

The profile of the operation demonstrates the rupture caused by the intrusion of layer C (Fig. C.8), possibly done in the excavation of the funeral site. Layer C represents the layer of sterile sand under which no other stratum with cultural remains exists. Layer A is organic soil and corresponds to a Sapoá occupation, while B is light brown clayish soil and contains Bagaces remains.

SO-1 E 20-22: Located 20 m to the east of the northeastern corner of S0-2 EO-2, this is a trench measuring 1x2 m. Three levels of 20 cm each were excavated. The first 15 cm consists of a humic layer, below which appears a layer of yellowish sand which precedes the layer of grey sand that

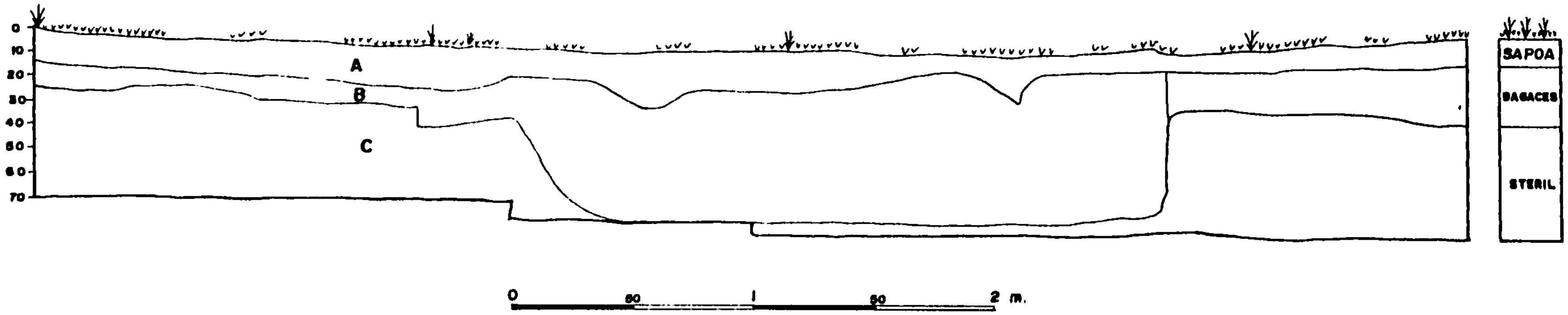
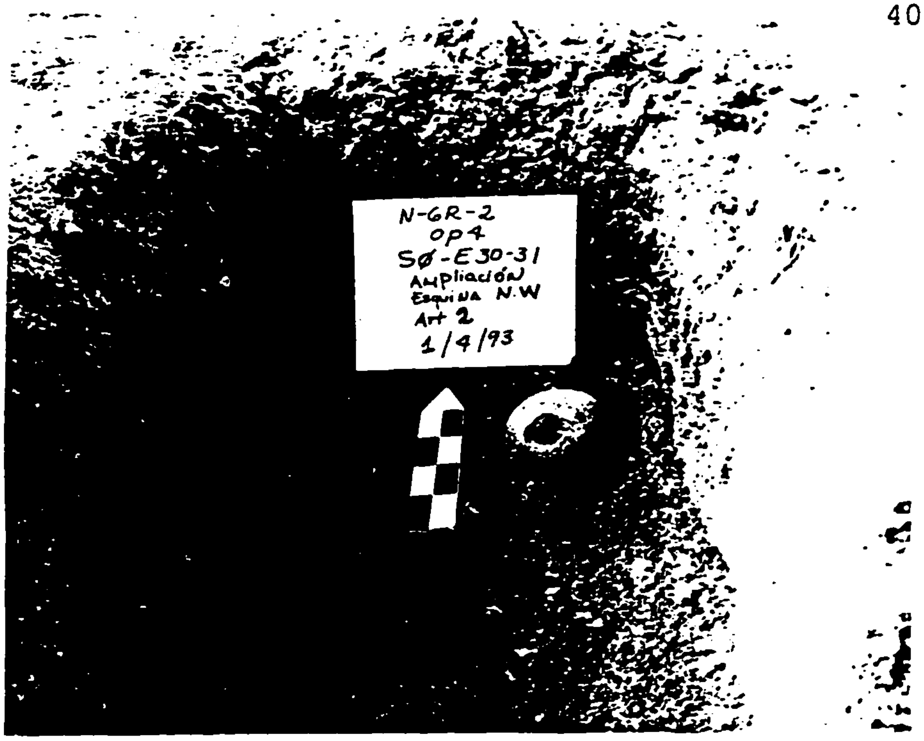


Figure C.8 Operation 4 profile, S 0-1 E 10-12 appears at the end of level 3. The few materials recovered can be assigned to the Ometepe period.

SO-2 E30-31: Located at 30 m of S0-2 EO-2, it was excavated at levels of 20 cm. At a depth of 40 cm on the northwestern corner, a large tripod bowl was found. An extension (SO-1.5 E29-31) was made, and another monochrome vessel was uncovered (Fig. 9a). No other artifacts or associated remains were found. This is considered a funerary feature, and it probably could be assigned to Ometepe since the upper levels contained remains of that period.

In this operation the first fifteen cm are defined by humic soil, followed by a layer of sandy yellowish earth. At 40 cm appears the layer of grey sterile sand, and the operation was closed.

N8-9.5 O17.5-19: Situated 15 m west and 9 to the north of the SE corner of SO-2 E0-2. Dense surface deposits were observed and the area was selected primarily to obtain data on the sequence of occupation. Levels of 10 cm each were excavated, but at 60 cm an error in level measurement destroyed the statistical control of level content. A new 1.5x1.5 m pit -N8-9.5 016-16.5- was placed adjacently, and also excavated in levels of 10 cm. At the bottom of level four, on the eastern half of the pit, a Sacasa Striated and a Vallejo Polychrome:Lazo variety vessels were uncovered (Fig. C.9b). The funerary pit extended to a depth of 70 cm. No associated osteological remains were recovered, but the a



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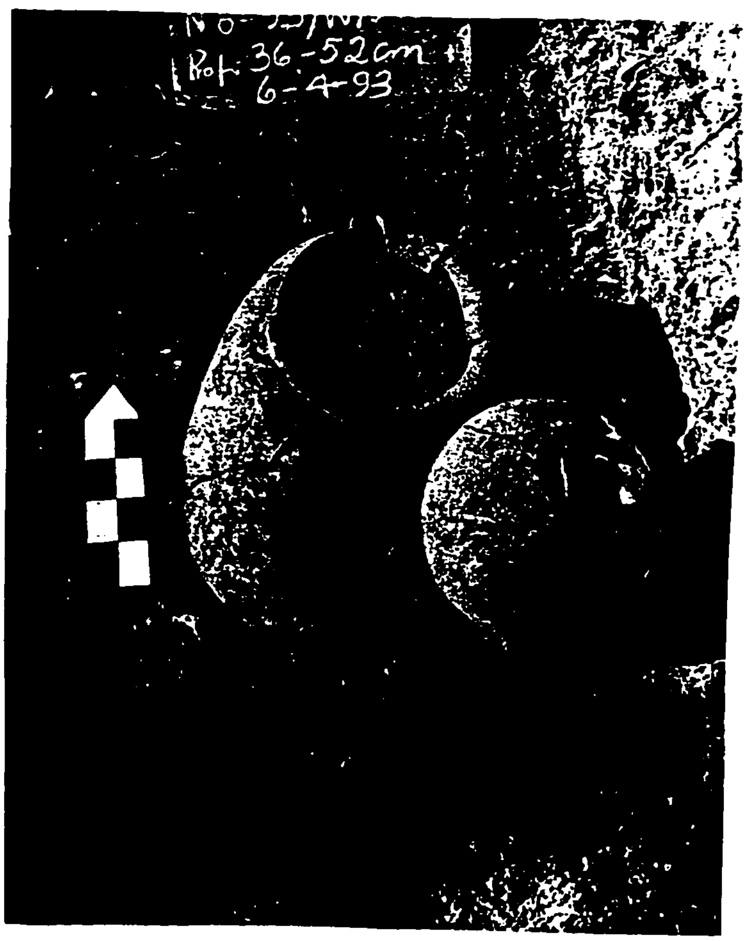


Figure C.9

a) Funerary offering
S 0-1 E 30-32
b) Funerary feature

finding is defined as a funerary feature. After the feature was dug, the excavation was continued only in the eastern half of the sub-operation due to the disturbance of stratigraphy in the other half. Although they were not analyzed in detail, levels 5 through 12 of the eastern half can be used to study artifactual complexes, since no stratigraphic alteration was observed.

The soil is loose, dark brown, to a depth of 90 cm. From surface to a depth of 60 cm abundant Ometepe remains are found, and both Xalteva and Cocibolca phases are represented. Below 60 cm, the material pertains to the Ayala phase of Bagaces and are abundant. Below 90 cm a yellowish sandy layer appears and the quantity of cultural remains diminishes drastically. At the depth of 1.30 m a strata of mixed yellow and grey sand precedes the sterile layer. The operation is closed at 1.4 m.

Operation 5

Located at the base of a natural elevation, at 16.55 m from the northwestern corner of Operation 4 S0-2 EO-2. Although initially designed as a 3x3 m pit, it was only partially excavated into sub-operations SO-1 E2-3, SO-1 E0-2, and extension NO-1 E1-3 (Fig. C.10).

SO-1 E2-3 is a stratigraphic pit dug at levels of 20 cm. The stratigraphy of this sub-operation describes and is applied to the entire operation (Fig. C.11). Layer A is

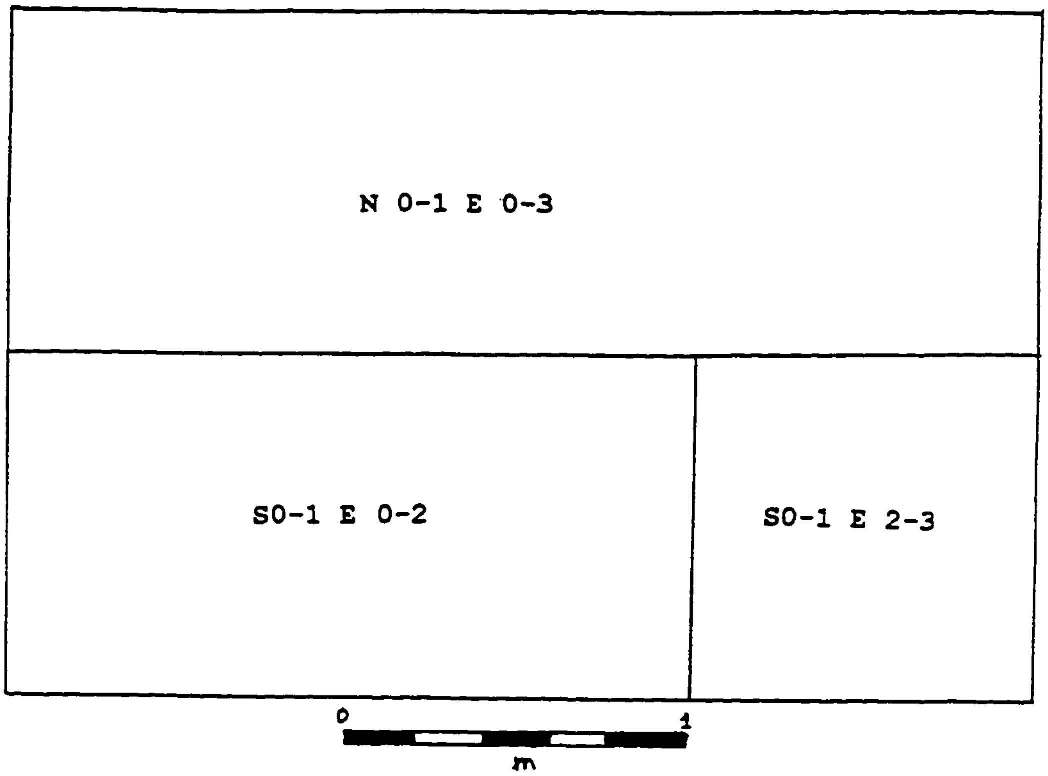


Figure C.10 Operation 5, Suboperations

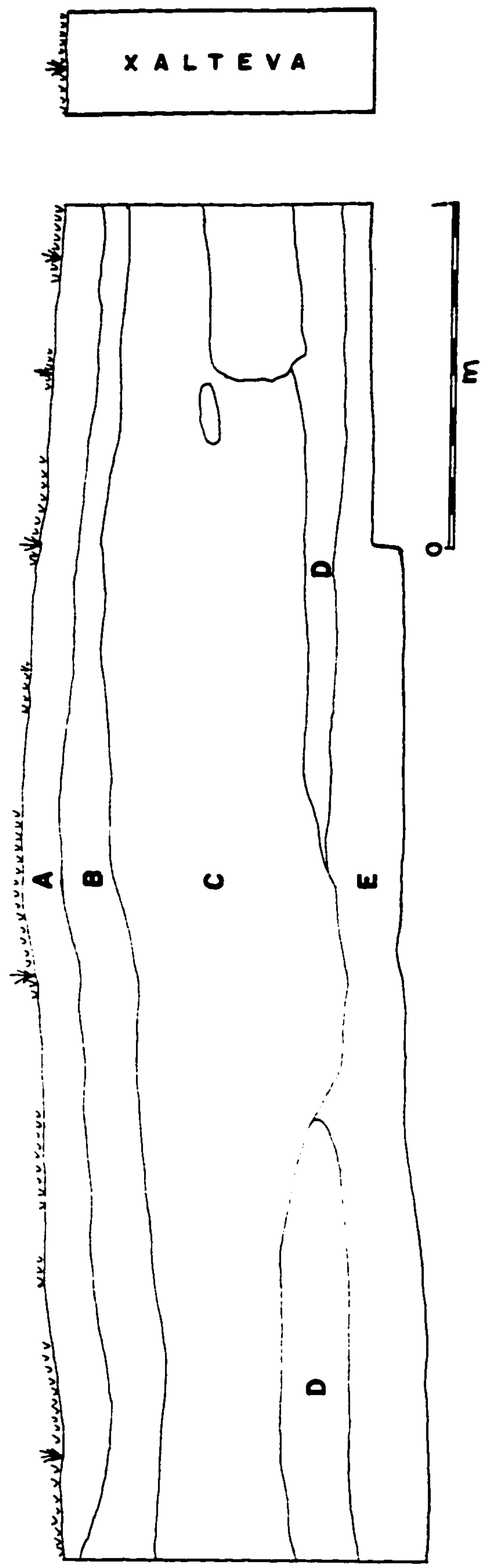


Figure C.11 Operation 5 profile

humic soil, and B is loose and brown soil. These two layers contain material from the Xalteva phase. Layer C is sandy yellowish soil, with some materials from both Xalteva and Cocibolca phases but mainly Bagaces remains. Layer D is yellow sand, and under it grey sand marks the end of cultural occupation in layer E.

A Chávez bowl was found in this pit at a depth of 75 cm. An extension was made to determine if there was any association, however no other artifacts or cultural remains were found. In the profile of the operation it was noticed an intrusion in layer D, perhaps as the result of the funerary pit where the vessel was deposited (Fig. C.11). Nevertheless, osteological human remains were not found.

The other sub-operations were excavated as part of the extension. Material was not sifted. At levels 2 and 3 of NO-1 E0-3 a few stones appeared but they did not show a definite pattern nor any clear association. The first group of stones was found between the depths of 10 cm and 38 cm and the second group between 69 and 79 cm.

Operation 6

Situated 17 m to the south of the southeastern corner of operation SO-2 E0-2, at the base of a natural hill. This was originally a 3x3 m pit but only S1-3 EO-3 was excavated, and then extended to S3-4 EO-3 (Fig. C.12). The first level (0-10 cm) was not sifted, only a sample of diagnostic

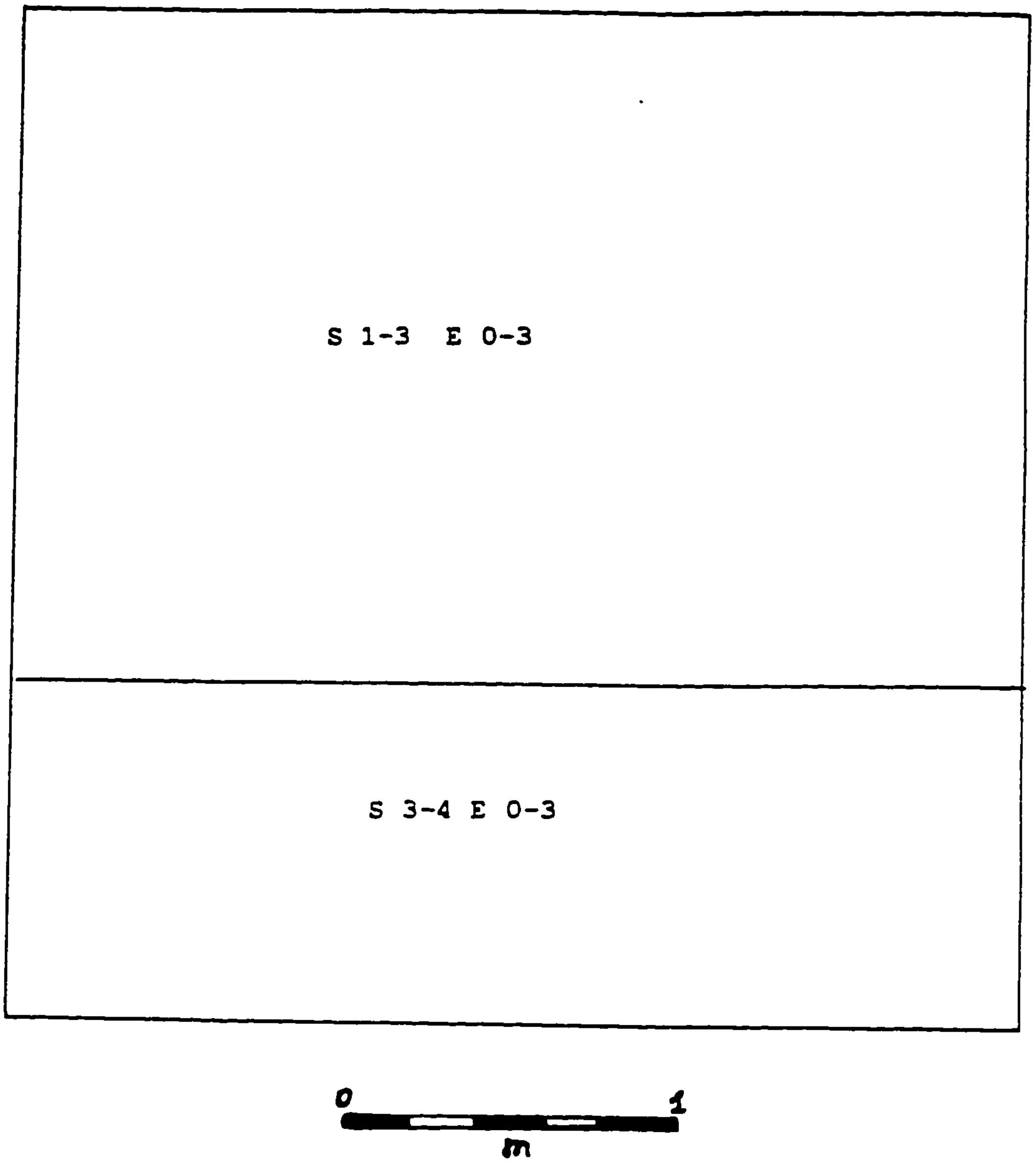


Figure C.12 Operation 6, Suboperations

fragments was picked up. Level 3 (20-30) of S1-3 E0-3 is subdivided into two squares, the western half and eastern half, since the first showed mixed soil of layers B and C. The eastern half is composed exclusively of level C. All levels presented material of the Xalteva phase.

Layer A is of humic soil. Layer B is composed of dark brown earth but with small stones of a diameter of less than one cm. Layer C is of yellowish, sandy soil, and the last layer is a grayish sterile sand (Fig. C.13).

An intrusion in layer C appeared at 44 cm. At first we thought that it related to the altered remains of the small oven because of the very fine grayish earth similar to ash. On the south wall, it was noticed that the characteristic continued in that direction, therefore it was decided to extend S3-4 EO-3 to observe the trait. This extension was excavated in natural levels.

The feature continued at a depth from 44 to 80 cm. Below the fine grayish ash layer which has at the most had a depth of 2 cm, very dark brown soil is found. It was excavated partially and all soil sifted through a 1mm net, recovering an important quantity of botanical examples. It was not possible to define the nature of the feature since there was no clear association had been observed to establish its function. The trait extended south to the wall of extension S3-4 EO-3, but no further extensions were made.

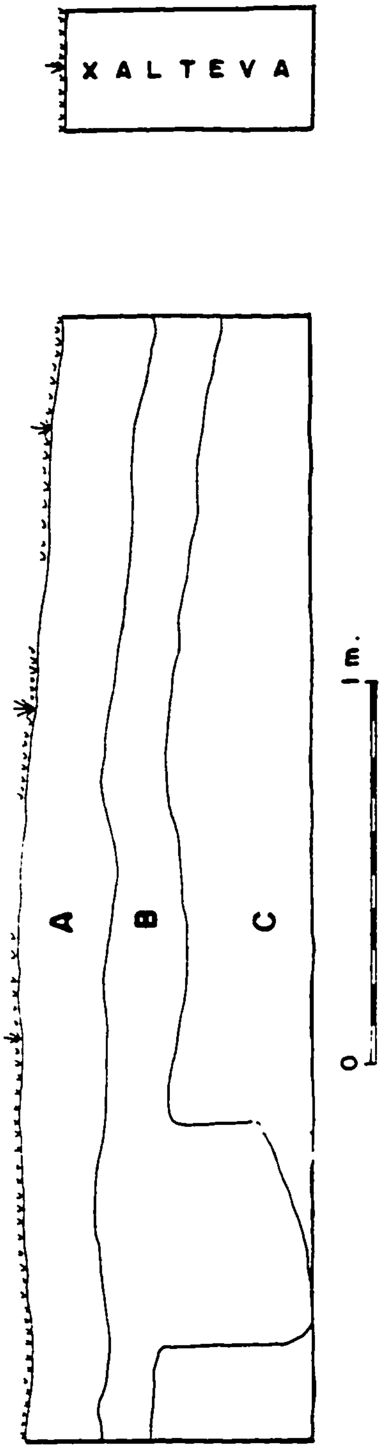


Figure C.13 Operation 6 profile, South wall

Operation 7

Situated on the land of Ulises Ayala on a knoll. Before locating the operation we had observed exposed profiles of a depth of 60 cm. These were a result, according to Ulises, of the cleaning of anthills to prevent crop damage.

Initially designed as a 1x4 m trench, it was expanded with a 1.5x1.5 m pit situated to the south of the north wall (Fig. C.14). The trench was divided into SO-1 EO-3 and SO-1 E3-4, a stratigraphic pit. Then S1-2.5 E2.5-4 was added.

Trench SO-1 E3-4 was excavated by natural layers, using only trowels. The materials were not sifted, instead they were hand collected by the excavators. No cultural features or occupation floors were defined here.

Stratigraphic pit SO-1 E3-4 was begun by digging layers of a depth of 10 cm. An excavation error in level 5 forced the placement of a new stratigraphic pit, S1-2.5 E2.5-4. This was dug in layers of 10 cm, and all material were first sieved through a 1/8" screen and then through one of 1mm mesh. This sub-operation has an excellent recollection of botanical and faunal remains, and all types of material. It was used for a detailed analysis of the ceramics and lithics to refine the pottery complexes and define the lithic ones. The stratigraphy of this sub-operation can be generalized for the entire operation 7 (Fig. C.15). Five radiometric datings were obtained with samples from this operation (Table D.4).

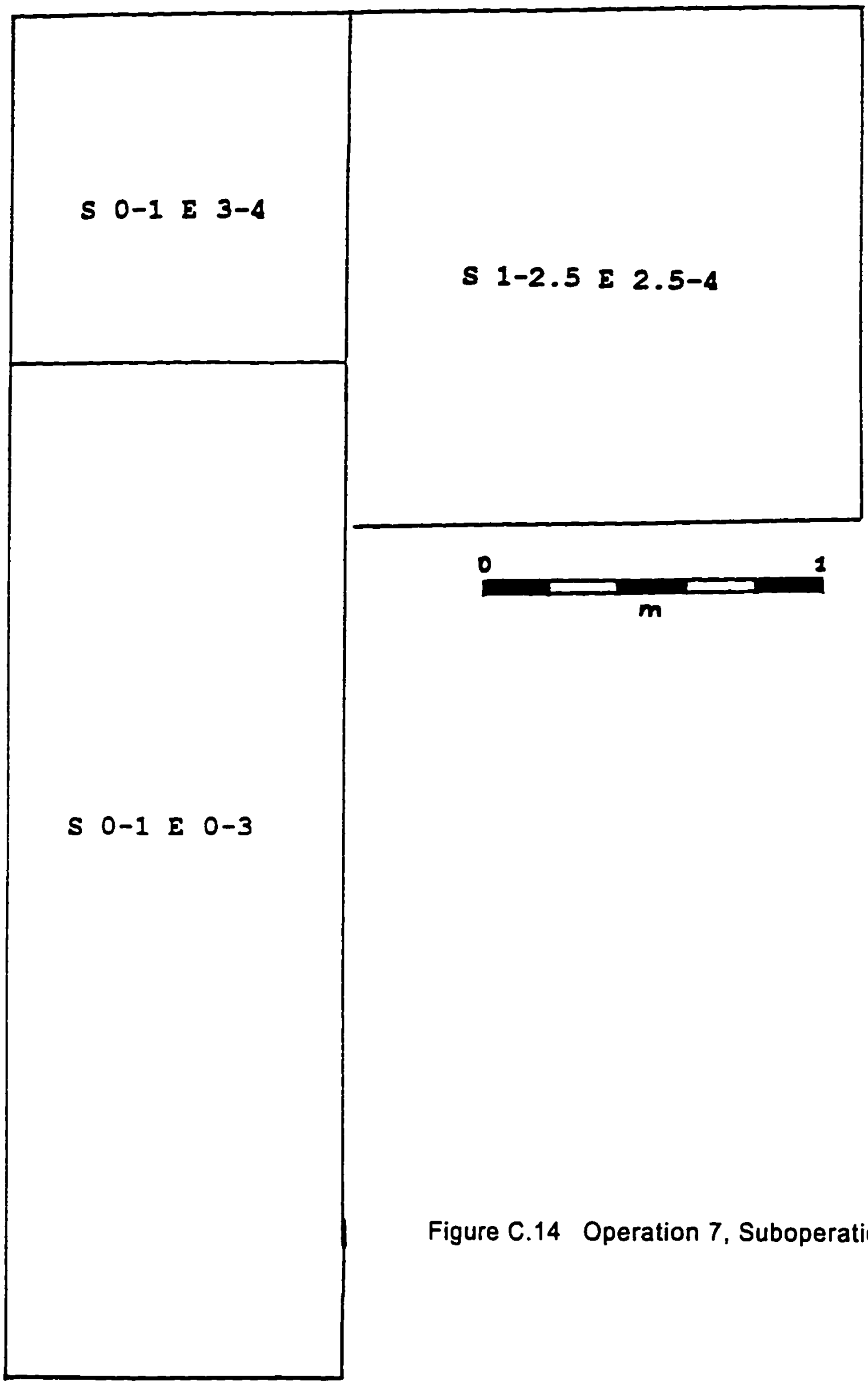


Figure C.14 Operation 7, Suboperations

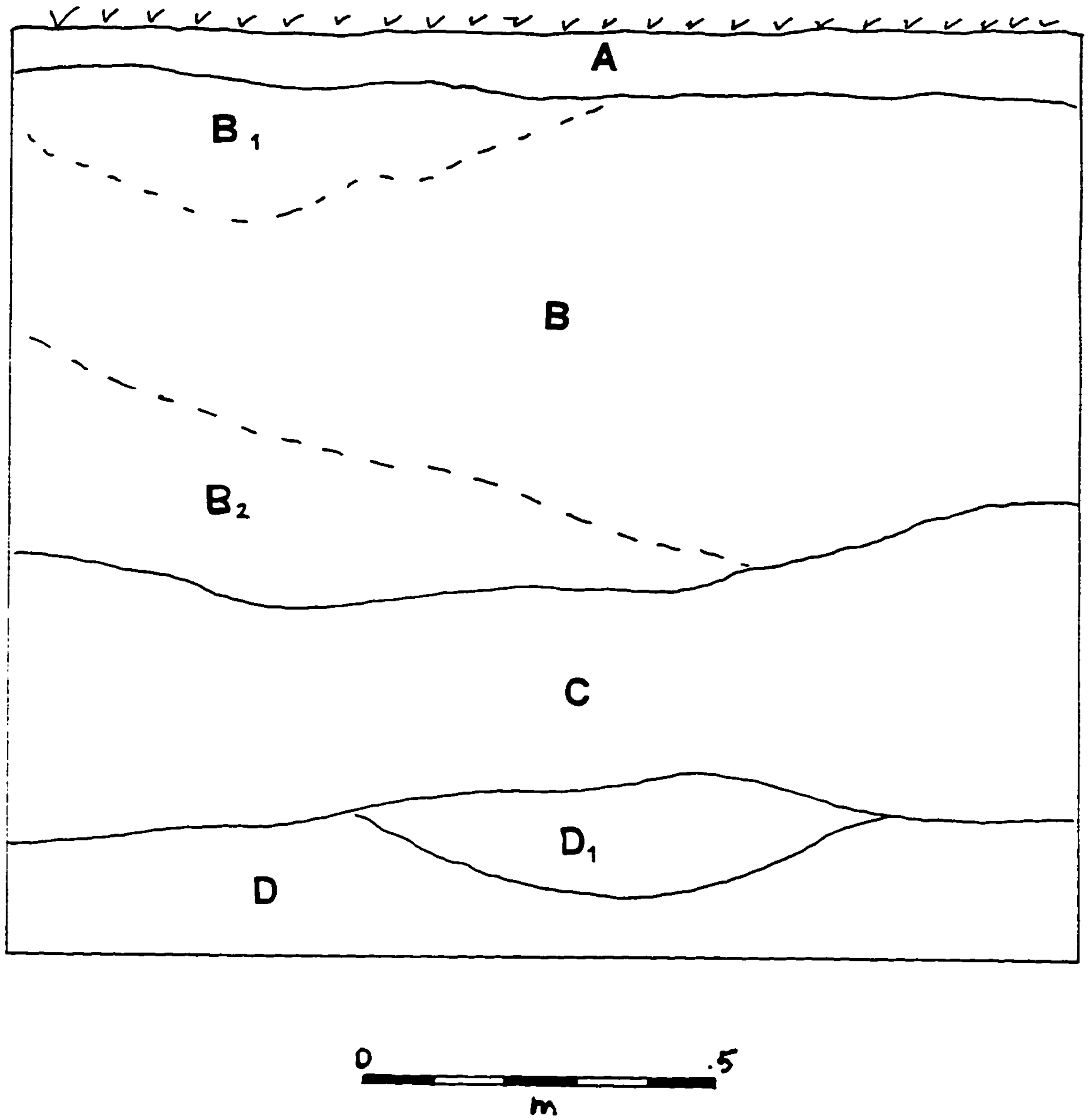


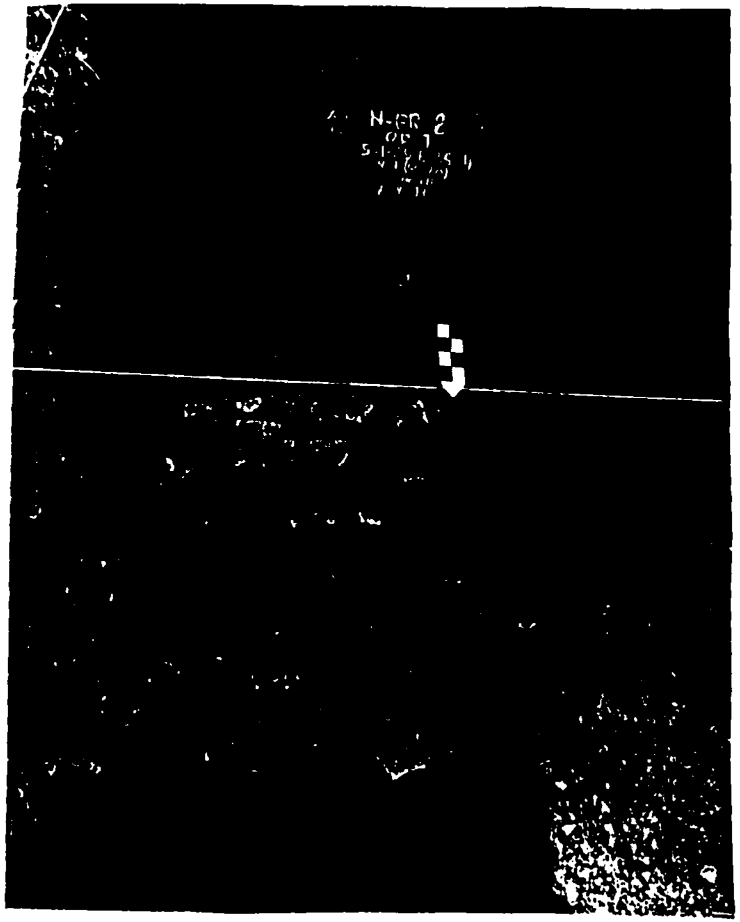
Figure C.15 Operation 7 profile, North wall

Layer A is a layer of humic, dark and loose earth. Layer B is a dark brown loose soil containing a refuse midden of the Ayala phase (650-950 B.C.) of the Bagaces period. B_1 is a lense with high content of sand, while B_2 high content of small pebbles. Layer C is also a refuse midden less dense than that of layer B, and corresponds also to the Ayala phase. The soil is of a fine texture and yellowish brown. Finally, layer D is stratum of layer of yellowish brown soil thicker than C. Cultural remains diminish drastically as the layer of sterile sand starts to appear. D_1 is a lens of sandy soil. Excavation ends at 1.30 m.

Apparently two occupation floors were uncovered in layer C, one at approximate depth of 70 cm and the other about 85 cm. Collapsed vessels were found over a layer of ash in both cases (Fig. C.16). Perhaps these remains are associated with some domestic structure that we were not able to locate in this stage of the investigation.
This is a promising sector of the site and more excavations are required.

Operation 8

This operation was a 1.5 x 1.5 m stratigraphic pit located on lower ground, at the base of natural elevation where operation 4 took place. It is within the property of Chico Reyes, to the side of the fence which divides this land with that of Ulises Ayala.



a

b

Figure C.16 Occupation floors, Operation 7

Levels of 10 cm were dug to a depth of 1.20 m. Layer A is humic soil, and layer B is dark brown soil with small pebbles (Fig. C.17). In the stratum B was found the highest concentration of cultural remains, and it s considered a midden area. Stratum B1 is dark brown sandy soil where cultural deposits are lighter than in B. Stratum C is formed by a yellowish brown sandy soil and cultural remains reduced significantly. At the bottom of this last level, appears a layer of sterile gray sand which marks the end of the cultural strata in the site. The first 5 levels report the largest quantity of cultural remains. From 60 cm, the number of cultural material drastically reduces.

The remains obtained from the operation were used to define the artifactual complexes associated to the latter phases of occupation: Cocibolca (950-1150 A.D.) and Xalteva (1150-1524 A.D.). Two radiometric dates were obtained from samples of this operation.

Operation 9

This operation was located in an area which had been pot-hunted by villagers years before. They did inform us that they had discovered stone-cist tombs. We wanted to determine what period these tombs pertained to, and their structure.

The operation was a square of 1.5 x 1.5 m dug in levels of 10 cm to a depth of 2 m, where we found with the sterile, yellowish sand and close the operation. The material was

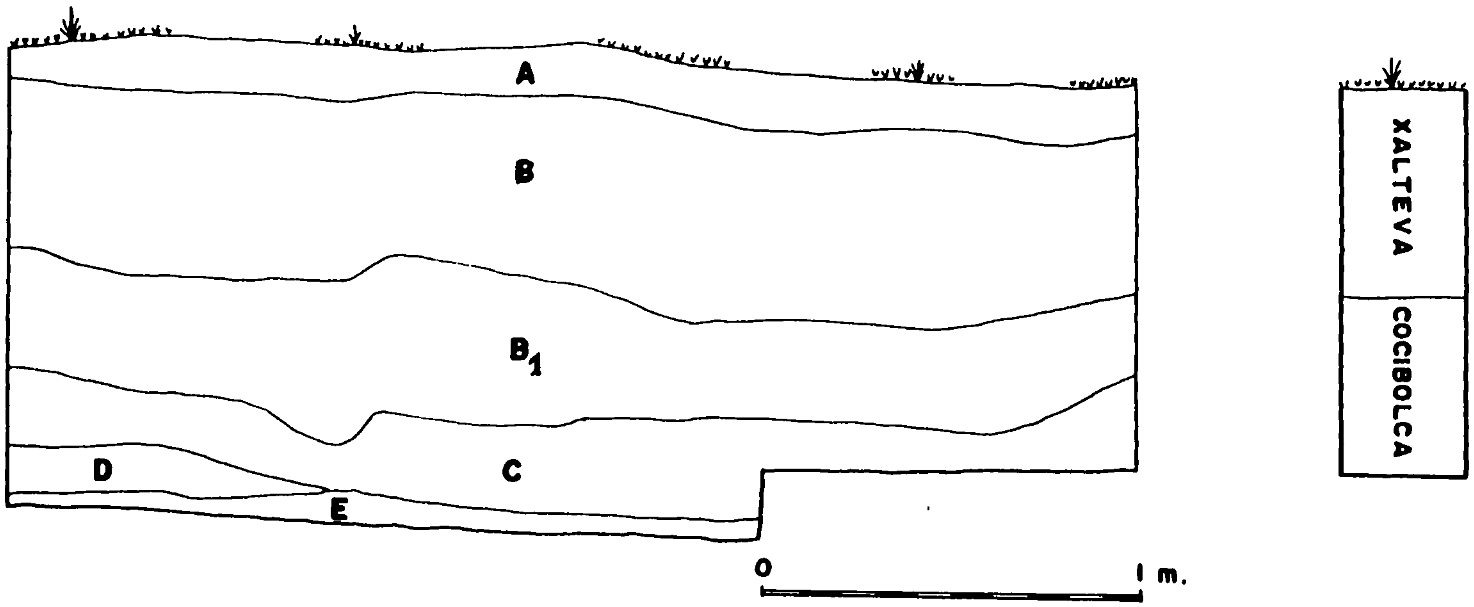


Figure C.17 Operation 8 profile, North wall sifted using a 1/4 inch screen. The material was abundant at the first m, below this the quantity lowered drastically.

A layer of loose, humic soil was found at 10 cm. Between 20 and 40 cm, the earth becomes clayish, although the color continues to be dark. Approximately around 40 cm, the earth begins to be softer.

At a depth of 50 cm, indications of stratum disturbance were clearly noticed. Fragments of very deteriorated human bones appear, as well as a fragment of an aluminum can, and a large quantity of large pieces of the Sacasa Striated type.

At a profundity of 53 cm, at the NE corner, appeared the mouth of a monochrome pot of an undetermined type. An extension of 40 cm was made at each of the walls to determine if there were associated artifacts, but no more were found. Indications of plundering were not noticed in the sector where the pot was found.

Between 60 and 90 cm, the remains of a tomb made of stone slabs are found (Fig. C.18). The tomb was too altered to determine the dimensions. These strata contained a large quantity of cultural materials, including fragments of osseous human remains (a molar and a canine tooth in level 9).

Although the levels above the tomb were very disturbed, we feel the tomb can be dated to the Ometepe period. The majority of the material found from the surface down to

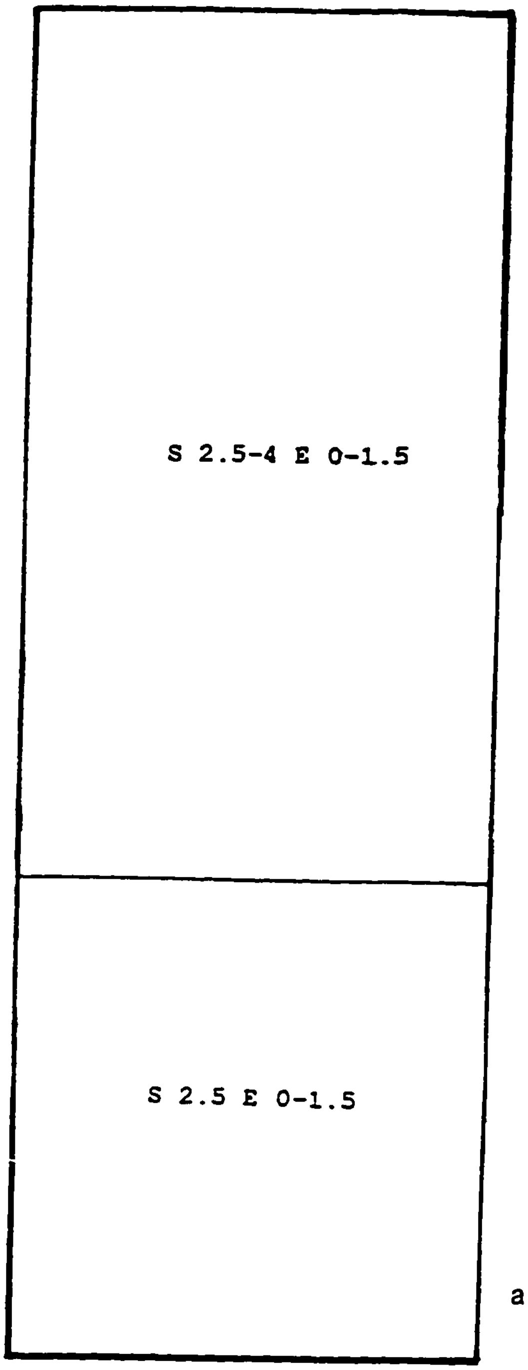
Figure C.18 Operation 9, Remains of looted tomb

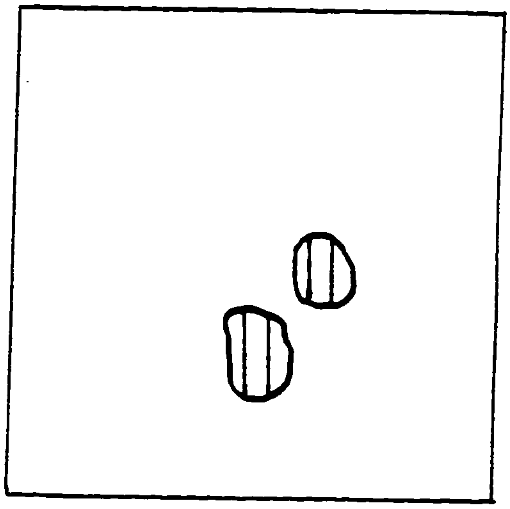
where the stone slabs appear pertains to the Ometepe period, abounding in materials from Sacasa, Vallejo and occasionally Luna and Castillo.

At 90 cm, the operation shows in the northeastern half, undisturbed soil which is yellow and clayish, and the other half demonstrates loose black earth, the result of plundering. Layers were excavated separately and the materials were kept en different bags. At the 13th level (120-130 cm), a black layer disappears. Nevertheless, at a depth of 150 cm, reappears a black spot in the center of the operation, possibly the result of an intrusion caused by an animal. At 1.5 m, the materials are basically from the Bagaces period, although there are very few. From 1.5 m to 2 m the cultural remains are very scarce and at 1.90 m soil is mix black and yellowish sand. The operation was close at this point with the emergence of the sterile layer identified in the site.

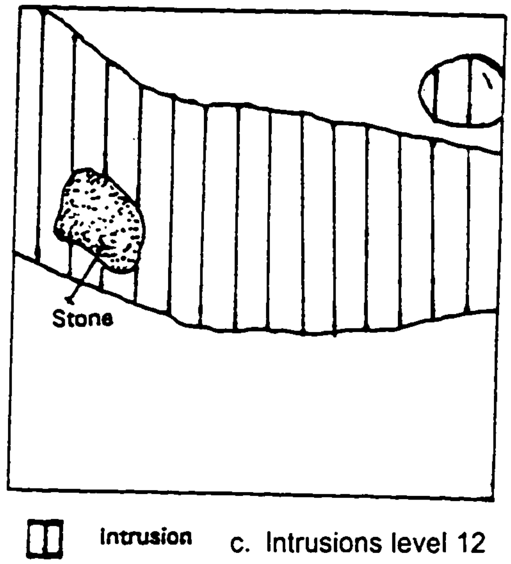
Operation 10

Located on the property of Ulises Ayala, 29.75 m east of the northeastern corner of operation 7. This was a 1.5 x 4 mtrench divided into two sub-operations (Fig. C.19). The first was a stratigraphic pit called S2.5-4 EO-1.5 excavated at 10 cm levels to a depth of 1.8 m, and the second a trench, SO-2.5 EO-1.5 also excavated at 10 cm but matrix was not screened.





b. Intrusions level 7



c. Intrusions level 12

a. Distribution of operations

Figure C.19 Operation 10

The trench was situated after a series of sondages were conducted to locate an area outside of the deposits which contained the midden of operation 7. The sondages were located every 5 m in a straight line towards the east of the NE corner of operation 7.

Unfortunately most field notes and the profile of the operation were lost. The information provided here is thus limited. Levels 1 to 3 (0-30 cm) can be dated to the Ometepe period, while 4 to 6 (30-60 cm) are transitional between Ometepe and Bagaces. The deeper levels are all Bagaces. At 1.20 m the sterile layer was reached and the operation was closed.

In S2.5-4 E0-1.5 two darker spots were noted against the light brown matrix of level 7 (Fig. C.19b). These were apparently caused by the intrusion of an animal. They were excavated apart from the rest of the level and the materials were labeled and put in different bags. At level 9 (80-90) a third intrusion was noted, an area of yellowish soil was clearly distinguishable. The intrusions continue until the last level excavated (Fig. 19c). Due to the disturbance observed the stratigraphic pit was discarded for analysis of artifacts sequence.

The density of materials in this operation was significantly lower than in operation 7. No cultural feature was detected this operation.

Operation 11

It was a 2 x 2 m sondage to locate stone slabs tombs. Villagers told us that in the area where they had looted this type of tomb. The operation is situated on the land of Delfina Flores, to the east of her house, in the corner NW of a fence.

The soil is brown and clayish, it was dug at levels of 20 cm without sifting until we reached a layer of yellow sand, at a depth of 1.2 m. This layer is found throughout the entire site, and as mentioned before, below this layer, only strata of sterile sand are found.

Indications of cultural remains were not found and few ceramic materials pertinent to the Sapoá and Ometepe periods were uncovered.

Operation 12

This operation was located to the south of Delfina Flores family's house, on the land of William Flores. Mr. Carlos González informed us that Norweb excavated on this land, and that don Carlos himself has found pots containing burned human bones in other occasion. Searching for some indication of this nature, we located a 4x2 m trench, of which only a square of 2x2 m was excavated.

Mr. Juan Reyes, who lives 50 m north of Mr. William Flores, showed us a pot of the Ayala Plain type which they found on his land while constructing the fence. Inside of the pot, they found burned human remains as well. Ricardo

Vázquez identified such bones are human, though he indicated that the heat had deformed them.

A 2x2 m square is therefore excavated, S2-4 EO-2, at levels of 10 cm. The soil in the first 9 levels is loose and dark brown, like humic earth. At a depth of 90 cm, the soil becomes harder and yellowish. Below 1.10 m, it turns yellow and sandy, and the quantity of materials found is minimal. Levels 13 and 14 are in the sterile and grayish sand that indicates the end of cultural strata. A drawing of the profile was not made.

From the first level, a disturbed area was noted at the SW corner, where the soil was looser. This intrusion extended down to the fifth level (40-50 cm). At 30 cm, another intrusion is noted at the NW corner. The intrusions were excavated apart from the rest of the level, and the materials recovered were separated and stored apart as well. At level 5 (40-50 cm), the operation is divided into two sectors. Sector E1-2 S2-4 is in the same location where the two intrusions were discovered. At level 7 (60-70 cm), the excavation were resume in the whole 2x2m since intrusions were not observed in the previous level.

At level 8, a miniature pot of the Ayala Plain type is found. And at level 11, a small pot with a long handle was located 65 cm north and 125 cm east of the SE corner. No features were associated to it.

This operation reported a large quantity of material from the Bagaces period, especially from the Ayala phase, and it is define as a refuse midden associated to the domestic structure found at operation 13. Despite the intrusions, it can be utilized in the analysis of the stratigraphic sequence which allows the comparison with the one in square S1-2.5 E2.5.4 in operation 7. This work should be done in the future.

Operation 13

This was initially a 4x2m trench, which was horizontally lengthened to an area of 77 sq m (Figs. C.20-21) when the foundations of a domestic structure were uncovered, in some cases, at only a depth of 15 cm (Fig C.21). Since the land is frequently plowed it is surprising, to a certain point, that the associated base and remains were not more disturbed.

The operation is discussed in detail in chapter 5, therefore it is unnecessary to repeat the facts already stated in that chapter. Once discovering part of the base of the domestic structure, the excavation was extended by units of a square meter. This was done not only to define the perimeter of the structure, but also probable areas of associated activity. I also looked for a strong control of the spacial distribution of artifacts. The entire structure and its environs were excavated with trowels and all materials were sifted.

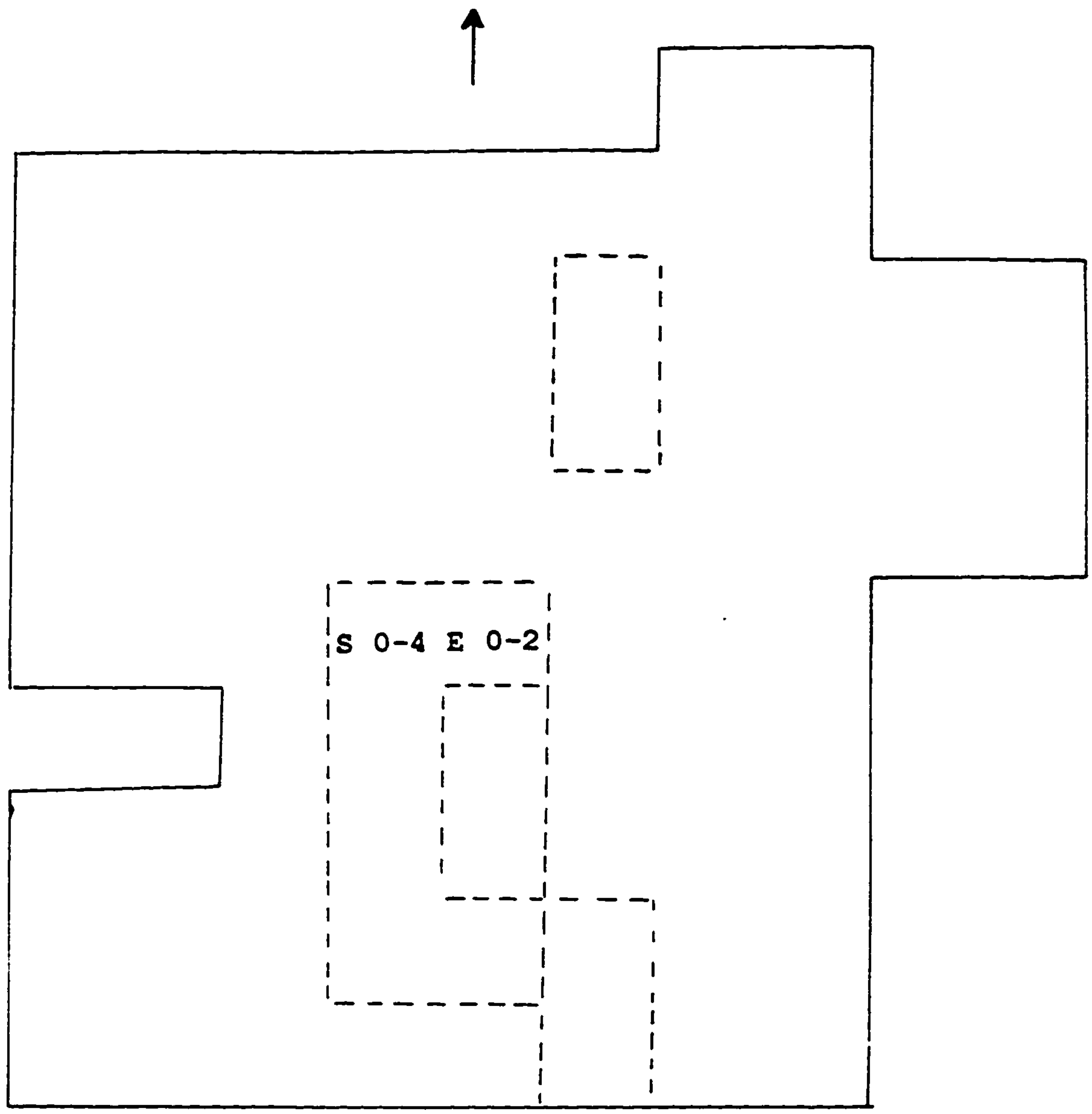
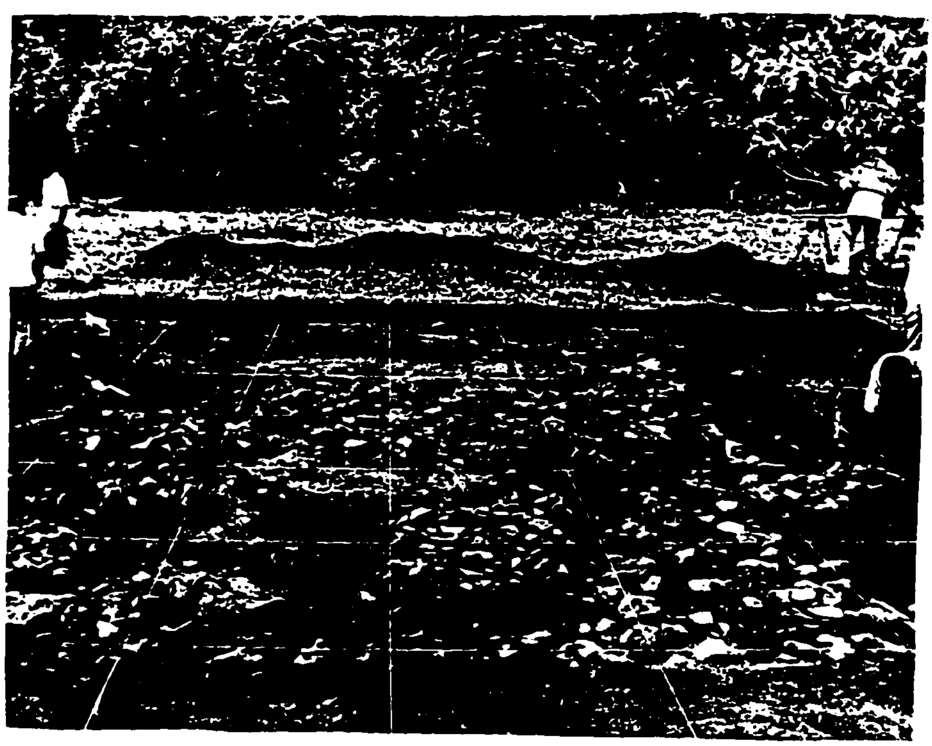


Figure C.20 Operation 13. Dashed lines indicate initial trench S 0-4 E 0-2, and the smaller trenches that were dug under the floor of the structure

a. Section of the foundation



b. Central section of domestic structure

Figure C.21 Operation 13, Domestic structure

Three small 1x2 m trenches were excavated to determine if there were other structures or other types of cultural remains beneath the structure (Fig. C.20). S3-5 E2-3 was excavated to a depth of 1.10 m when the sterile layer was reached. In N1-3 E2-3, bahareque fragments were still recovered down to .50 m; the sterile layer was reached at .80 meters under surface. S1-3 E1-2 was excavated to a depth of .90 meters. The trenches did not reveal any previous construction or other type of cultural feature.

This was the only clearly defined domestic structure found, and it is necessary to expand excavations in its surroundings to determine if there were other associated structures. We do not know if the household used more than one structure to fulfill different domestic activities.

In general, this sector of the site is very promising and research should be expanded. The El Socorro farm, situated to the south adjacent to the terrain where operation 13 was located, is an important location. Albert Norweb dug there, and the materials found were analyzed by the author of this dissertation (Salgado 1992). Until now, this is the zone of the site where the depth of the deposits seems to be greatest (3.20 m), and the density also high. We tried on several occasions to obtain permission to excavate in El Socorro, but failed to find the owner, Mr. Estrada, who lives in Ticuantepe, Managua.

<u>Operation 14</u>

While I was excavating operation 13 looting started near the house of Ulises Ayala (Fig. 22a). We convinced the looter to stop and to let us conduct a salvage operation to rescue some information on that area. It was the end of the field season, and there were no resources to extend our research.

From its NE corner the operation was located 16.55 m and 35° east of the southwestern corner of the house of Ulises Ayala. The unit was a 3x3 m dug in arbitrary levels of 20 cm without sieving.

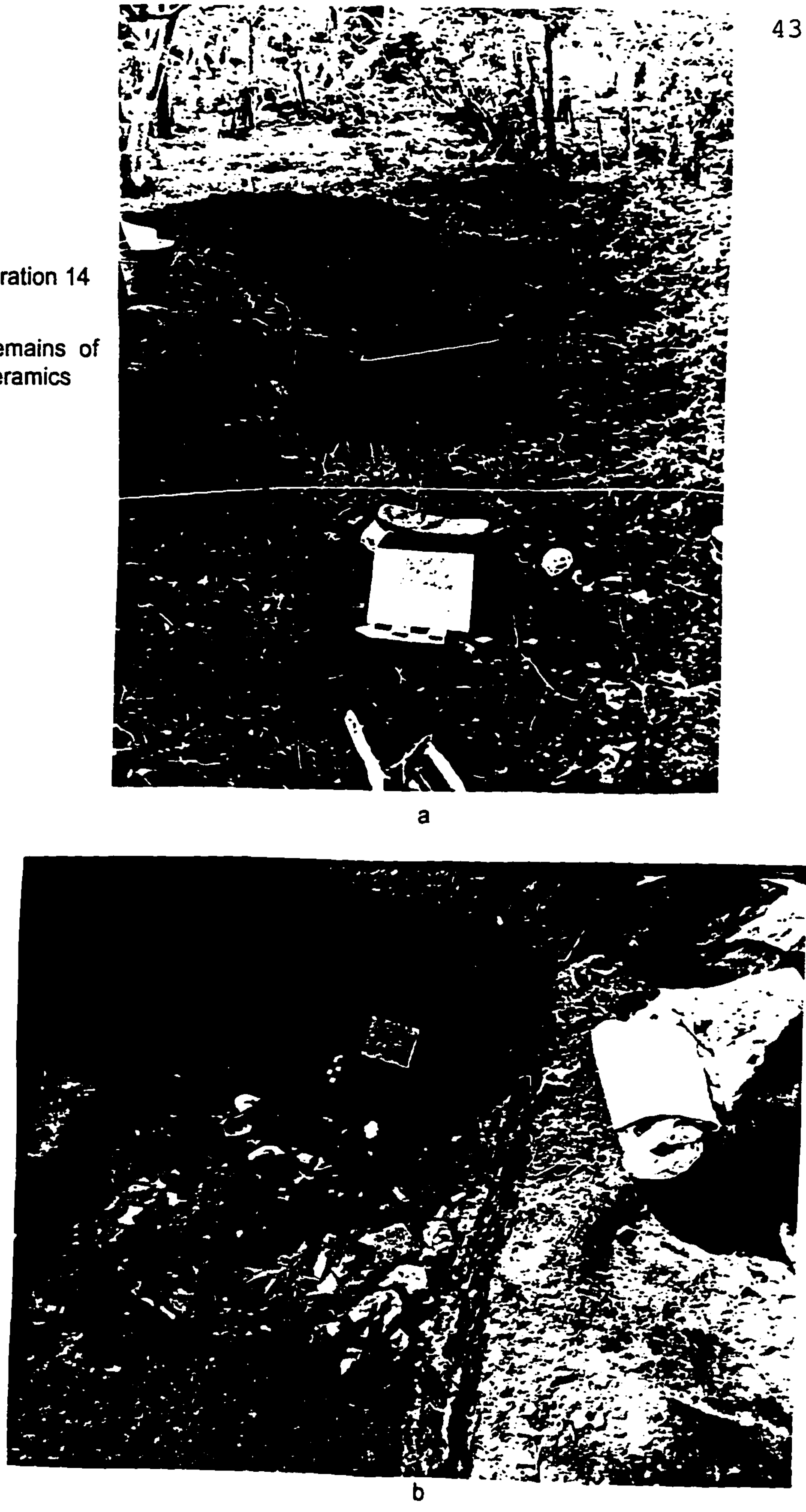
There was one deep stratum of humic soil were numerous cultural features were observed. These basically consist of groups of fragmented vessels associated with lots of deer bones (Figs. C.22b-23), though turtle and human remains were also recovered. Some evidence of open fires was left by the presence of ashes in different spots (Fig. C.24).

The operation was excavated to an approximate depth of 1.50 m. In the northeast corner a 1x1 m continued to be excavated to a depth of 1.90 m when we reached the layer indicating the end of the cultural occupation in the site.

The details of what was found are discussed in chapter 5. The operation yielded interesting results, and if the area has not been totally destroyed by looting, it will be important to better define the nature and extension of the area.

Figure C.22 Operation 14

a. Looted area
b. Floor with remains of bones and ceramics



a

b

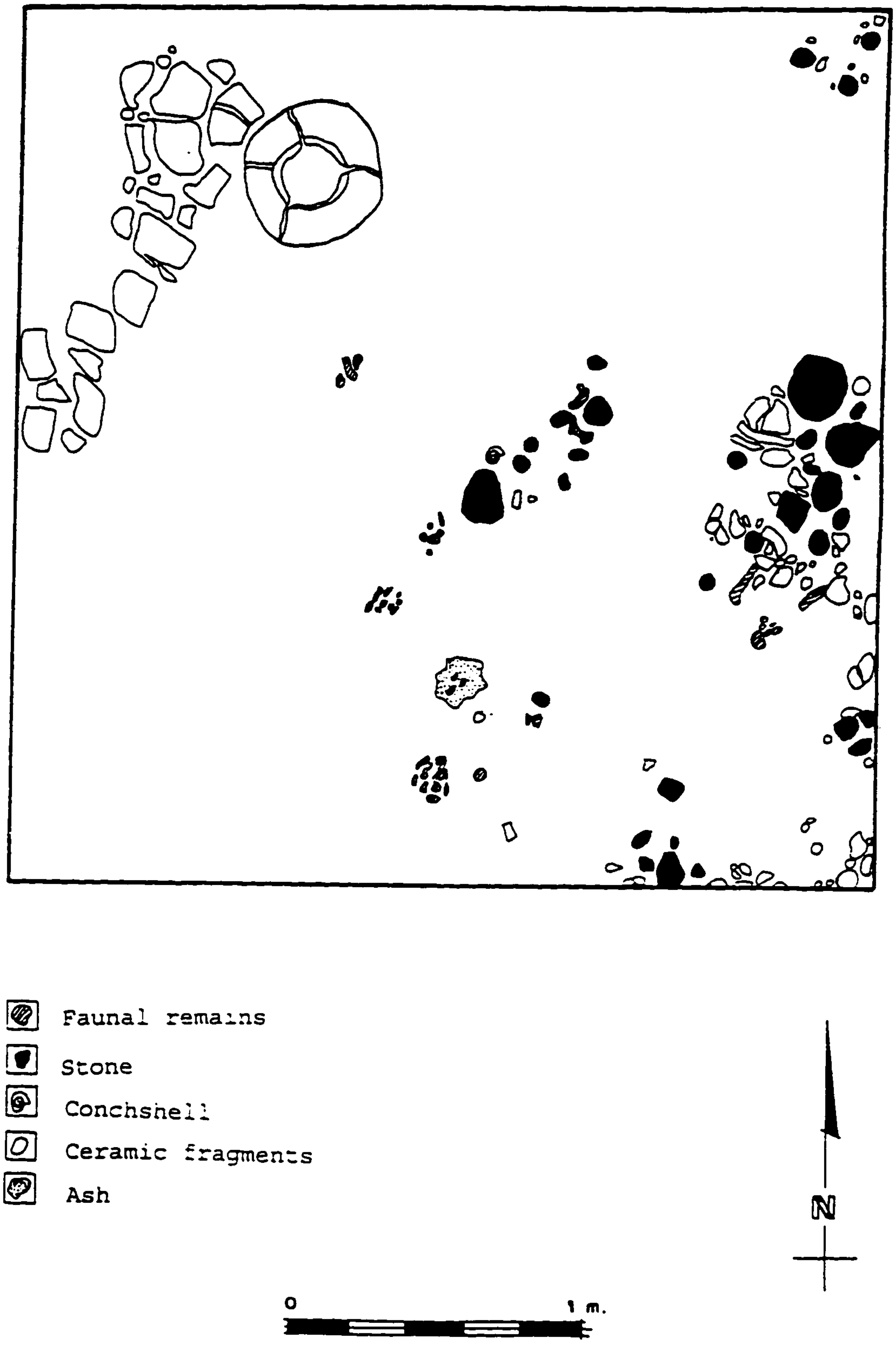


Figure C.23 Occupation floor, Operation 14

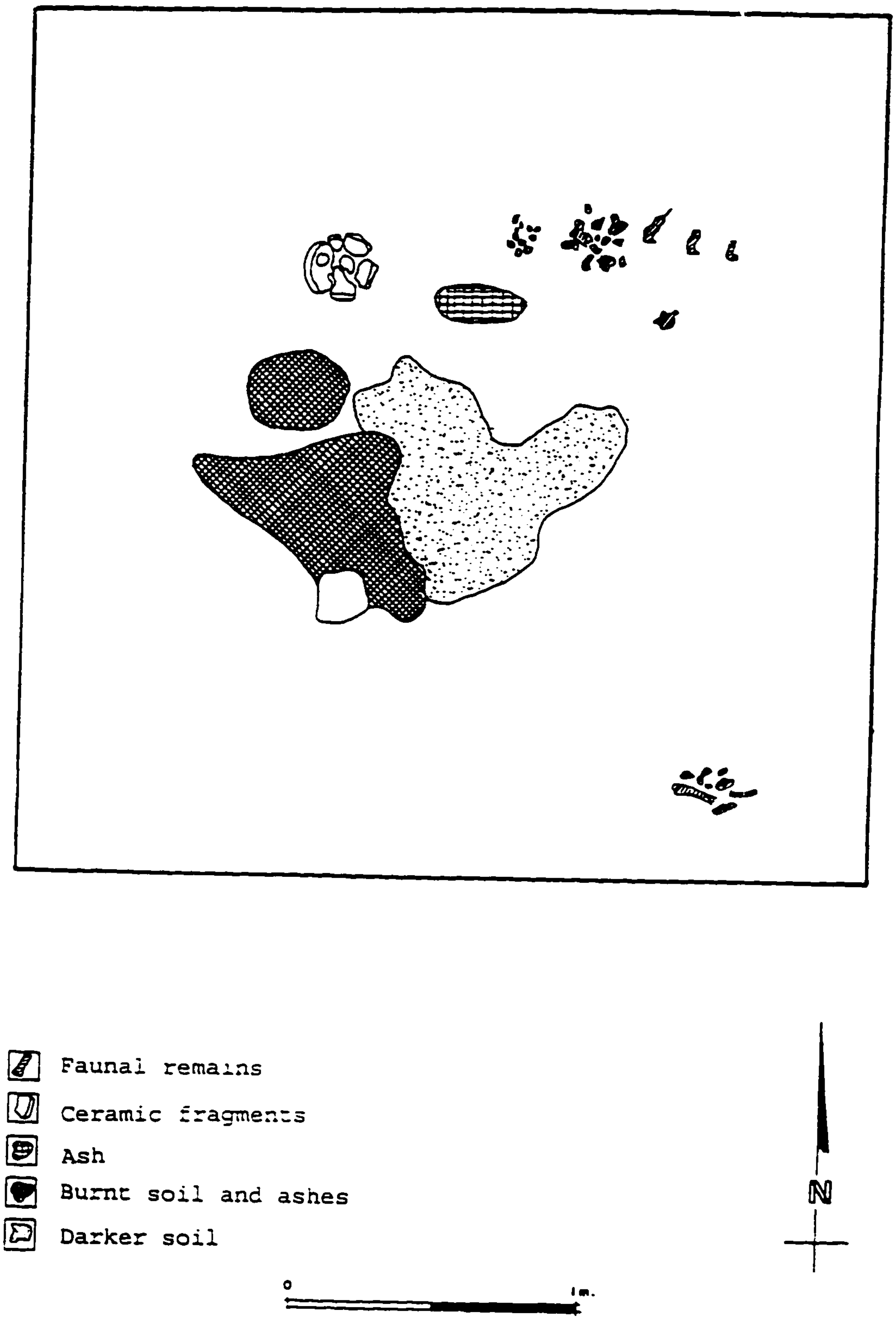


Figure C.24 Occupation floor, Operation 14

Appendix D

POTTERY DATA

Table D.1. Distribution of ceramic types per level, Operation 7 (S0-1.25 E2.5-4)

Types	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9	%	10	%	11	%	12	%	Totals
VALLEJO	1	0.13																							1
SACASA					2	0.29																			2
NICARAGUA ORANGE													1	0.14											1
PAPAGAYO	8	1.06									5	0.30													13
MOMTA			4	0.25	19	2.79			3	0.20	32	2.20													58
AGURCIA	1	0.13	2	0.13	1	0.15	1	0.05																	5
BORGOÑA STRIATED			3	0.19			2	0.10					1	0.14											6
GALO POLYCHROME			1	0.06	1	0.15	1	0.05	19	1.20	3	0.21	4	0.57	5	0.87	5	0.95	3	0.53	3	1.02			45
ROSALITA							2	0.10																	2
CHÁVEZ	3	0.40	9	0.57	1	0.15	60	3.12	46	3.05			39	5.55	26	4.51	27	5.13	24	4.24	8	3.73	17	7.17	260
TOLA TRICHROME	5	0.70	13	0.82	1	0.15	35	1.82	42	2.78	33	2.27	28	3.98	14	2.43	27	5.13	18	3.18	5	1.71	5	2.11	226
POTOSÍ APPLIQUÉ					3	0.44																			3
AYALA PLAIN	572	76.06	1410	89.18	409	60.15	1473	76.56	1190	78.91	1148	78.90	467	66.43	358	62.04	376	71.48	369	65.19	210	71.67	162	68.35	8144
RIVAS RED	127	16.89	121	7.65	232	34.12	319	16.58	170	11.27	160	11.00	144	20.48	159	27.56	91	17.30	150	26.50	57	19.45	48	20.25	1778
USULUTAN-RELATED			1	0.06			1	0.05							1	0.17					1	0.34			4
ESPINOZA RED B.							3	0.15															2	0.84	5
ULUA POLYCHROME	1	0.13																							1
ULUA: TENAMPUA									1	0.07	2	0.14													3
DELIRIO											6	0.41													6
REWORKED SHERDS			4	0.25	10	1.47	27	1.40	37	2.45	15	1.03	19	2.70	5	0.87					8	2.73	3	1.26	128
UNDET.	34	4.50	13	0.82	1	0.15					51	3.50			9	1.56			2	0.35	1	0.34			111
TOTAL[1]	751	99.98	1581	99.97	680	100.01	1924	99.98	1508	99.99	1455	100.00	703	99.99	577	100.01	526	99.99	566	99.99	293	99.99	237	99.98	10,802
Decorated		2.51		2.06		4.12		5.44		7.36		5.57		10.38		7.98		11.21		7.95		5.80		10.12	
Non decorated		92.95		96.83		94.27		93.14		90.18		89.90		86.91		89.60		88.73		91.69		91.12		88.60	
Others		4.52		1.07		1.62		1.40		2.45		4.53		2.70		2.43				0.35		3.07		1.26	

[1] Differences in the sum of percentages are due to rounding.

Table D.2 Distribution of ceramic types per level, Operation 8

Types	2	%	3	%	4	%	5	%	6	%	7	%	8	%	9	%	10	%	11	%	Totals
LUNA POLYCHROME	1	0.07			1	0.08															2
BRAMADERO POL			1	0.04	1	0.08															2
CASTILLO ENGRAVED	5	0.33					3	0.25													8
LAGO NEGRO	2	0.13	3	0.13	10	0.77															15
MURILLO MODELED					1	0.08															1
MADEIRA POL.	24	1.57	6	0.27	7	0.54	2	0.16									2	1.45			41
VALLEJO POL.	40	2.61	78	3.45	28	2.14	40	3.28	11	1.34	6	0.69	1	0.21	1	0.15					205
COMBO COLANDER	1	0.07	8	0.35			3	0.25	1	0.12	2	0.25									15
OMETEPE RED INC.			1	0.04	1	0.08															2
GRANADA POL.					1	0.08															1
PATAKY POLYCHROME	2	0.13	5	0.22	5	0.38	3	0.25	1	0.12	1	0.11			3	0.45	3	2.17			23
PAPAGAYO POL.	285	18.63	496	21.95	218	16.68	284	23.30	159	19.39	171	19.34	56	11.84	4	0.59	20	14.49			1693
SACASA STRIATED	421	27.52	442	19.56	337	25.78	293	24.03	187	22.80	128	14.48	161	34.04	15	2.23	2	1.45			1986
MOMTA POLYCHROME	1	0.07					1	0.08	3	0.37	1	0.11	1	0.21	10	1.49					17
AGURCIA POL.			1	0.04					1	0.12			1	0.21			2	1.45			5
BORGOÑA STRIATED											1	0.11					1	0.72			2
DELIRIO									2	0.24											2
ULUA: TENAMPUA	1	0.07							1	0.12											2
NICARAGUA ORANGE									1	0.12											1
GALO POLYCHROME													1	0.21							1
CHÁVEZ W.-ON-RED	2	0.13	2	0.09					3	0.37					2	0.30					9
TOLA TRICHROME			2	0.09					1	0.12	1	0.11			10	1.50	5	3.62			19
RIVAS RED	221	14.44	248	10.99	150	11.48	122	10.01	78	9.51	202	22.85	74	15.64	179	26.60	19	13.77	4	0.50	1297
ESPINOZA									1	0.12							4	2.90			5
USULUTAN-RELATED							1	0.08													1
BOCANA INCISED															2	0.30					2
VELAZCO																	3	2.17			3
AYALA PLAIN	449	29.35	430	19.06	266	20.35	391	32.08	250	30.49	288	32.58	138	29.18	366	54.38	58	42.02	1	12.50	2637
REWORKED SHERDS	33	2.16	10	0.44	5	0.38	7	0.57	5	0.61	1	0.11	2	0.42	9	1.34	4	2.90			76
NET-SINKERS	1	0.07	1	0.04			1	0.08	3	0.37											6
EAR PLUGS			2	0.09																	2
UNDETERMINED	41	2.68	524	23.23	276	21.12	68	5.58	112	13.66	82	9.28	38	8.03	72	10.70	15	10.87	3	37.50	1231
TOTAL	1530	100.03	2260	99.98	1307	100.02	1219	100.01	820	99.99	884	100.00	473	99.99	673	100.03	138	99.98	8	100.00	8015
Decorated		23.74		26.22		20.91		73.40		26.43		20.45		12.68		4.78		28.97			
Monochrome		74.06		73.19		78.73		71.96		76.58		79.44		86.89		93.91		68.11		100.00	
Others		2.23		0.57		0.38		0.65		0.98		0.11		0.42		1.34		2.90			

Table D.3 Radiometric dates

Lab Sample #	Project Cat #	Conventional Radiocarbon Age (BP)	Intercepts (BC, AD)	1 Sigma Range	Text Format	Archaeological Context
Beta 66956	N-Gr-2-5	840 +/- 60	cal AD 1220	AD 170-1260	AD 1040-1290	Op. 8, level 3. Ometepe period midden
Beta 66957	N-Gr-2-6	810+/- 60	cal AD 1245	AD 1275	AD 1055-1090 AD 1150-1275	Op. 8, Level 4, Ometepe period midden
Beta 66952	N-Gr-2-1	1210+/- 80	cal AD 820 cal AD 830 cal AD 860	AD 710-910 AD 920-950	AD 660-1000	Op. 7, Level 6. Bagaces
Beta 669553	N-Gr-2-2	1270 +/- 80	ca AD 770	AD 670-870	AD 640-970	Op. 7, level 7. Bagaces period midden
Beta 66954	N-Gr-2-3	1190 +/- 60	cal AD 870	AD 780-910 AD 920-950	AD 690-990	Op. 7, level 8. Bagaces period midden
Beta-73221	N-Gr-2-7	1270 +/-60	cal AD 770	AD 680-820 AD 830-860	AD 660-890	Op. 13. Level 3, Bagaces period domestic structure
Beta-73222	N-Gr-2-8	1300 +/-50	cal AD 700	AD 670-780	AD 650-780	OP. 13. Level 5, Bagaces period domestic structure
Beta-73223*	N-Gr-2-9	1000 +/-80	cal AD 1020	AD 990-1060 AD 1070-1160	AD 890-1220	OP. 13. Level 4, Bagaces period. Domestic structure
Beta 66955*	N-Gr-2-4	1160 +/-120	cal AD 890	AD 720-740 AD 760-1010	AD 890	Op. 7, level 10. Bagaces period midden

* Date discarded. Possible contamination of sample or/and stratigraphic contamination

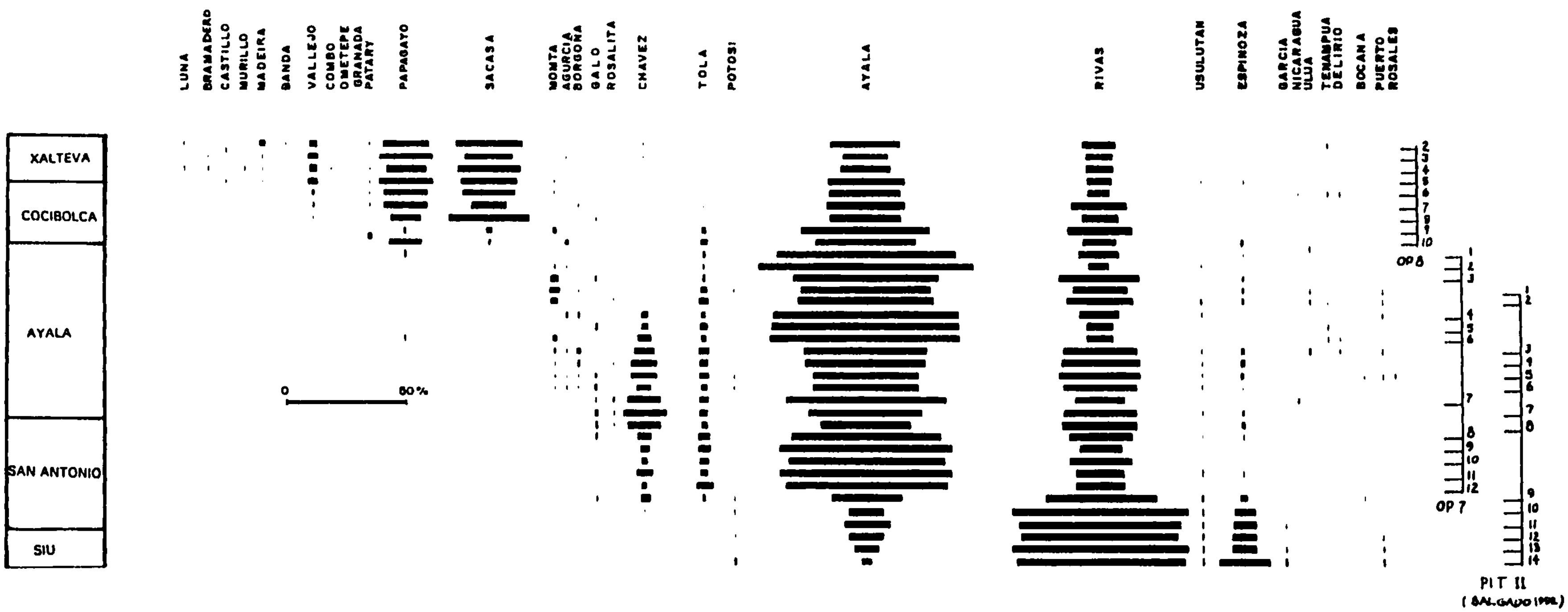


Figure D.1 Seriation graphic

Appendix E

OBSIDIAN COMPOSITIONAL DATA

Table E.1 Element concentrations in parts per million for artifacts from the Ayala site

anid	Ba(ppm)	La(ppm)	Lu(ppm)	Nd(ppm)	Sm(ppm)	U(ppm)	Yb(ppm)	Ce(ppm)	Co(ppm)
GEB037	963	27.2	0.268	17.1	3.13	5.07	1.61	48.2	0.465
GEB038	965	26.9	0.266	18.1	3.14	4.33	1.41	47.9	0.476
GEB039	999	27.6	0.269	16.5	3.16	4.56	1.60	48.0	0.508
GEB040	986	27.5	0.261	15.6	3.19	4.49	1.59	48.6	0.433
GEB041	955	27.6	0.271	18.0	3.18	4.34	1.57	48.8	0.445
GEB042	994	22.7	0.281	14.4	2.69	2.24	1.87	41.0	0.921
GEB043	979	27.0	0.268	16.0	3.17	4.27	1.55	48.3	0.431
GEB044	1006	22.8	0.285	15.7	2.78	2.20	1.95	41.5	1.010
GEB045	969	27.1	0.259	16.8	3.14	4.08	1.62	48.4	0.452
GEB046	984	27.8	0.279	17.3	3.17	4.19	1.50	48.0	0.438
GEB047	974	27.9	0.283	16.0	3.23	4.65	1.57	49.5	0.457
GEB048	988	24.3	0.281	16.0	2.83	2.61	1.90	43.9	0.936
GEB049	958	26.8	0.258	16.9	3.13	4.39	1.48	47.4	0.431
GEB050	970	27.7	0.277	12.4	3.19	4.30	1.58	48.6	0.450
GEB051	981	27.7	0.272	20.0	3.21	4.36	1.55	49.0	0.471
GEB052	966	27.0	0.261	19.6	3.09	4.17	1.49	47.2	0.432
GEB053	975	27.6	0.292	16.3	3.17	4.65	1.56	48.1	0.442
GEB054	957	27.2	0.261	15.5	3.14	4.04	1.55	47.0	0.449
GEB055	983	28.1	0.289	17.2	3.24	4.18	1.58	49.8	0.450
GEB056	952	26.8	0.289	16.5	3.13	4.09	1.53	47.6	0.431
GEB057	965	27.1	0.264	19.6	3.15	4.41	1.54	47.2	0.439
GEB058	975	27.4	0.279	16.1	3.15	4.49	1.53	47.3	0.439
GEB059	949	27.0	0.289	16.8	3.16	4.26	1.51	47.0	0.440
GEB060	1005	22.6	0.276	15.6	2.72	2.22	1.94	42.1	1.038
GEB061	992	27.8	0.282	18.2	3.23	4.62	1.48	49.9	0.454
GEB062	979	27.4	0.284	17.9	3.20	4.61	1.49	47.7	0.616
GEB063	974	26.7	0.265	18.4	3.14	3.98	1.55	47.9	0.471
GEB064	979	28.3	0.274	17.8	3.28	4.43	1.57	48.8	0.445
GEB065	986	27.6	0.281	15.6	3.22	4.64	1.59	48.9	0.444
GEB066	985	27.7	0.282	15.5	3.22	3.95	1.55	48.1	0.480
GEB067	974	27.4	0.266	17.3	3.20	3.96	1.55	49.1	0.516

anid	Ba(ppm)	La(ppm)	Lu(ppm)	Nd(ppm)	Sm(ppm)	U(ppm)	Yb(ppm)	Ce(ppm)	Co(ppm)
GEB068	1002	23.2	0.288	13.8	2.73	2.34	1.88	41.6	0.898
GEB069	948	27.2	0.295	10.4	3.21	3.31	1.56	48.0	0.452
GEB070	942	27.2	0.286	22.7	3.21	4.40	1.70	47.2	0.446
GEB071	950	27.3	0.289	23.0	3.19	7.02	1.63	48.1	0.458
GEB072	947	26.8	0.287	22.1	3.14	5.87	1.78	47.3	0.450
GEB073	971	27.3	0.294	19.3	3.31	5.58	1.63	47.9	0.458
GEB074	931	26.5	0.284	10.6	3.16	3.37	1.62	49.5	0.502
GEB075	958	26.9	0.289	26.8	3.20	4.32	1.75	47.2	0.521
GEB076	331	52.7	0.735	39.4	8.03	11.95	4.74	108.6	1.183
GEB077	958	27.0	0.290	23.1	3.26	4.35	1.68	47.8	0.461
GEB078	969	23.0	0.292	15.7	2.87	2.06	2.02	42.0	0.978
GEB079	950	27.1	0.273	20.9	3.25	5.20	1.62	47.8	0.438
GEB080	943	27.2	0.289	29.2	3.21	4.51	1.79	46.7	0.435
GEB081	904	26.2	0.267	16.7	3.17	5.16	1.60	46.3	0.467
GEB082	942	27.0	0.285	23.9	3.25	4.44	1.58	47.5	0.465
GEB083	961	27.2	0.288	15.2	3.26	5.72	1.75	48.5	0.459
GEB084	948	26.7	0.281	24.8	3.28	6.78	1.68	49.3	0.475
GEB085	954	26.9	0.294	18.4	3.27	4.99	1.55	48.0	0.457
GEB086	939	26.6	0.271	27.1	3.19	5.06	1.62	46.9	0.458

anid	Cs (ppm)	Eu (ppm)	Fe (%)	Hf (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Sr (ppm)	Ta (ppm)
GEB037	7.64	0.503	0.862	3.14	153	0.402	1.95	271	0.903
GEB038	7.58	0.493	0.854	3.07	151	0.390	2.09	244	0.903
GEB039	7.52	0.497	0.855	3.10	151	0.365	1.97	256	0.885
GEB040	7.62	0.503	0.850	3.15	154	0.394	1.92	255	0.903
GEB041	7.60	0.501	0.847	3.13	154	0.382	1.93	292	0.883
GEB042	2.57	0.522	0.874	4.33	93	0.221	1.88	202	0.753
GEB043	7.51	0.494	0.840	3.09	151	0.392	1.91	259	0.908
GEB044	2.53	0.546	0.896	4.42	95	0.200	2.02	232	0.775
GEB045	7.50	0.489	0.843	3.11	153	0.369	1.94	230	0.893
GEB046	7.56	0.492	0.842	3.11	152	0.409	1.92	268	0.896
GEB047	7.69	0.494	0.860	3.17	154	0.381	1.95	267	0.900
GEB048	2.52	0.537	0.882	4.38	94	0.194	1.89	242	0.759
GEB049	7.43	0.494	0.830	3.11	150	0.379	1.89	259	0.878
GEB050	7.60	0.496	0.847	3.20	155	0.374	1.92	263	0.887
GEB051	7.65	0.502	0.853	3.13	155	0.381	2.08	257	0.904
GEB052	7.39	0.483	0.820	3.08	148	0.366	1.86	251	0.862
GEB053	7.51	0.498	0.838	3.08	151	0.378	1.92	265	0.896
GEB054	7.42	0.492	0.832	3.04	149	0.390	1.90	229	0.865
GEB055	7.77	0.510	0.868	3.25	153	0.398	1.99	274	0.905
GEB056	7.47	0.488	0.829	3.13	150	0.383	1.89	224	0.894
GEB057	7.45	0.479	0.834	3.04	151	0.377	1.90	275	0.873
GEB058	7.50	0.497	0.841	3.11	152	0.378	1.92	288	0.887
GEB059	7.39	0.486	0.828	3.02	149	0.381	1.89	259	0.883
GEB060	2.57	0.541	0.915	4.46	96	0.198	1.97	229	0.764
GEB061	7.67	0.494	0.856	3.12	154	0.400	1.93	276	0.896
GEB062	7.48	0.492	0.873	3.10	151	0.386	2.07	283	0.883
GEB063	7.49	0.497	0.847	3.08	150	0.382	1.97	255	0.886
GEB064	7.62	0.499	0.850	3.17	156	0.390	1.94	253	0.891
GEB065	7.59	0.496	0.844	3.11	154	0.385	1.93	278	0.895
GEB066	7.58	0.498	0.854	3.22	155	0.396	1.97	243	0.894
GEB067	7.65	0.500	0.873	3.16	154	0.414	2.00	269	0.898
GEB068	2.58	0.539	0.884	4.43	97	0.193	1.86	199	0.789

anid	Cs (ppm)	Eu (ppm)	Fe (%)	Hf (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Sr (ppm)	Ta (ppm)
GEB069	7.64	0.502	0.847	3.15	154	0.451	1.94	198	0.897
GEB070	7.51	0.488	0.831	3.12	151	0.436	1.92	197	0.876
GEB071	7.58	0.491	0.844	3.13	153	0.426	1.93	189	0.894
GEB072	7.51	0.486	0.832	3.11	151	0.414	1.89	160	0.877
GEB073	7.55	0.493	0.848	3.12	153	0.427	1.94	173	0.880
GEB074	7.80	0.514	0.877	3.23	159	0.431	2.00	161	0.916
GEB075	7.51	0.493	0.843	3.11	152	0.415	1.98	179	0.877
GEB076	15.46	0.472	1.068	7.10	281	1.045	3.03	0	1.935
GEB077	7.55	0.500	0.839	3.21	153	0.444	1.90	177	0.881
GEB078	2.59	0.547	0.913	4.47	96	0.221	1.93	155	0.774
GEB079	7.51	0.490	0.836	3.12	153	0.418	1.89	183	0.890
GEB080	7.39	0.482	0.821	3.15	150	0.428	1.87	149	0.873
GEB081	7.31	0.484	0.822	3.08	148	0.424	1.88	155	0.873
GEB082	7.50	0.495	0.838	3.16	153	0.419	1.92	182	0.876
GEB083	7.58	0.498	0.843	3.16	153	0.432	1.92	183	0.894
GEB084	7.78	0.511	0.859	3.20	158	0.432	2.06	203	0.917
GEB085	7.61	0.503	0.842	3.14	155	0.432	1.91	178	0.905
GEB086	7.44	0.488	0.819	3.06	151	0.410	1.87	188	0.877

anid	Tb(ppm)	Th(ppm)	Zn(ppm)	Zr(ppm)	Cl(ppm)	Dy(ppm)	K(%)	Mn(ppm)	Na(%)
GEB037	0.338	11.1	54.3	128	780	2.63	3.91	551	2.78
GEB038	0.390	11.1	54.4	125	719	2.41	3.60	515	2.57
GEB039	0.330	11.0	67.1	116	638	2.34	3.70	523	2.59
GEB040	0.316	11.1	68.5	120	633	2.56	3.41	522	2.61
GEB041	0.323	11.2	55.3	111	616	2.63	3.64	514	2.57
GEB042	0.311	6.4	54.7	164	648	2.28	3.34	463	2.96
GEB043	0.369	11.1	54.5	112	747	2.49	3.99	522	2.43
GEB044	0.316	6.6	44.8	154	680	2.34	3.87	474	2.99
GEB045	0.362	11.1	54.9	116	639	2.08	3.83	533	2.67
GEB046	0.386	11.1	56.5	120	543	2.64	3.45	517	2.60
GEB047	0.329	11.3	68.7	128	667	2.37	3.84	527	2.65
GEB048	0.374	6.9	47.3	152	534	1.86	3.45	460	2.95
GEB049	0.339	11.0	63.4	120	667	2.38	3.66	532	2.67
GEB050	0.333	11.2	68.0	125	691	2.66	3.50	528	2.65
GEB051	0.458	11.2	59.5	120	705	2.55	3.97	551	2.77
GEB052	0.340	10.8	53.9	114	723	2.38	3.78	524	2.61
GEB053	0.383	11.0	61.7	112	615	2.61	3.72	526	2.61
GEB054	0.326	10.9	52.9	116	627	2.27	3.63	521	2.60
GEB055	0.412	11.5	55.7	128	582	2.48	3.88	532	2.67
GEB056	0.418	11.0	63.2	123	663	2.35	3.62	527	2.65
GEB057	0.376	11.0	53.3	123	647	2.54	3.75	517	2.59
GEB058	0.422	11.0	55.2	122	630	2.30	4.19	531	2.61
GEB059	0.388	10.9	63.1	122	590	2.13	3.65	521	2.60
GEB060	0.394	6.6	45.3	168	595	2.73	3.59	459	2.93
GEB061	0.358	11.4	54.8	126	617	2.70	3.78	507	2.54
GEB062	0.339	11.0	59.0	114	624	2.43	3.65	518	2.58
GEB063	0.384	11.0	64.6	126	621	2.21	3.80	510	2.54
GEB064	0.338	11.2	54.3	123	585	2.64	3.58	513	2.54
GEB065	0.345	11.2	54.1	121	680	2.30	3.64	537	2.69
GEB066	0.376	11.2	66.2	121	668	2.44	3.31	513	2.59
GEB067	0.330	11.3	55.8	118	730	2.66	3.59	513	2.57
GEB068	0.308	6.6	29.7	156	739	2.44	3.52	459	2.96

anid	Tb(ppm)	Th(ppm)	Zn(ppm)	Zr(ppm)	Cl(ppm)	Dy(ppm)	K(%)	Mn(ppm)	Na(%)
GEB069	0.352	11.1	31.4	121	626	2.36	3.40	505	2.53
GEB070	0.352	11.0	31.4	118	603	2.36	3.64	525	2.63
GEB071	0.347	11.1	31.3	119	699	2.73	3.84	548	2.77
GEB072	0.362	11.0	20.3	127	679	2.42	4.02	539	2.69
GEB073	0.328	11.0	32.3	117	626	2.30	3.75	522	2.62
GEB074	0.437	11.5	34.0	119	904	2.49	3.76	529	2.66
GEB075	0.410	10.9	31.9	125	663	3.01	3.55	521	2.61
GEB076	0.902	36.3	35.4	254	577	7.49	4.36	173	2.52
GEB077	0.294	11.0	31.9	123	699	2.22	3.48	535	2.69
GEB078	0.269	6.6	28.9	164	849	2.26	3.44	458	2.96
GEB079	0.347	11.1	32.6	131	743	2.33	4.00	552	2.75
GEB080	0.292	10.9	30.8	113	681	1.92	3.72	512	2.56
GEB081	0.287	10.7	30.8	115	702	2.70	3.85	530	2.67
GEB082	0.298	11.1	32.2	115	798	2.37	3.42	525	2.64
GEB083	0.350	11.1	32.4	119	766	2.88	3.44	539	2.70
GEB084	0.355	11.4	32.9	119	703	2.35	3.60	533	2.70
GEB085	0.304	11.1	24.1	128	624	2.11	3.56	523	2.61
GEB086	0.289	10.9	30.9	122	633	2.49	3.71	528	2.62

Table E.2 Source assignments for artifacts from the Ayala site

Record#	ANID	FIELD ID	SOURCE NAME
161	GEB037	2	Guinope
162	GEB038	17	Guinope
163	GEB039	34	Guinope
164	GEB040	57	Guinope
165	GEB041	60	Guinope
166	GEB042	68	Ixtepeque
167	GEB043	77	Guinope
168	GEB044	114	Ixtepeque
169	GEB045	124	Guinope
170	GEB046	129	Guinope
171	GEB047	133	Guinope
172	GEB048	142	Ixtepeque
173	GEB049	143	Guinope
174	GEB050	148	Guinope
175	GEB051	152	Guinope
176	GEB052	163	Guinope
177	GEB053	171	Guinope
178	GEB054	175	Guinope
179	GEB055	186	Guinope
180	GEB056	192	Guinope
181	GEB057	200	Guinope
182	GEB058	203	Guinope
183	GEB059	206	Guinope
184	GEB060	213	Ixtepeque
185	GEB061	228	Guinope
186	GEB062	236	Guinope
187	GEB063	247	Guinope
188	GEB064	253	Guinope
189	GEB065	254	Guinope
190	GEB066	261	Guinope
191	GEB067	269	Guinope
192	GEB068	275	Ixtepeque
193	GEB069	283	Guinope
194	GEB070	289	Guinope
195	GEB071	300	Guinope
196	GEB072	313	Guinope
197	GEB073	329	Guinope
198	GEB074	338	Guinope
199	GEB075	351	Guinope
200	GEB076	352	Zacualtipan, Hidalgo
201	GEB077	358	Guinope
202	GEB078	376	Ixtepeque
203	GEB079	391	Guinope
204	GEB080	404	Guinope
205	GEB081	428	Guinope
206	GEB082	431	Guinope
207	GEB083	444	Guinope
208	GEB084	475	Guinope
209	GEB085	483	Guinope
210	GEB086	487	Guinope

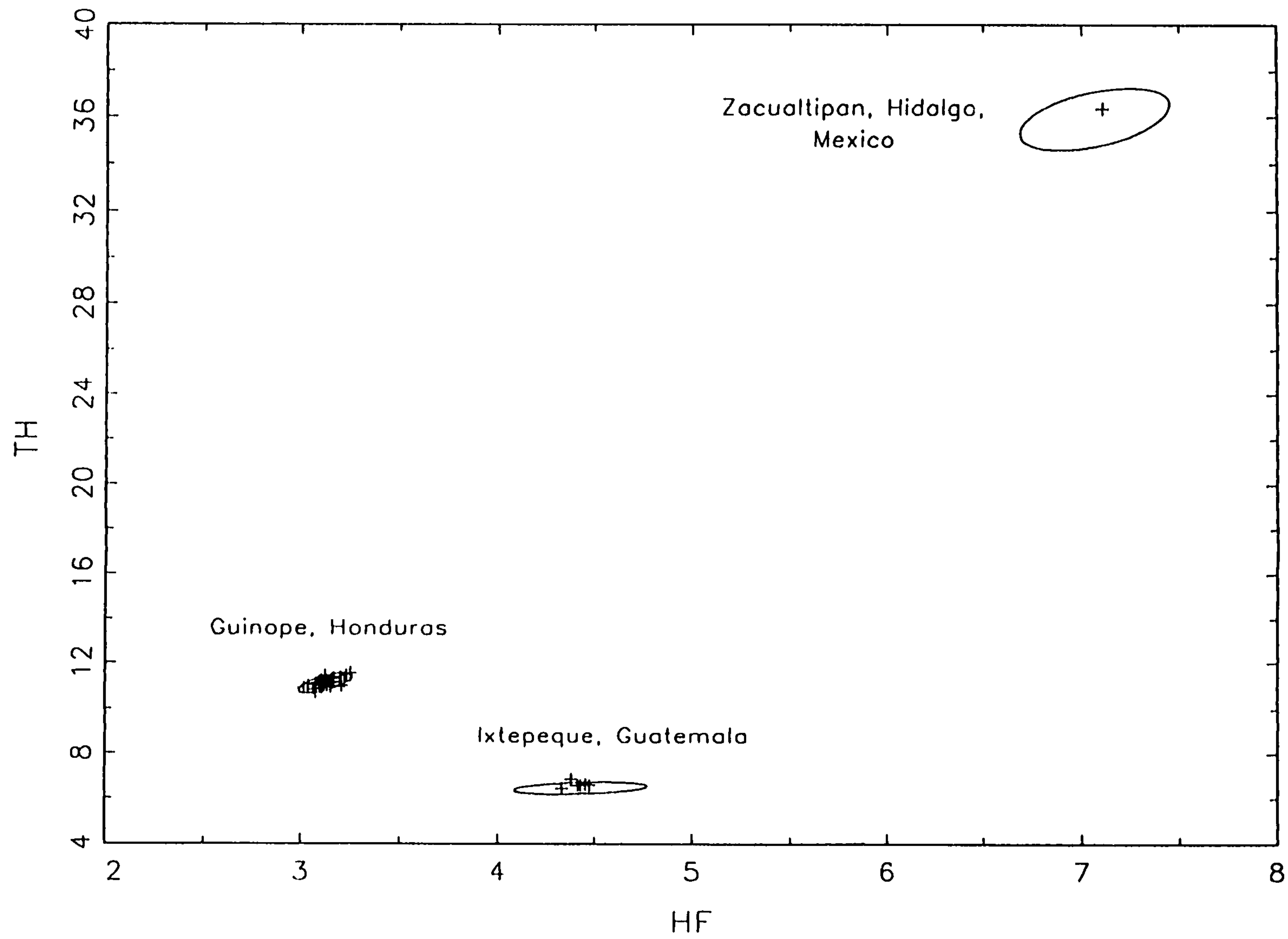


Figure E.1 Th and HF compositions of obsidian artifacts from Ayala

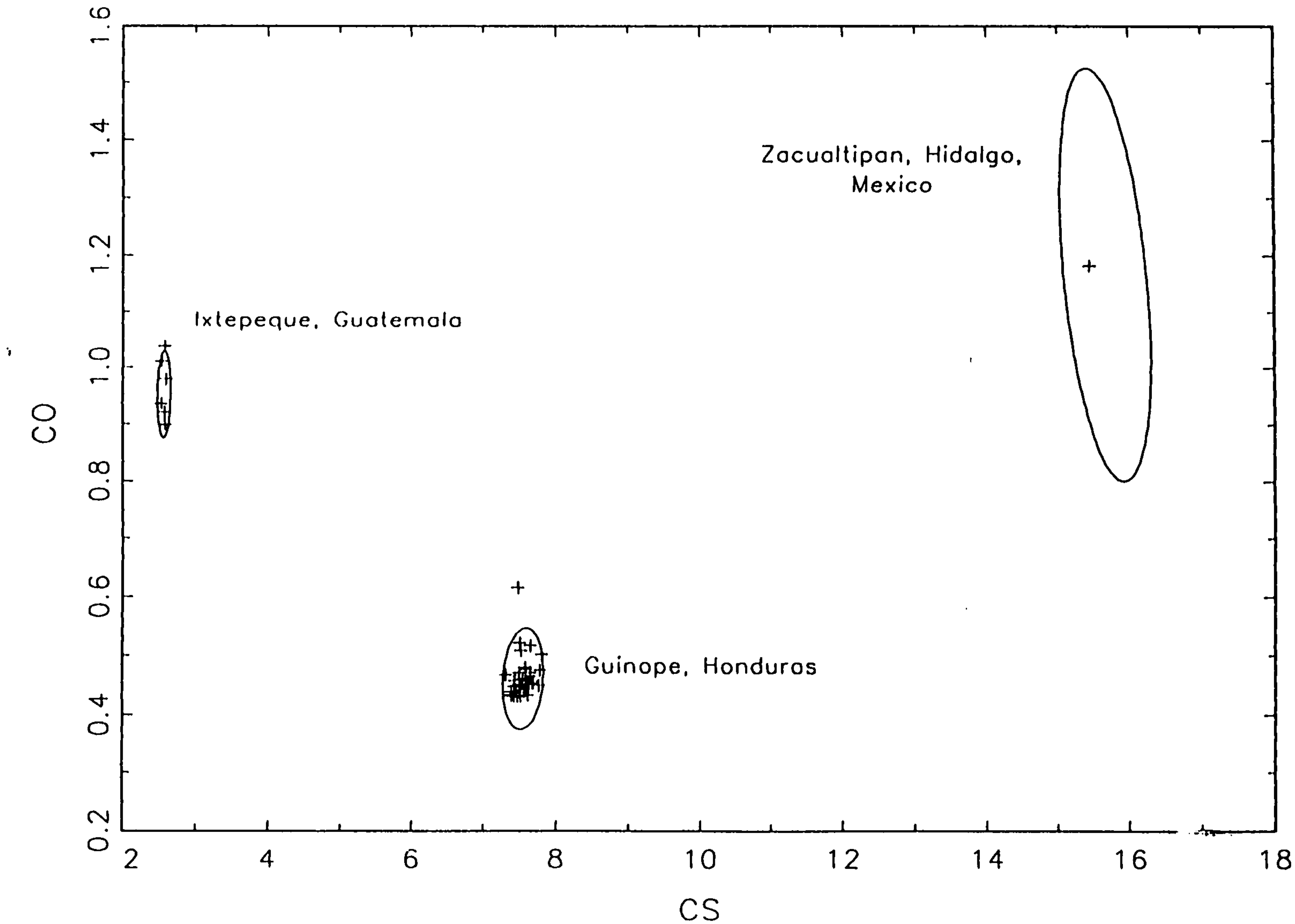


Figure E.2 CO and CS compositions of obsidian artifacts from Ayala