Ceramic Analysis and Culture History in the Arenal Region

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INTRODUCTION

The first attempt to formulate an archaeological chronology based on ceramics for the Greater Nicoya subarea was made by Coe and Baudet (1961, 1962). They suggested a succession of four major periods: the Zoned Bichrome, the Early Polychrome, the Middle Polychrome, and the Late Polychrome. Baudet (1967) presented the first detailed description of Greater Nicoya ceramic types. Lange (1971) made use of Baudet's and Coe's periodization and Baudet's type descriptions in his research in the Sapos River Valley. These also formed the basis for Healy's (1974, 1980) analysis of material from the Rivas region of Nicargua, and Sweeney's (1975) analysis of Greater Nicoya ceramics by ware, group, and variety (as opposed to Baudet, whose categories often crosscut these divisions).

Parallels in cultural sequences and recognizable continuities in ceramic horizons from Rivas to the Gulf of Nicoya (Cramer 1983) have been important characteristics of the Greater Nicoya subarea. Lange (1984) proposed ceramic sequences have played a key role in the interpretation of the region's prehistory, and their revision and fine-tuning have received a great deal of attention in recent years (Lange et al. 1984, Abel-Vidor et al. 1987). Principal concerns have been (1) 'streamlining' lists of ceramic types and type descriptions in order to eliminate redundant categories (Abel-Vidor et al. 1987), (2) documenting regional variation and utilizing ethnohistoric documents (Abel-Vidor 1986, 1981, 1988) to define cultural and geographical subdivisions (e.g., northern and southern sectors) of Greater Nicoya; (3) using compositional analysis to investigate processes of pottery manufacture and distribution (Day 1984, Bishop et al. 1988, Healy 1988); and (4) strengthening chronological correlations (Abel-Vidor et al. 1987).

Although the basic outline of the Greater Nicoya sequence was available in the early 1960s, and an initial ceramic typology for the Atlantic Watershed of Costa Rica was suggested in the latter part of that decade (Kennedy 1968), the working ceramic sequence for the Atlantic Watershed of Costa Rica did not appear in its current form until the late 1970s (Snavros 1976, 1978). A great deal of research has focused on the Central Highlands and Atlantic Watershed regions of Costa Rica (see summaries by Snavros 1981a, 1984a, Fonseca 1981), and many of the data are relevant to the Arenal area. Unfortunately, much less on ceramic classification has been published for this region than is available for Greater Nicoya.

The archaeology of the volcanic highlands and the Guanacaste and San Carlos plains in the northern portion of Costa Rica is less well known. Research conducted by Snarskis in central San Carlos (1978), by Aguilar in the Arenal area (1984), and by Norr in the Naranjo River Valley (1982-1983) suggests that these zones were occupied from as early as the Middle Formative Period up to the time of European contact. Evidence from the latter part of the sequence indicates that there were important contacts between these northern regions of Costa Rica and both Greater Nicoya and the Atlantic Watershed, however, the nature of these contacts remains poorly defined.

Material collected during reconnaissance and excavation of sites in the Arenal area demonstrates that the Cordillera region was occupied as early as Paleo-Indian times (Chaps. 1 and 11). Lithics and ceramics suggest a continuous occupation of the region from the Archaic Period through the fifteenth century A.D. Ceramic analysis and stratigraphic excavation have revealed the existence of an Early Formative (ca. 2000 cal B.C.), pre-Zoned Bichrome complex associated with the remains of a small village—the earliest known settlement in Costa Rica to date. Pottery from all subsequent periods was recovered in both surface-collected and excavated lots from a variety of sites. The association of ceramic assemblages with dated volcanic stratigraphy has allowed the construction of a ceramic chronology for the Northwestern Cordillera (Hoopes 1984a). A culture area that includes the Arenal basin, the Cordillera de Talaman, and the Cordillera de Guanacaste.

The configuration of the study area was determined in part by the availability of stratigraphic sequences. Although the basic outline of the Greater Nicoya sequence has important affinities with both the Greater Nicoya and the Atlantic Watershed sequences, it is also distinct in many ways. Its principal characteristics are (1) an Early to Middle Formative Phase whose ceramics bear strong similarities to Snarski's (1978, 1984a) Chaparron and La Montaña complexes as well as to other early Central American complexes; (2) an extensive Zoned Bichrome occupation sharing pottery types and a number of stylistic parallels with Greater Nicoya; (3) a late Zoned Bichrome/Early Polychrome transition with ties to both Greater Nicoya and the Atlantic Watershed regions; (4) Middle Polychrome assemblages dominated by local types and decorative modes, supplemented with imported polychromes from Greater Nicoya, and (5) a late occupation characterized by an absence of Nicoya-style polychromes and an emphasis on appliqué decoration, suggesting the existence of strong cultural ties with peoples to the east and south.

The sequence for the Northwestern Cordillera region will benefit from future refinement and further correlations with chronometric dates; however, the data presented here should provide a foundation for future research. While the present study may be interpreted as primarily cultural-historical, the construction and refinement of a working time-space framework is fundamental to a further understanding of Costa Rican prehistory.

CERAMIC CHRONOLOGY IN THE ARENAL REGION

While a number of formal and decorative modes are specifically characteristic of pottery from the Northwestern Cordillera, the ceramics of the Arenal region are sufficiently similar to documented assemblages from Greater Nicoya and the Atlantic Watershed that cross-dating with published sequences (e.g., Baudet 1967, Snarski 1978, Lange et al. 1984, Abel-Vidor et al. 1987, Chap. 1, Fig. 1-8) is possible. Six phases have been defined:
We have based the ceramic sequence on the analysis of 12,629 sherds from 43 sites. Almost 75% of the remainder from surface collections. We entered data from index cards in the field on an IBM-compatible personal computer. Subsequent analysis was performed on an incompatible personal computer. The spreadsheet contains tabulations of ceramic types, varieties, and modal combinations from each lot. When possible, each lot was assigned a number corresponding to its location in the various soil and tephra units of the Silencio stratigraphic sequence (e.g., 10, 20, 50, Mueller 1984a, Chap. 2).

Using data base and statistical functions, we sorted and combined lots by site, operation, stratum, and ceramic characteristic to facilitate the interpretation of thousands of potsherds by electronic rather than physical manipulation. This methodology was particularly useful in the field laboratory, where it was possible to allocate more conservative units of analysis while avoiding the temporal separation that often occurred during the course of fieldwork.

The classification can be understood as a "modified type: variety" system. We adopted this system in the interests of compatibility with published descriptions of ceramics from Greater Nicoya (Baudou 1967, Lengyel 1971, Sweeney 1975, Healy 1980, Lang et al. 1984, Abel-Viso et al. 1987). The method differs from the type: variety system commonly used in Mesoamerica (Smith, Willey, and Gifford 1946), Sahlof and Smith 1976, because it uses an abbreviated taxonomic hierarchy. To date, Healy (1980) has been the only researcher in Greater Nicoya to use "varieties" and "groups" in a systematic fashion. In other references, the principal unit of classification is the "type" rather than the "group." In lieu of detailed compositional information, we have been hesitant to postulate distinct "varieties." The level of "group" information on the classification of ceramics that have identifiable characteristics of surface finish but do not carry sufficient information to allow identification at the level of "type." In general, most ceramics are well preserved and can be classified at the level of type. In our assemblages, the most useful "group" designation is one that would subsume Los Hermanos Beige and the varieties of Mojica Impresso, all of which share modes of form and surface finish. Because group designations have not been formulated at a level in the classification of all of our ceramics, however, definitions at the group level are not included in the ceramic descriptions here. The most recent classification of Greater Nicoya ceramics (Lang and Bishop n.d.) has proved useful is that of "variety." Certain combinations of modes fell under existing type descriptions, but variation within these types was believed to be geo- graphically or chronologically significant. In some cases, we have defined varieties to distinguish between these subcategories.

THE CERAMIC SAMPLE

The principal sites excavated during the 1984 season date to the Silencio and Tilarán phases. The Silencio cemetery (G-150), Las Piedras (G-122), Nébina (G-151), Dos Armadillos (G-154), and other sites yielded burial and domestic assemblages that helped correlate cultural occupations with the stratigraphic sequence. The pottery from Arénal's tephras were preserved as visible horizons, it was possible to use C-14 dates and crossdate sequences using the Annual Perimeter of Lake Arenal in March 1984 (Bradley et al. 1984). Excavations at the site in 1985 demonstrated that, although some material from the later Arenal and Tilaran phases was present, the principal occupation of the site occurred during the Tronadora Phase.

TRONADORA PHASE DIAGNOSTIC MODES AND TYPES

Ceramic types as analytical units provide a convenient way of conveying frequently recurring sets of modes or attributes for purposes of interregional as well as intra-site comparisons. So far, with the exception of broad type classes such as the Atlantic Red-Filled Black Group of the Chapa- rao, regional Red on Brown Type (Snickars 1978)—the latter of which might best be understood at the level group as well—Middle Formative Costa Rican ceramics have been analyzed and quantified only at the level of modes. To assist with the definition and identification of Tronadora ce-
2. Large, incurving-rim bowls or tegucamates. Comma-shaped rims are thicker than vessel walls. These often have rounded-bottomed grooving along the lip and rim exterior (R6).

3. Squat, restricted-neck jars with externally thickened rims. Decoration is usually incised on the exterior neck, immediately beneath the rim.

4. Tall, hyperboloid or cylindrical vessels with flat bases. In the former, the walls gradually curve inward, and the base is always the widest part of the vessel (Snarski: fig. 25a).

**Decoration**

1. Round-bottomed groove incising, often used to outline horizontal bands of red paint (D10).

2. Round or oblique punctation in zones outlined with groove incising (D17), found beneath the rim on exteriors of both bowls and jars.

3. Red-painted strip applique emphasized by gouge incision, executed on the vessel body when the paste was soft. Strip applique can be linear and horizontal or can form curvilinear designs and figures. Unfortunately, the latter type has been found only in small fragments; full-design motifs are unknown.

4. Wavy shell-edge stamping (D18). This mode has two forms. The first is as a series of vertical impressions in a circumferential band around the vessel exterior, outlined with groove incising. The second is as a fine (sometimes barely visible) stamping or rocker stamping on an unplastered surface, used to fill large zones when the paste was soft and smooth.

5. Sharp-edged, multiple incisions, sometimes filled with red or orange pigment. This mode, referred to as “Middle Formative shell-stamping” on the lip. Well-preserved examples show a surface finish that is whitish-gray in color. Pastes contain a high proportion of gray-to-white particles, possibly pumice. The unusually large size, weight, and volume of these vessels (rim diameters range from 30 cm to 50 cm) suggest that they may have been used for brewing alcoholic beverages, such as chicha. Wide, thickened rims may have served as graps for lifting and moving these heavy vessels.

**Ceramic Types of the Tronadora Phase**

Given the size of the assemblage from Tronadora Vieja, it has been possible to define preliminary type designations. Large portions of whole vessels are known only for Zettel Shell-Stamped.

**Tonibie Beige**

This is the most common in Tronadora Phase assemblages (Figs. 10-2A–D, 10-3, Hoopes 1987: fig. 6.1). It is characterized by large, olla-seccomaties of thickly expanded rims (R11). The late Enrique Herra found sherds of this type at Palenque Tonibie in San Rafael de Cuatuso (Snarski, personal communication, 1985). It is also known from Chaparron and La Montana assemblages (Snarski 1978). Tonibie Beige vessels were often massive, and their poorly fired thick rims frequently fracture into several small pieces. Rims are usually painted with a band, glossy red paint on the lip. Well-preserved examples show a surface finish that is whitish-gray in color. Pastes contain a high proportion of gray-to-white particles, possibly pumice. The unusually large size, weight, and volume of these vessels (rim diameters range from 30 cm to 50 cm) suggest that they may have been used for brewing alcoholic beverages, such as chicha. Wide, thickened rims may have served as graps for lifting and moving these heavy vessels.

**Tronadora Incised**

This type is the second most common in Tronadora Phase assemblages (Figs. 10-2E-K, 10-4; Hoopes 1987: fig. 6.2, pl. 6.1:A-G). Similar ceramic...
Figure 10-2. Transatlantic Phase: Textile Beige rim sherds. A–D; Transatlantic Incised rim sherds. E–K. Sherd widths: A, 5.5 cm; B, 6.0 cm; C, 6.0 cm; D, 4.5 cm; E, 6.6 cm; F, 5.9 cm; G, 7.3 cm; H, 3.9 cm; I, 4.0 cm; J, 5.5 cm; K, 5.5 cm. Photographs by John Hoopes.

Figure 10-3. Textile Beige rim profiles. All are from Transatlantic Viejo (G-163). Proveniences (by operation and lot): A (K6), B (E3), C (H1), D (P2), E (E2), F (F4), G (W3), H (W5), I (W7), J (W9), K (W1), L (W11), M (W12), N (W13), O (W14), P (P5), Q (R4), R (R6). Figures by John Hoopes.

Figure 10-4. Textile Beige rim profiles. All are from Transatlantic Viejo (G-163). Proveniences (by operation and lot): A (K6), B (E3), C (H1), D (P2), E (E2), F (F4), G (W3), H (W5), I (W7), J (W9), K (W1), L (W11), M (W12), N (W13), O (W14), P (P5), Q (R4), R (R6). Figures by John Hoopes.
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Figure 10-4. Tronadora Incised sherds and profiles. All are from Tronadora Vieja with the exception of J (an isolated find). Proveniences: A (H25), B (N4), C (L36), D (H6), E (M9), F (F3), G (H15), H (H9), I (V30), J (F38), K (Q8), L (C4), M (Q4), N (V5), O (I40), P (H21), Q (W30), R (R4).

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ics from La Montana and Chaparrón (cf. Snarskis 1978: fig. 125-1, fig. 122-4, fig. 131-1) are identified as La Montana Fugitive Red-on-Cream and Chaparrón Red-on-Brown. Tronadora Incised is characterized by tecomates and incurving-rim bowls expanded on the interior lip (R), round-bottomed grooving (especially on the vessel lip), and red-painted bands delineated with grooving (D10). Surface finish is smooth and often white. Red paint, while frequently eroded, is bright and polished on well-preserved examples. Tronadora Incised has analogues in Ocós (Coe 1961) and early Zoned Bichrome assemblages (cf. Schectel Incised; Healy 1980:fig. 103), where grooved rims without the addition of red painted zones appear.

Tigra Grooved-Punctate

This type is characterized by a combination of round or oblique punctations, delineated by horizontal lines of groove incision (Figs. 10-5, 10-6, Hoopes 1987:fig. 6.3, pl. 6.1F-2). Punctate decoration is confined to the vessel neck or areas immediately beneath the rim on vessel exteriors. Vessel rims are painted red. Unlike the aforementioned types, Tigra Grooved-Punctate is not characterized by a single vessel form. Punctate decoration appears on both tecomates (Snarskis 1978: fig. 23s-ul) and squat, necked jars. Shards of this type appear in Asseretoan assemblages, but not in La Montana.

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Zetillal Shell-Stamped

The type vessel for Zetillal Shell-Stamped (Figs. 10-7, 10-8; Hoopes 1987:fig. 6.4, pl. 6.3K-M) was found at the site of Zetillal de Lipis near San José (Snarskis 1978: fig. 70-70). A second example—the only other complete vessel known—was excavated from the lakeshore at Tronadora Vieja. This type is characterized by the use of shell-edge stamping on tall, hyperboloid vessels with outflaring, flat bases. These two modes of unusual curvilinear patterns using gouge incising to emphasize contours and shapes. Pastes are usually a fine cream or white, sometimes with a reduced core, and the use of bright red paint on the raised applique design gives this ceramic a distinctive appearance.

Unfortunately, we could not identify a single rim sherd with the distinctive decoration. For this reason, vessel form is largely unknown. Most sherds indicate a globular shape, and the smoothness of their interior surfaces suggests bowls rather than closed jars. Tigra Grooved-Incised and Zetillal Shell-Stamped are the only Tronadora Phase ceramics decorated extensively on the vessel body rather than simply on the neck or rim, and there is little doubt that they both had specialized functions.

To date, this type is known only from the Arenal area. The curvilinear decoration on Tigra Grooved-Incised may be distantly related to carved designs on Olmec ceramics such as those from the San Lorenzo Phase (Coe and Diehl 1980), but a clear relationship cannot be established at present.
As noted earlier, the predominant vessel form of the Tronadora Complex is the bolstered-rim colla-tecomate. Tapering and comma-shaped rim profiles are also present. Tecomates are widespread throughout the Americas during the Formative Period, and the broad distribution of this form has stimulated much research on the early diffusion of culture and ideas in the Americas (J. Ford 1969; Myers 1978).

Tecomates in the Tronadora assemblage suggest the participation of Costa Rican cultures in Formative patterns that appear throughout Nuclear America between 4000 and 1500 cal BC.

None of the sherds from Tronadora Vieja are as "primitive" or poor in quality as either Poxo (Brash 1965) or Purron (MacNeish et al. 1970) ceramics from Mexico, or the majority of Munagrillo ceramics from Panama (Willey and McGimsey 1954).
Figure 10-7. Tronadora Phase: Zelma Shell-Stamped. A–B: rim sherds; C–I: body sherds; K–L: base sherds. Sherds widths: A, 4.6 cm; B, 4.4 cm; C, 3.9 cm; D, 3.3 cm; E, 4.2 cm; F, 3.1 cm; G, 3.6 cm; H, 4.9 cm; I, 4.5 cm. J, cylindrical vessel fragment. K, 4.9 cm. L, 5.2 cm. Height of J, 21.5 cm. Photographs by John Hoopes.

Figure 10-8. Atlantic Red-Filled Black (A–B, F–I), cylindrical vessels (C–E), shell stamping (J–M), and Zelma Shell-Stamped profiles (N–Q). All sherds are from Tronadora Vessels. Proveniences: A (V24), B (M3), C (H10), D (H5), E (M2). F (L14), G (H11), H (W7), I (V6). J (V15), K (W25), L (W3), M (H5), N (H15), O (K20), P (D20), Q (W3). Figures by John Hoopes.
The assemblage gives the impression of a mature execution of the potter's craft rather than a weakly developed and incipient technology. Pastes are well fired and vessel forms demonstrate a high level of sophistication.

Important modes that Tronadora Phase ceramics share with other Early and Middle Formative assemblages include the use of round-bottomed grooving, heavy punctation, shell stamping (sometimes rocker stamping), and red zoning (Figs. 10-10, 10-11). In Panama, these appear on Monagrillo and Sarigua Phase ceramics (Hoopes). In Mesoamerica, they are diagnostic of Barra and Ocós ceramics from the Pacific Coast of Guatemala and Chiapas (Green and Lowe 1967; Lowe 1975; Coo 1961). Asian ceramics from the Tehosin Valley (MacNeish et al. 1970), and other Early Formative assemblages (cf. Lowe 1978). Side-by-side comparisons of Tronadora ceramics and type collections of Panamanian and Guatemalan pottery indicate that the Costa Rican sherds are far more similar to Ocós ceramics than are any of the Panamanian examples. While some Ocós pottery, most notably the thin-walled, sharply-incurving "pumpkin" teconmates, has no parallels in the Tronadora assemblage, others are virtually identical. Among these are sherds with rocker-stamped and shell-stamped decoration, punctation, and groove incision, especially on vessel rims. Open bowls with bright red rims from both assemblages are close in form, color, and paste, although specular hematite—found on the Ocós ceramics—has not been identified on Tronadora pottery.

The small sample and apparent mixing in relevant stratigraphic deposits make it difficult to say with certainty which modes or types are characteristic of the Early versus the Late Tronadora Phase. At present, there is no stratigraphic evidence available to support the division of the Tronadora Phase modes into early and later facets. Their separation is based on broader comparisons with assemblages from other parts of Nuclear America (Hoopes 1987). Modes of form and decoration that are shared by Tronadora, Barra, and Ocós (as well as by early South American complexes such as Tesca, Canoseito, Barlovento, and Machalilla [Bucholz 1972; Meggers et al. 1965]) are characteristic of the Early Tronadora Phase (2000-1000 cal BC). The earliest C-14 dates at Tronadora Vieja are associated with lithic artifacts and debitage embedded in the top of the Arenal Formation clays. Tronadora Phase occupation continued through the initial eruptions of Arenal Volcano, which deposited large quantities of tephra in the Arenal area and contributed to the formation of fertile soils.
Figure 16-10. Tronadora Phase: Unnamed Shell-Stamped. A-D: rim sherds. E-Q: body sherds. Sherds widths: A, 4.6 cm; B, 4.5 cm; C, 4.1 cm; D, 2.9 cm; E, 3.7 cm; F, 3.6 cm; G, 4.6 cm; H, 3.6 cm; I, 3.5 cm; J, 2.8 cm; K, 4.3 cm; L, 4.3 cm; M, 5.1 cm; N, 2.7 cm; O, 3.0 cm; P, 2.5 cm; Q, 3.4 cm.

Photographs by John Hoopes.

Figure 16-11. Tronadora Phase: Miscellaneous sherds. A-C: red-painted teconate rims; D-L: grooved black ceramics with traces of red ocher (D and E are rims of cylindrical vessels); M-P: squat, necked jar fragments with seed impressions. Sherds widths: A, 5.0 cm; B, 9.5 cm; C, 3.3 cm; D, 4.0 cm; E, 5.7 cm; F, 3.0 cm; G, 7.7 cm; H, 3.7 cm; I, 3.2 cm; J, 2.5 cm; K, 2.0 cm; L, 3.0 cm; M, 3.3 cm; N, 9.3 cm; O, 3.2 cm; P, 3.2 cm. Photographs by John Hoopes.
preceramic occupation? The two dates for the beginning of the Tronadora Phase occupation of the site come from stratigraphic units immediately above the Aqualate. These are 2460-1890 cal BC (Tx-5077) and 1900-1694 cal BC (Tx-5279). The dendro-corrected 95% confidence interval of the first date completely overlaps that of the second, suggesting a date of occupation between the Formuna Phase and the Tronadora Phase at about 2000 cal BC.

As noted earlier, Tronadora pottery is closely related to Snarksi's (1978, 1984a) Chaparro and La Montaña complexes. Of the two, it is most similar to Chaparro. Unfortunately, no dates are available for Snarksi's pottery. Snarksi (1978) did obtain a total of five dates for deposits with early ceramics at La Montaña, a site near Térraba (Chap. 4). Work in the region: 2271-1430 cal BC (UCLA-2113A; 3456 ± 160), 3000-596 cal BC (UCLA-2113D; UCLA-2113N: 2900 ± 60, 800 BC cal AD 52 UCLA-2113B: 3275 ± 160, and 400-122 cal BC (UCLA-2110M: 2230 ± 60). The last two are thought to have been charred from a later period cemetery superimposed on the level containing La Montaña material. The earliest date was initially rejected as being too early (ibid. 107), however, the Tronadora Vieja levels suggest it may not be.

At the Méndez site on the Narrazón River, north-east of the Arenal area but still in the Northwestern Cordillera, Norr (1982-1983) included ceramics similar to those from Chaparro in her Narrazón Phase. This is defined as temporally equivalent to Langa's Bora Phase at the Vidor site, and Norr dated it to 580 BC (uncorrected). Two dates are reported from Narrazón Phase deposits. The first, 2028-1645 cal BC (UCLA-2167A: 3500 ± 60), comes from sterile subsoil at the base of a large funerary structure. The second, 410-132 cal BC (UCLA-2168: 2250 ± 60), comes from ceramic-bearing deposits in the same feature. The earliest date is thought to be much too early for the ceramic occupation. The dating of the Loma B context at Vidor has also been controversial (Lange 1984). High number of sherds similar to those from Méndez and Tronadora Vieja were associated with a date of 1291-830 cal BC (UCLA-2110). This type is not very common in Tempisque Valley and Pacific Coast assemblages, and it is also rare in the Northwestern Cordillera.

TRONADORA PHASE CERAMICS

We found Tronadora Phase ceramics in the lower levels of all operations at Tronadora Vieja. The most interesting association of Tronadora ceramics and occupational features was in Operation W, where they were associated with the floor of an early house (Chap. 4).

In the nine excavation lots from Unit 60 and below in Operation W, 95% of the seventy-three diagnostic sherds recovered belong to the Tronadora Phase. The most common type is Tongue Beige, followed by Tongue Serrated and Tongue Incised. These comprise groups with very few, if any, diagnostic sherds that can be assigned to any other phase. Tongue Serrated is the only type with a clearly general groove incising, shell stamping, and reed stamping. Some reed-stamped jar fragments had a thick, black substance adhering to the exterior of the vessel. These appear to be part of the decoration, but it did not burn when held over a flame, its nature and purpose are unknown. The style of ceramics associated with the habitations includes both decorated and undecorated vessels, with Tongue Beige present as well as both Tongue Grooved and Tongue Shell-Stamped. Although the greatest number of sherds of Tongue Grooved-Incised appeared in Operation W, both this type and Zettel Shell-Stamped and Assorted were present in the other operations (H, L and V). The proportions of other types and modal categories do not vary significantly over the site.

ARENAL PHASE

The Arenal Phase Phase bears many similarities to the Greater Nicoya Zoned Bichrome horizon (Lange 1984); however, it also has significant local characteristics. Bocana Zoned Bichrome appears frequently in Arenal Phase surface assemblages; however, Rondón Zoned Engraved, and other marker types of Zoned Bichrome assemblages to the west are rare or absent. The Arenal Phase is characterized by the use of linear incision and decoration than by zoned decoration. Las Palmas Red-on-Beige and Charco Black-on-Red are the two types most representative of the former, the different varieties of Moca Impressed and the type Congo Impressed best represent the latter tradition. The use of zoned areas of color outlined with either incision or painting is uncommon in Arenal Phase assemblages, except for Bocana Impressed Bichrome. While zoned punctuation and shell-stamping are common in the Tronadora Phase, these diminish in popularity. The only type with zoned punctuation to appear during the Arenal Phase is Huila Zoned Punctate (ibid. Baudier 1967-591). This type is not very common in Tempisque Valley and Pacific Coast assemblages, and it is also rare in the Northwestern Cordillera.

ARENAL PHASE SITES

Of forty-three sites for which ceramics were analyzed during the 1984 and 1985 field seasons, 10 demonstrated a higher percentage of Arenal Phase ceramics than of any other phase. In addition to Tronadora Phase ceramics, we found a strong Arenal Phase component at Tronadora Vieja (G-163; Hoopes 1987:43-97, Chap. 4; Atto Bolivar (G-164, Hoopes 1987:98-161, Chap. 5), and Viboriana (G-175; Bradley et al. 1984:88-92). Virtually all ceramics belonged to the Arenal Phase, however, the Arenal components at Tronadora Vieja, Viboriana, and San José are 1987-323 were earlier than components at Atto Bolivar.
We recovered 177 Arenal Phase sherds from excavations at this site, of which 120 (68%) were located in 50's strata. Among the types represented (in the order of their importance) are Los Hermanos Beige, Los Hermamos Beige, Espinoza Variety, Moita Impressed: Laguna Variety; Bo- 

cana Incised Bichrome, Las Palmas Red-on-Beige, Charco Black-on-Red, and Horda Zoned-Punctate. All of these appear in Zoned Bichrome assemblages throughout much of Greater Nicoya, and their presence suggests that the Arenal Phase was a time of strong cultural affinities between the Arenal area and regions to the west. One interesting difference between this assemblage and those of the Tempisque Valley is the presence in the Arenal region of Espinoza Red-Banded, a type defined by Healy (1980) in the Rivar region of Nicaragua and defined for the Arenal region as Los Hermamos Beige, Espinoza Variety (Hoopes 1987: 415–420). This type suggests ties with the north as well, perhaps as part of a horizon extending along the volcanic cordillera, although its red decoration also has important parallels with El Bosque pottery from the Atlantic Watershed (Sanakis 1978).

Charco Black-on-Red sherds at Tronadora Vieja suggest that the Arenal Phase occupation extended through both Early and Late facets at this site; however, this sample of Charco differs from those of more typical Late Arenal assemblages. The black-painted decoration was executed in broad strokes rather than the narrow lines noted at Sitio Bolivar. This may be a characteristic of early examples of this type, but the sample was not large enough to clarify this point.

Sitio Bolivar (G-164)

What it lacked in longevity, the Arenal Phase occupation at Sitio Bolivar made up for in intensity. We recovered almost six thousand diagnostic sherds from relatively small excavations, providing us with a large assemblage that appears to have been restricted in time to the last 200 years of the Arenal Phase. Los Hermamos Beige is the most important type at this site. Moitas Impressed (Corrida, Ataza, and Congo varieties) is second. Charco Black-on-Red, Los Hermamos Beige, Espinoza Variety, Guiana Incised, Los Hermamos Beige: Cervezas Variety, Zolaya Painted (Bichrome and Trichrome varieties), and unidentified triochrome sherds are also important types in the Sitio Bolivar assemblage. A number of early modes appear in this assemblage, most notably Uslutun-type resist decoration and medial-flange bowls (both on Guiana Incised); however, all together the ceramics represent a clear assemblage of Linear Decorated types of Bocana 1967. A few sherds of Casillo Polychrome confirm the dating of the assemblage to a time corresponding to the transition between late Zoned Bichrome and Early Polychrome periods in Greater Nicoya.

Viboriana (G-175) and La Isla (G-166)

Surface collections from these sites provided the best diagnostic assemblages for the Early facet of the Arenal Phase. Charco Black-on-Red and Guiana Incised, found in large numbers at Sitio Bolivar, are rare or absent while Bocana Incised Bichrome and Las Palmas Red-on-Beige are present. Viboriana confirmed the stratigraphic position of Early Arenal sherds in the lower 50's strata; however, the excavated sample was not large enough for any stylistic changes over time to be determined.

ARENAL PHASE CERAMIC TYPES

Bocana Incised Bichrome

This type (Figs. 10-12A–E, 10-13A–K, Hoopes 1987: figs. 7.1–7.6, 8.0) was first defined by Baudez (1967) for the Tempisque River. It was recorded by Sweeney (1975) and Lange (1976) at sites on the Pacific Coast of Guanacaste. Healy (1980) noted five sherds of Bocana Incised Bichrome in the Rivas region of Nicaragua. Bocana is the marker type for Early Arenal Phase assemblages in the Arenal area (Hoopes 1987: 346–356). It is frequently associated with Las Palmas Red-on-Beige and Los Hermamos Beige: Espinoza Variety.

Bocana Incised Bichrome in the Arenal area is characterized by grooved, vertical incisions in combination with zoned red slipping on a beige unslipped surface. Decorative technique ranges from wide, round-bottomed grooving to sharp-edged, deep incising. Incisions are usually found in multiple sets of three to four vertical lines, corresponding to Baudez' "combed variety" (1967: 63–64, pl. 19) and Healy's "Bocana variety" (1980: 91–92, fig. 26). Unlike on Tronadora Incised and other Tronadora Phase sherds with incised decoration, resist
Las Palmas Red-on-Beige

Bocana Incised Bichrome vessels. We noted two distinctive support types. The first is a solid, elongated, curving support with longitudinal facets. The second is a hollow, rattle support, about 10 cm to 15 cm long, with vertical, rectangular slits on the exterior side. What is not included in the type as defined by Baudez, these latter are decorated with the diagnostic incision and red bichroming found in Arenal assemblages. Examples from the Arenal area are identical to supports on vessels in the Museum of the Instituto Nacional de Seguros Carlos in the Atlantic Watershed (Snarskis 1982:88, upper right illustration—captions transposed). This latter support type was found associated with the early Loma B contexts at the Vidor site (Lange, personal communication, 1985).

Bocana Incised Bichrome is a diagnostic type of Lange’s Loma B Phase at the Vidor site, and is considered a marker for the earliest Zoned Bichrome assemblages in Greater Nicoya. It is likely that Bocana Incised derives from incised types of the Tronadora Phase. Bocana Incised may well appear sometime during the Late Tronadora Phase. Until we can more clearly understand the transition between the Tronadora and Arenal Phases, however, Bocana Incised is interpreted as a marker type for the Early Arenal Phase.

Las Palmas Red-on-Beige

The use of multiple-brushed wavy lines of red ochre pigment is an important Arenal Phase mode, although it survives in later types such as Carrillo Polychrome, Cabuyal Polychrome, and Jimenez Polychrome (Figs. 10-12F-J, 10-13A-I; Hoopes 1987:fig. 7.1-A-D, pl. 7.1-E-H). Its earliest appearance is on Las Palmas bowls (Fig. 10-14). We noted that the most common vessel form of this type in his assemblage is the necked jar. Open, complex-silhouette bowls are much more common in our collections.

The principal decorative motifs of this type are wavy lines and solid triangles, executed in red paint on an unslipped surface. Bowls are decorated on the interior, with simple horizontal lines on the exterior. One example found has a hollow conical/mammiform rattle support. Jars are decorated exclusively on the exterior. A few examples in both the Arenal area and the Tempisque Valley collections bear Mojica-style impressions, indicating the contemporaneity of these two types.

Baudez (ibid.: 206) notes similarities between the early multiple brushing on Las Palmas Red-on-Beige and the decoration of Usulutan ceramics of the Protoclassic Maya. Some of the hooked rim profiles on Las Palmas bowls (Fig. 10-3A) are also characteristic of Usulutan and Iberia Orange ceramics of the Maya area. Healy (1980:239-241) describes a type he calls “Usulutan Resist” in the Rivas region of Nicaragua, which dates to the Avila/San Jorge Zoned Bichrome Phases and may be related to Las Palmas. Despite its being a “resist” type, diagnostic modes include “multiple brush produced straight and wavy lines . . . in orange or red . . . on a cream brown or orange base slip.” His illustrated sherds (ibid.: figs. 110-111) are remarkably similar to Las Palmas sherds.

Mojica Impressed

The use of various implements to stamp rows of small marks on the necks or shoulders of unslipped vessels is a feature of Arenal Phase ceramics (Fig. 10-14). The Mojica Impressed type (Hoopes 1984:fig. 2:1987:pl. 7.1-I-L; Baudez type “Mojica à impressions de coquille” (1967:57, pl. 16) is ubiquitous in both Early and Late Arenal Phase assemblages. Five varieties of Mojica Impressed have been defined on the basis of differences in impressed patterns (Hoopes 1987:368-390). Because of their large size, Mojica vessels were probably used primarily for storage. The different varieties appear to have temporal significance. The Mojica Variety and Lagada Variety are both diagnostic of the Early Arenal Phase. The Corrida Variety, Arrastrada Variety, and Congo Variety are all diagnostic of Late Arenal.

Mojica Impressed: Mojica Variety

This variety (Hoopes 1984:fig. 2:1987:pl. 7.1-I-L) bears small impressions in multiple rows and corresponds to examples of the type from the site of La Bocana (Baudez 1967:pl. 16A-Cl). On characteristic examples, the impressions resemble semicircles with an extra dot above. Individual
impressions are deliberately placed and clearly defined. There is sometimes a slight "drag-and-jab" effect, but all marks are crisp and distinct. Interestingly, this type of decoration was noted on a few sherds of Las Palmas Red-on-Beige.

**Mojica Impressed: Laguna Variety**

This variety (Hoopes 1984:fig. 2A-D; 1987:pl. 7.1:M-Q) is distinguished by single or double rows of impressions, usually made with instruments other than a shell. Finger-nail and bar impressions fall into this category. Some sherds included in this variety appeared to have "pinched" or cord-marked decoration, reported by Snarskis (1978:123) for Chaparron pottery. The similarity between Mojica Impressed: Laguna Variety and certain Chaparron ceramics and the former's appearance in earlier assemblages leads us to place this variety in the Early facet of the Arenal Phase. This variety may correspond to some examples classified as "Congo Punctate" by Baudez (1967:61).

**Mojica Impressed: Corrida Variety**

The Corrida Variety (Hoopes 1987:pl. 7.1:R-S) bears the same type of mark found on Mojica Impressed: Mojica Variety, but it has been drawn or jabbed more rapidly and less carefully, giving it a coarser appearance. The individual marks are still evident, but they run together. In general, the paste and surface finish of this variety appear to be coarser than that of the Mojica Variety.

**Mojica Impressed: Arrastrada Variety**

This fifth variety (Hoopes 1987:pl. 7.1:T-V) is distinguished by decoration that is scraped rather than impressed. The pattern was made with the same multiple-point instrument used for Mojica Variety decorations (most likely the edge of a shell). Horizontal scraping has obliterated individual vertical marks, however, and the effect is that of a set of rough, contiguous horizontal channels (cf. Baudez 1967:pl. 162).

**Mojica Impressed: Congo Variety**

This variety of Mojica derives its name from "Congo Punctate" (ibid., pl. 18F), while Baudez' category includes a range of different decorations.

**Discussion**

Baudez illustrates examples of pottery corresponding to all five varieties of Mojica Impressed; however, he does not make any varietal distinctions or note temporal differences in the use of the different patterns. Data from the Arenal area indicate that Mojica Impressed decoration changed through time. Mojica Impressed: Mojica Variety and Mojica Impressed: Laguna Variety occur most frequently in survey lots with Bocana Incised Bi-chrome and Las Palmas Red-on-Beige, both diagnostic of the Early Arenal Phase; Las Palmas Red-on-Beige vessels will sometimes have impressions identical to those of Mojica Impressed: Mojica Variety. On the other hand, Mojica Impressed: Corrida Variety and Mojica Impressed: Arrastrada Variety appear in the large assemblage of Late Arenal ceramics from Sitio Bolivar, while Mojica and Laguna varieties were absent. In general, there was a tendency for the decoration on Mojica Impressed pottery to become hastier and less well executed over time. Mojica Impressed: Congo Variety was found in its most significant quantities at Sitio Bolivar, and it may belong in the Late Arenal Phase; however, the close similarity between some examples of this and the Laguna Variety suggest that the Congo Variety is not as clearly diagnostic as the other varieties.

**Guinea Incised**

This type, also defined by Baudez (1967:73), was best represented in assemblages from Sitio Bolivar (fig. 10-15A-D; Hoopes 1987, pls. 7.2:A-F). It is characteristic of the Late Arenal Phase (Hoopes 1987:391-402). In our assemblages, the surface finish of Guinea vessels is predominantly red and orange. Brown, beige, and tan examples are rare or absent. Virtually all Guinea incised vessels are open, tripod bowls with large, hollow supports. Vessel profiles vary widely, with a predominance of basal angles and carinations. We noted some basal or medial flanges, often decorated with incision. We excavated a few examples of Guinea incised vessels with Unslabulike resist decoration at Sitio Bolivar. Resist areas include parts of the incised panel on the vessel exterior and curvilinear designs on the interior surface of bowls. Both the use of resist decoration and the carinated, tripod bowl recall examples of ibid., pl. 18F), while Baudez' category includes a range of different decorations.

**Figure 10-14.** Early and Late Arenal Phase. Mojica Impressed: Laguna Variety (A-E), Mojica Variety (F-I), Corrida Variety (J, K), Arrastrada Variety (L-N). (Nice scale) Photographs by John Hoopes.
Izalco Usulutan from western El Salvador [Sharer 1978:39]; however, the relationship is not close. Guanacaste Incised and analogous types are absent from contemporaneous assemblages in the Rivas region of Nicaragua [Healy 1980:313].

There is also a strong resemblance between some examples of Guinea Incised from the Cordilleran region and vessels of Snarks' Zoila Red Group (1978:201–202) from the Atlantic Watershed region. Hollow, bulbous, nattle support forms (cf. Snarks' modes S18 and S23, ibid., figs. 91–92) are common to both, as are the red surface color and geometric incision. Incision and engraving on open tripod bowls were common to both Greater Nicoya and the Atlantic Watershed regions of Costa Rica at around cal AD 500. These vessels appear to have been more important at inland sites than at coastal ones in Guanacaste.

**Charco Black-on-Red**

The definition of this type [Hoopes 1987:pl. 7.4–G] used here combines Baudez' Charco and Cobo's Black-on-Red types (1967:83–87). Charco is the most common decorated type in assemblages from Sitio Bolivar. It is a rare type at Early Arenal Phase sites, however, and its representation is small when all Arenal Phase sites in our sample are considered (Hoopes 1987:421–426).

Charco is characterized by black line decoration on a red slip. The use of an overall red slip does not appear on Cordilleran ceramics until the late Zoned Bichrome period. Charco also signals the first use of fired black decoration on pottery in the region. On the great majority of Charco vessels from Sitio Bolivar, both slip and black paint tend to be soft and friable, in distinct contrast to the hard, often glossy finish typical of Early and Middle Polychrome vessels in Greater Nicoya. Decorative motifs on Charco echo those found on Las Palmas Red-on-Beige. These include multiple-brush wavy lines, triangular elements, and vertical and horizontal narrow lines. While most Las Palmas vessels are open bowls, Charco is represented more frequently by restricted-neck jars.

The temporal position of Charco Black-on-Red is not clear either in the Tempisque Valley or the Northwestern Cordillera region. Baudez (1967:85) notes that Charco was common to both the Catalan and the Ciruelas phases, but found it more common in the latter, which corresponds to his "Linear Decorated" period (AD 300–500). Healy [1980:204] identifies Puerto Black-on-Red, from Rivas, as belonging to the San Jorge Phase. Both authors suggest that these black-on-red types appeared in the late Zoned Bichrome and diminished in frequency in the Early Polychrome Period. Charco is not typical of the Late Arenal Phase; however, a single vessel of this type was found beneath construction fill at the El Silencio cemetery, a site with an almost pure Silencio Phase ceramic component.

**Los Hermanos Beige**

Los Hermanos Beige (Fig. 10-16A–N; Hoopes 1987:fig. 7.3, pl. 7.2–G–I) is the most common type designation in Arenal Phase assemblages (Hoopes 1987:405–410), however, it also serves as a more-or-less catch-all term for red-rimmed beige jar and bowl fragments with characteristic profiles. Two partially reconstructed vessels and several large sherds indicate that rims designated as Los Hermanos Beige may have come from vessels of Motica Impressed, Espinosa Red-Banded, Las Palmas Red-on-Beige, and even Barana Incised Bichrome. Baudez (1967) places Los Hermanos Beige in the Cimelas Phase (AD 300–500) of the Tempisque Valley. Red-rimmed beige vessels are also typical of his earlier Zoned Bichrome type, Monte Cristo Beige. It is not possible to distinguish Monte Cristo from Los Hermanos in our assemblages. Because of the wide application of this designation, we used "Los Hermanos" for vessels produced as early as the Late Tronadora Phase. Los Hermanos Beige is also the most abundant ceramic type at Sitio Bolivar, a Late Arenal site. The long duration of this type suggests a strong continuity in Northwestern Cordillera populations, and the tradition of red-rimmed storage vessels continues into the Silencio Phase.

Vessel forms range from incurving, direct-rim bowls to large, necked storage jars. In Late Arenal assemblages, the principal vessel forms are large, outcurving, exteriorly thickened rim jars; outflaring, exteriorly thickened rim jars; and open, thickened-rim bowls, usually with small solid conical supports (Baudez 1967: vessel groups I, II, and III).

**Los Hermanos Beige: Espinosa Variety**

This variety was not recognized by Baudez in the Tempisque Valley, nor has it been noted in assemblages from coastal Guanacaste (Fig. 10-17A–C). It was first defined by Norweb (1964:539) and later by Healy (1980), from ceramics excavated in the Rivas region of Nicaragua. The principal decorative modes are "Red painted and polished verti-
Figure 10-16. Left: Los Hermanos Beige rim profiles. A-N: jar and bowl profiles from Tronadora Viejo; O-R: jar profiles from Sitio Bolivar; S-T: short-necked jars; U-V: direct-rim bowls. Figures by John Hoopes.

Figure 10-17. Above: Late Arenal Phase: Los Hermanos Beige: Espinoza Variety: A-C; Huila Zoned-Punctate: D-E; unnamed incised, punctate, zoned-bichrome: F; Zelaya Bichrome: G-H; Carillo Polychrome: I-J. Sherd widths: A, 4.0 cm; B, 3.2 cm; C, 6.4 cm; D, 3.7 cm; E, 6.9 cm; F, 4.8 cm; G, 11.5 cm; H, 10.2 cm; I, 5.5 cm; J, 8.0 cm. Photographs by John Hoopes.
cal bands...on a natural, buff colored base...on various-sized jars" (ibid.: 115). Unlike on the Nicaragua examples, we did not note the use of appliqué on this type.

Espinoza Variety modes of vessel size and form are the same as Los Hermanos Beige (see forgoing). Decoration consists of red-painted rims and the use of broad strokes of red paint on vessel shoulders and sides. Strokes are usually vertical, appearing in sets of three or four linear elements, however, some examples show a rough, horizontal "wiping" of red paint on vessel walls. The latter are the most common at Sitio Bolivar. The decoration on examples of Espinoza Variety sherds and vessels from the Arenal area is usually rough, and vessel forms indicate that its principal function was probably for storage.

According to Healy (ibid.: 116), Espinoza Red-Banded dates primarily to the Zoned Bichrome period; however, the type continues through the Early and even into the Middle Polychrome periods (though clearly reduced in importance). Healy also suggests that Espinoza is homologous to Baudez' Matazana Red-on-Brown from the Tempisque Valley; however, I see Matazana as equivalent to Los Palmas Red-on-Beige and Espinoza as something different. Los Hermanos Beige: Espinoza Variety is characteristic of both Early and Late Arenal phases, with a marked deterioration in the quality of decoration over time.

Los Hermanos Beige: Cervantes Variety Defined by Baudez (1967:109) as the "Cervantes Incised-Punctate" type but assigned varietal status by consensus of the Greater Nicoya Ceramic Conference (Lange et al. 1984), this variety is characterized by the use of heavy incision, punctuation, and (less frequently) appliqué to decorate the broad interior surfaces of open bowl rims (Fig. 10-15E-I, Hoopes 1987:pl. 7.4). While some punctuation, especially triangular impressions, is reminiscent of Mojica Impressed, the incisions in Los Hermanos Beige: Cervantes Variety are usually coarse, made when the clay was wet and soft. Baudez places this type in both his Catalina and Ciruelas phases (ibid.). It is a principal diagnostic of our Late Arenal Phase.

Other Important Arenal Phase Types and Modes In addition to Charco Black-on-Red, other decorated types that were first defined in Tempisque Valley assemblages (Baudez 1967) appear in Late Arenal contexts. These include sherds of Huila Zoned Punctate (Fig. 10-17D-E), Zelaya Painted: Bichrome Variety (Fig. 10-17G-H; Hoopes 1987:pl. 7.48), Zelaya Painted: Trichrome Variety (ibid.: pl. 7.4A), and Cartillo Polychrome (Fig. 10-17F-I). As noted earlier, they suggest that the Arenal region should be interpreted as an eastern extension of Greater Nicoya at this time.

A number of sherds from Sitio Bolivar are not typical of contemporaneous assemblages in Greater Nicoya and suggest communication between the Arenal region and other parts of Costa Rica (Fig. 10-18). Among these are rim sherds from wide-mouthed tripod bowls, unslipped on the exterior but coated with a thick maroon slip on the interior. These are tentatively identified as belonging to the Anita Fine Purple Group of the Selva Phase in the Atlantic Watershed and appear to have the same "powder-fine" paste noted at Linea Viria sites (Snarskis 1978:208-209). Both the paste and the purple slip found on these few sherds are different from those of local Arenal-area pottery. Snarskis traces Anita Fine Purple to southeastern Costa Rica and cites this as a trade ware in the Atlantic region. If this is correct, their presence at Arenal area sites indicates wide-ranging interregional interaction.

Other ceramics from Sitio Bolivar indicate contact with the Atlantic Watershed region. These include long, hollow conical supports with anthropomorphic adornos (ibid.: fig. 90, S1S1; zo- morphic appliqué figures on vessel rims (ibid.: fig. 111, D23), and short vertical handles with appliqué (ibid.: fig. 100, H12). All of these are diagnostic of late El Bosque and La Selva assemblages from the Atlantic Watershed region. These motifs were found in far lower quantities than those of the local Arenal Phase ceramic types. They may mark trade vessels from regions to the east of the Cordillera rather than local imitations of Atlantic Watershed ceramics. Atlantic-style sherds are far more common in the Arenal area than at contemporaneous sites to the west and their presence suggests a significant level of trade or exchange between the Cordilleran and Atlantic Watershed regions around cal AD 500.

DATING THE ARENAL PHASE Lange (1980a) divides the Zoned Bichrome Period in Greater Nicoya into three phases on the basis of data from the Vides site: Loma B (800–300 BC), Ordo [300 BC–AD 300], and Mata de Uva (AD 300–500). The Loma B, or "Zoned Incised," Phase is marked by Bocana Incised Bichrome, Toya Zoned

Figure 10-18. Late Arenal Phase: Miscellaneous sherds with modes suggestive of Atlantic Watershed influence. Animota: A, B, G; R. appliqué. B-D, H, decorated support fragments. F, F-I. hollow supports: L, M. Sherd lengths: A, 4.5 cm; B, 5.0 cm; C, 4.6 cm; D, 5.6 cm; E, 4.7 cm; F, 12.0 cm; G, 9.5 cm; H, 14.5 cm; I, 10.5 cm; J, 11.5 cm. Sherd widths: A, 4.2 cm; G, 5.2 cm; H, 5.7 cm. Photographs by John Hoopes.
Incised, and ceramics common to Lothrop's "Pal-

sales Zoned Engraved. According to Lange [ibid.:

40), Orso is contemporaneous with Catalina and

Chencha, the Digital Valley and Santa Elena

Peninsula, respectively, and corresponds to the

Zoned Bichrome Period as initially defined by Cole

and Baudez [1961]. The Mata de Uva, or "Zoned

Painted." Phase corresponds to the "Linear Deco-

rated" Period (Baudet 1967: 194) and is signaled by

the appearance of Tola Tichrome at coastal sites.

Mata de Uva, and the ceramic traits associ-

ated with it, has been variously considered as

the beginning of the Early Polychrome or the end of

the Paleo-Indian Period. The latter view is the

latter (see Baudez 1961: 3). Baudez observed that

the Zoned Bichrome Period is "a continuation, or
termination, of Zoned Bichrome patterns. It is com-

monplace in southern coastal areas in the Early

Polychrome" (Haberland 1966). These Angeles Phase

ceramics were found below levels with Rosales

Zoned Engraved and Schettel Incised, and they

were associated with types such as the late Colima

types. According to Lange [ibid. 640 and 410], At

Sito C. Menéndez, Non [1982 -1983] reports a

mixture of Colima B- and Catalina-type ce-

ramics from the lowest levels (Lange 1980a: 141).

The Angeles Phase is contemporaneous with all

three of Lange's coastal phases, beginning with

the appearance of Bocana Incised Bichrome and

ending with linear painted and trichrome decora-

tion. It therefore covers the "Zoned Bichrome Pe-

riod" in its broadest conception. The beginning of

the Angeles Phase and the end of the Angeles-

Zoned Bichrome Phase is placed at 500 cal bc on the

basis of the available dates for La Montaña ceramics

and conservative estimates for the beginning of the

Zoned Bichrome Period. It should be noted, how-

ever, that the period from 1000 to 500 cal bc —
during which time Early Arenal traits probably
dominate—is poorly defined in the Angeles Phase

sequence.

The dates for the Angeles Phase are based as

much as is possible on ceramic as well as date

project excavations. The early facet is marked by

the appearance of Bocana Bichrome and the lower

assemblages at Sito Bocana (Lange 1980a: 35).

Smarski, personal communication, 1985). An

example of one of these sites was excavated at

Vidor (Snarski 1985). At Vidor, we recovered a small

amount of material in strati-

fied collections. A large "oven" feature at the Vidor

site (Lange 1980a: 41), a date of 1291-830 cal BC

(UCLA-2177A) from a Late Arenal component.

Unfortunately, both of these dates are of limited

value because of large standard deviations.

The Angeles Phase is represented at these sites by

a variety of subphases. For example, Martinez

[1982: 140], Baudez [1961: 410], at Site C. Menéndez,

and Snarski, personal communication, 1985). At

Sito C. Menéndez, Non [1982 -1983] reports a

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a variety of subphases. For example, Martinez

[1982: 140], Baudez [1961: 410], at Site C. Menéndez,
THE SILENCE PHASE

The Silencio Phase is marked by the appearance of polychrome ceramics and has been defined primarily on the basis of comparisons between the Arenal basin ceramics and the well-documented sequences of western Greater Nicoya. It is estimated to date from ca. AD 600–1300. As with the Arenal Phase, there are a significant number of similarities between Cordilleran assemblages and those from sites farther west at this time. Although vessels from the Atlantic Watershed region appear in Late Arenal contexts, however, trade vessels from Silencio contexts are exclusively from the west. Greater Nicoya techniques such as polychrome decoration and fine incision become dominant, and the presence of polychrome vessels from Greater Nicoya in burials suggests that there was a high level of contact between the two areas in the Silencio Phase.

In spite of contacts with the west, however, the Silencio Phase appears to have been a time of regional consolidation. There is an increase in the number of local ceramic types over those shared in Greater Nicoya, appear in special cemeteries. Locally produced vessels show modes of both form and decoration that may be derived from Central Highland and Atlantic Watershed traditions, rather than from those of Greater Nicoya. The blend of ceramic traits noted in Cordilleran assemblages during the Silencio Phase may reflect the area's geographical location between two areas that were experiencing unprecedented growth in population and social complexity at this time.

The ceramic sample for the Silencio Phase comes primarily from excavations at the Silencio cemetery (G-150), an essentially single-component site. Relatively few sites from the lakeshore reconnaissance showed an abundance of Silencio Phase material (Chap. 3). At El Silencio, Silencio Phase pottery was distributed vertically through Units 30 and 50, which were separated by layers of tephra (Units 40 and 41). Unfortunately, the disturbed nature of the site (with many deep burials, evidence of significant earth moving, and heavy looting) do not permit subdivisions of the Silencio Phase.

Ceramics diagnostic of the Early Polychrome Period (ca. AD 500–800), as it is known in Greater Nicoya, are extremely rare in the Arenal area. With the exception of a few sherds of Carillo Polychrome from Sitio Bolivar (G-164), the two principal pottery types of this period, but farther to the west—Carillo and Galo Polychromes—are practically absent in our samples. Decorative elements of both Carillo and Galo Polychrome are present in a local type—Jimenez Polychrome—identified at El Silencio.

At a general level, the ceramic assemblage from El Silencio is similar to Middle Polychrome (AD 800–1200) assemblages from La Guayma (Bau dez 1967), Hoopes (1980), Vidor (Acosta 1978), and La Ceiba (Blanco et al. 1986; Guerrero and Blanco 1987). Distinctive Middle Polychrome types such as Mora, Papagayo, Altiplano, Cabuya, Bimarana, and Santa Marta (Fig. 10-19) are present in significant quantities, and both polychrome and incised decoration on local types indicate widespread stylistic trends at this time.

Typical Greater Nicoya polychromes may not have been manufactured in the Cordilleran region, however. Fancy Greater Nicoya polychromes appear only at the Silencio cemetery, in either burials (one of which contained five miniature Cabuya polychrome vessels) or construction fill (Fig. 10-20). Moreover, the typical Greater Nicoya domestic types from Middle Polychrome assemblages such as Fiches Red and Santa Fe Beige are found only in small quantities. The dominant monochrome type is instead Tres Esquinas Beige, and the abundance of distinctive local polychrome vessels, which are not known from sites in western Greater Nicoya, implies that the high-quality polychromes may have arrived through trade or other special contacts.

As elsewhere in Greater Nicoya at this time, the Cordilleran region experienced an explosion of polychrome types during the Silencio Phase. With the exception of the local Jimenez Polychrome, all of the polychrome types at El Silencio are also found in Middle Polychrome assemblages in the Tempisque Valley (Bau dez 1967) and the Pacific Coast of Guanacaste (Lange 1976). Many appear as trade items at sites in the Atlantic Watershed (Snarskis 1978:289–290) and Meseta Central (Snarskis and Blanco 1978).

A preliminary examination of the pastes of sherds of Mora and Papagayo polychromes from El Silencio suggests that they were not locally manufactured. The Mora examples have a compact, fine-textured paste devoid of the white flecks of tepha found in locally manufactured pottery Papagayo sherds have a fine, orange-colored paste similar to that found in western Guanacaste and Rivas, Nicaragua. The relatively small numbers of these types in Silencio Phase assemblages sug-
gests that these fine-paste decorated wares were imported to the Cordilleran region from manufacturing centers in western or northern Greater Nicoya.

**SILENcio PHASE CERAMIC TYPES**

Several decorative and formal modes have been noted that are distinctive to the Silencio Phase, and they have assisted in the definition of two local types and one local variety.

**Jiménez Polychrome**

Jiménez Polychrome is the principal diagnostic type of the Silencio Phase (Figs. 10-30C, 10-21; Hoopes 1984a:fig. 4). It combines decorative modes of the Early and Middle Polychrome periods of Greater Nicoya with formal modes that may have Atlantic origins. It is characterized by large, open bowls and restricted-neck jars with flattened or everted rims, and is decorated with painting in red and black on a cream or buff surface. Painting is also found on the upper, flattened surface of rims with a T-shaped cross section (Hoopes 1984a: fig. 4F). The lower half of the vessel is always slipped red, but the upper half bears a horizontal frieze of geometric motifs executed in broad strokes in combination with sets of horizontal wavy lines in red or black. Multiple brushing is also found on the broad lip surface of flattened-rim bowls. Vessel supports include small, solid conical feet and large, hollow mammiform rattle forms.

The use of broad-stroke geometric motifs in Jiménez Polychrome is similar in execution to motifs on Galo Polychrome (d. Baudez 1967:pl. 38B; Lange 1976:fig. 7a), but the characteristic surface luster and both pear-shaped and cylindrical vessel forms of Galo are absent. Jiménez Polychrome is related to Cabuyal Polychrome in a fashion analogous to that between Galo and Carillo. Principal motifs are shared, but sufficient differences in the way they are combined—along with variables of paste, surface finish, and form—distinguish one from the other. Jiménez Polychrome shares the use of multiple brushing in red on a cream or white background with Cabuyal, and small sherds of the two are often confused. The modal repertoire of form and decoration for Cabuyal is substantially smaller than that for Jiménez Polychrome, and the former could in fact be classified as a variety of the latter (i.e., Jiménez Polychrome: Cabuyal Variety).

**Belen Incised**

Incised decoration is the same as that defined for Belen Incised in the Tempisque Valley (Baudez 1967:139). Principal motifs are cross-hatched triangles and rectangles in friezes on the upper vessel exterior. The Belen Incised: Ayotes Variety (Fig. 10-22) is characterized by a distinct T-shaped rim profile, which is shared with Jiménez Polychrome and Tres Esquinas Beige. Just as Jiménez Polychrome frequently bears decoration on the upper vessel surface, the Belen Incised: Ayotes Variety occasionally has incisions on the broad upper surface of the vessel lip. The most common vessel type is the open bowl, slightly incurving at the rim. Surfaces are slipped brown or left unslipped and burnished. Vessels are black to reddish brown in color. Infilling of incisions with white pigment is common. Pastes are fine but poorly oxidized and contain inclusions of tephra and ferriferous spherules.

Chronologically, Belen Incised enjoyed a later popularity than Jiménez Polychrome. We found more than three times as many Belen Incised sherds in Unit 30 than in Unit 50, whereas we found more than twice as many Jiménez Polychrome sherds in Unit 50 than appeared in Unit 30.

**Tres Esquinas Beige**

Another new type, Tres Esquinas Beige (Fig. 10-23; Hoopes 1984a:fig. 6K-T), is the dominant domestic ceramic in Silencio Phase assemblages, al-

through sherds of Piches Red, Malekos Red, and Danta Beige are also present in small quantities. Tres Esquinas Beige is closely related to the Hermanos Beige of the Arenal Phase, being characterized by red-slipped rims on bulb-paste jars and bowls. As in the earlier type, the red slip extends to the interiors of jar rims and open bowls. The two types are distinguished on the basis of rim profiles. While Los Hermanos Beige jar rims are rounded and externally thickened, Tres Esquinas Beige rims have a broad, outturned lip. In sum, although paste and decorative modes are virtually the same for some Arenal and Silencio Phase ceramics, rim forms are sufficiently different to allow for temporal distinctions.

DATING THE SILENCIO PHASE

The upper date for the Silencio Phase is based on a date of cal AD 1216–1295 (Tx-5077) for charcoal from a burial associated with a large assemblage of diagnostic ceramics at El Silencio. Previously, a terminal date of AD 1000 was suggested in the absence of C-14 assays (Hoopes 1984a). This suggestion was based primarily on the absence of a number of ceramic traits that distinguish the Middle Polychrome/Late Polychrome transition in Greater Nicoya. The small sample of Papagayo Polychrome consists entirely of early varieties, including a bowl fragment with a painted jaguar on the interior. The great majority of Mora Polychrome sherds are from varieties that Acosta (1978) places in the Panama Phase (AD 800–1000) of the Bay of Culebra. Asientillo Polychrome, a late Middle Polychrome type common in the Tempisque Valley, is another type that is not present. Late Polychrome white-slipped ceramics such as Vallenito, Mombacho, Patate, and Maderas Polychrome are also completely absent from Cordilleran assemblages.

Decorative modes of Jimenez Polychrome, the dominant marker for the Silencio Phase, also suggest that the phase as defined may be weighted toward the earlier half of the Middle Polychrome Period. The principal decorative motif of both Jimenez Polychrome and Cahimay Polychrome is wavy, multiple-brushed horizontal lines. Although this motif is not mentioned in the original type descriptions of either Carrillo or Calo Polychrome (Rendon 1967:119,132), an examination of whole vessels from the collections of the Museo Nacional de Costa Rica and the Instituto Nacional de Seguros reveals that it occurs frequently on both. Multiple brushing is diagnostic of the Arenal Phase Las Palmas Red-on-Beige type, and it is also found on examples of Charco Black-on-Red from Sitio Bollivar. Its use on Silencio Phase pottery indicates a strong continuity in local ceramic traditions; however, multiple-brush decoration declines in usage sometime toward the middle of the Middle Polychrome Period across Greater Nicoya. This may also be true in the Northwestern Cordilleras.

DISCUSSION

The dominance of red-slipped ceramics and gradual transitions in ceramic styles over a space of more than 3,000 years argue strongly for a continuity in populations from the Tronadora through the Silencio phases. Domestic pottery is usually a more reliable indicator of ethnic identity than are decorated types, which are frequently imitated or traded. The relative scarcity in Arenal-area assemblages of the monochrome culinary wares that dominate Middle Polychrome assemblages in the Tempisque Valley suggests that the populations of the Arenal region had household traditions that were markedly distinct from those to the west. The use of rock-lined tombs in the Silencio Phase is a major divergence from Greater Nicoya patterns and indicates cultural affinities with the Central Highlands region. In ceramics, there is more evidence of stylistic regionalization in the Silencio Phase than in the preceding Arenal Phase. Ceramic patterns suggest that the local population had regular interchange with peoples of lowland Guanacastec, somewhat lesser interaction with the Atlantic region, and maintained distinct local traditions.

THE TILARÁN PHASE

There is evidence for a marked divergence in cultural patterns between the cultures of Greater Nicoya and those of the Cordilleran region in the Tilarán Phase (cal AD 1300–1500). There is some evidence for interaction with peoples of the Gulf of Nicoya, but local ceramic assemblages bear little resemblance to Late Polychrome assemblages from the Pacific Coast and the Tempisque Valley. None of the late painted types of Greater Nicoya, with the exception of Lilocote Polychrome, are present in Tilarán Phase assemblages. Two sherds of Tempisque Incised hint at direct contacts between peoples of the Cordillera and the Gulf of Nicoya. In general, the phase is characterized by large, coarse ceramics with appliquéd-decorated handles that are very similar to late prehistoric ceramics from the Gulf of Nicoya.

Silencio Appliqué, Malekos Red, and San Luis Coarse have been placed in the Tilarán Phase on the basis of clear stratigraphic associations. They were present in a large assemblage found immediately beneath a layer of coarse gray lapilli (Unit 20) at Dos Armadillos (G-154; Chap. 7). They also show a much stronger correlation with Unit 30 than with Unit 50, as does a small sample of Lilocote Polychrome—a Late Polychrome type common in the Tempisque Valley. In addition to the types described below, modes and modal combinations found in association with Tilarán Phase assemblages include unslipped zoos...
Figure 10-24.  
Tilaran Phase: Silencio Applique handles.  Sneed widths:  A. 11.0 cm;  B, 11.0 cm;  C. 6.0 cm;  D. 7.0 cm;  E. 12.0 cm.  Photographs by John Hoopes.

Figure 10-25.  

TILARÁN PHASE CERAMIC TYPES

Silencio Applique  

Silencio Applique is the principal decorated type of the Tilaran Phase (Figs. 10-24, 10-25; Hoopes 1984a:fig. 7).  It is a dark brown to reddish paste utilitarian ware with an often coarse, unslipped finish.  Vessels are vertical-necked jars with direct or slightly everted rims.  Applique appears on vessel necks, rims, and shoulders.  One diagnostic mode is a decorated strap handle with a stylized face of applique buttons or modeled features.  These handles are usually fairly crude.  They are typically narrow in the middle and expanded at either end (Fig. 10-7).

Silencio Applique is very similar to Toro Applique, a type from sites near the mouth of the Tempisque River (Baudot 1967:168) and on islands in the Gulf of Nicoya (Creamer 1983:299-306, fig. 71), and may prove to be the same ceramic type.  The representation of zoomorphic motifs (which Creamer identifies as bats and reptiles) on the two types is similar.  As with Silencio Applique, Toro Applique has been identified only from vessel handles.

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Malekos Red

The most common culinary type is Malekos Red, which shares outlying jar forms with Tres Esquinas Beige but differs in having a red finish. The distinctive color is achieved in two ways, either by the use of a thick red slip or by complete oxidation of the vessel exterior. Malekos Red shares many similarities to the Fiches Red type of the Tempisque Valley, especially in wide-rimmed bowl forms and shoe-shaped vessels. Handles are usually round in cross section. Vessels of this type are often surprisingly large.

San Luis Coarse

A third utilitarian type of this phase has been termed San Luis Coarse (Fig. 10-26). It is distinguished principally by its rude execution. Vessels are principally thick-walled, vertical-necked jars that are unslipped and dark red, brown, or black. Both Malekos Red and San Luis Coarse bear many similarities to the Red type of the Arenal area. Several Sherds are unslipped and dark red, brown, or black. Both Malekos Red and San Luis Coarse, and Gulf Plain, share a number of characteristics with Gulf Plain, which is characterized by its crude execution. Vessels are usually round in cross section. Vessels of this type are often surprisingly large.

Tempisque Incised

Two sherds from the site of Dos Armadillos (G-154) have been identified as Tempisque Incised (Fig. 10-27A and B). A type identified by Baudez from collections on Tono Island (1967:70) and by Creamer at sites in the Gulf of Nicoya (Creamer 1983:311-314), suggesting further affinities between late monochrome types of the Arenal area and Gulf of Nicoya regions.

DATING THE TILARAN PHASE

A single C-14 date, cal AD 1298-1420 (Tx-5079), was associated with a Tilaran Phase assemblage at the site of Dos Armadillos. This sample came from the upper portion of Unit 30 in a deposit buried under a thick layer of Unit 20 tephras. Current estimates for the date of deposition of Unit 20 are based on the foregoing date and two others, cal AD 1416-1471 (St-576) and cal AD 1455-1619 (St-577), derived from samples of charred bark buried by a pyroclastic flow from Arenal Volcano. These suggest a date of approximately cal AD 1450 for Unit 20. The late dates for this phase are in agreement with estimates for the age of the ceramics from the Gulf of Nicoya mentioned earlier. No Tilaran Phase materials were identified in contexts that clearly posited the deposition of Unit 20.

CERAMIC PHASE DISTRIBUTION

REGIONAL PATTERNS OF CERAMIC PHASES

Table 10-1 illustrates the distribution of ceramics from each of the four phases for the forty-three sites sampled during the 1984 and 1985 seasons. We identified Tronadora Phase pottery at 20 sites, and Arenal Phase ceramics were present at all but six. Only two sites, G-162 and G-163, yielded a predominance of sherds from the Tronadora Phase; however, a total of twenty sites proved to have a majority of ceramics from the Arenal Phase, with seven more having at least 25% of the ceramic assemblage in this phase. There were only three sites with strong Silencio Phase components, and five with predominately Tilaran Phase components.

Of the forty-three sites sampled, few were strictly single-component sites. Almost all sites were occupied during two or more ceramic phases, and eleven had evidence of occupation during all four. This suggests that there was a strong continuity of site use throughout the study region, in some cases lasting as long as 3,000 years.

STRATIGRAPHIC RELATIONSHIPS OF CERAMIC PHASES

One of the principal aims of this study was to correlate the ceramic sequence with tephra layers from Arenal Volcano (Chap. 1, Fig. 1-8). In doing so, we were able to combine interpretations of volcanic and cultural stratigraphic units. Volcanic activity was responsible for the destruction of crops and habitations during violent eruptive intervals as well as for the creation of fertile, tephra-enriched soils. A recognizable sequence of volcanic strata was traceable throughout the study area, although not all individual strata were visible at all sites. This sequence provided a unique opportunity for the calibration of stratigraphic deposits from a number of widely separated sites.

TABLE 10-1

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Note: Total counts (where applicable) include sherds from both surface collections and excavations.
There was not a strong correlation between volcanic activity and cultural change in the Arenal region. No tephras occurred clear transitions from one cultural phase to another. Sealed deposits were rare with the exception of the Tilarán Phase assemblage at Don Armasillo, however, it was possible to associate the ceramic sequence with the volcanic stratigraphy.

We combined artifact lots of known stratigraphic affiliation for a regional sample of almost 9,000 diagnostic sherds with known stratigraphic provenience. We recovered close to 1,000 sherds from Unit 30, most of these from El Silencio and Don Armasillo. We collected over 7,500 diagnostic sherds from 50 strata sampled at El Silencio, Tilarán Phase, Tovar, and other sites. We excavated over 300 diagnostic sherds from 60 strata horizons, virtually all from Tronadora Vieja. We recovered smaller numbers from Units 20 and 40/41, tephra horizons whose cultural contents were probably mixed from other strata.

The earliest Tronadora Phase occupation appears to have occurred just prior to the initial eruptive activity of Arenal Volcano, shortly after 2000 cal bc. This occupation continued throughout the deposition of the first tephras in the region. We are confident that diagnostic ceramics recovered from Units 64, 61, and 60 as belonging to the Tronadora Phase, the remaining being either Arenal Phase or unclassified sherds. At Tovar, we also found Tronadora Phase ceramics in the lower 50s horizons, although in small proportions relative to Arenal Phase ceramics. This suggests that the Tronadora Phase ceramics are significantly greater in strata below Unit 55 than above it, but it is not clear whether this is the result of Arenal Phase ceramic deposition or that of a separate Tronadora Phase cultural deposit. It seems safe to say, however, that the 60s strata were formed during the Tronadora Phase.

Ceramic associations of 50s complex stratigraphic horizons above Unit 55 and below Units 40 and 41 are not as clear. Arenal Phase ceramics appear to be present in the 50s strata at both Tovar and Silo Bolivar. At Tovar, the sample size from individual units within the 50s complex was not great enough to indicate ceramic change or the correlation of units with Early or Late Arenal assemblages.

At the Late Arenal site of Silo Bolivar, the stratigraphic association of the ceramic assemblage was somewhat clearer. Unit 50 was visible as a separate stratum in profiles. The majority of artifacts were situated in Unit 54. Unit 60 was mostly disturbed through cultural activities such as burials. In most places this disturbance had penetrated down into the Aguacate clay (Unit 65). While we found many artifacts in Unit 54, it appears that cultural activity at Silo Bolivar occurred on top of this unit and not during its formation. The 50-50 ratio of diagnostic sherds demonstrate a mixture of both Greater Nicoya and Atlantic Watershell characteristics, however, the region is not easily classified as belonging to either of these culture areas. Shifting affinities and strong local traditions indicate that the region had an important character of its own.

The TRONADORA PHASE

The earliest pottery in the Arenal sequence is mixed with or superimposed on artifacts from the preceramic Fortuna Phase. This suggests that the preceramic/traditional transition around 2000 cal bc was not accompanied by major changes in settlement pattern. Because Tronadora pottery does not appear to represent an incipient technology, it is unclear whether sites like Tronadora Vieja were used or continuously occupied through the preceramic/terracotta transition. The appearance of a sophisticated ceramic complex in the area as early as 2000 cal bc suggests either an expansion of pottery-using populations into a region previously inhabited by preceramic societies or an existing preceramic population's adoption of a developed ceramic technology. Our limited data on preceramic sites throws little light on either hypothesis. The presence of pottery is clearly related to both Chaparrón and La Montañita, but the available information is inadequate for determining which of the three has greatest antiquity. At present, the best explanation is that they represent a regional, Costa Rican development from a still poorly understood Formative substrate.

Although roughly contemporaneous, Tronadora is similar to the Panamanian complexes of Montagro and Sarigüa only at the site level of general ceramic associations. Tronadora ceramics also have a general relationship with early ceramic complexes of southern Costa Rica. For instance, the Ibidolambo, especially round-bottomed groove incision, especially in terms of rim forms, the use of red paint, and plastic decoration.

SUMMARY AND CONCLUSIONS

Archaeological research in the Arenal area has produced one of the longest cultural sequences in lower Central America. It is especially noteworthy that of the early dates for the appearance of identifiable ceramics demonstrate a mixture of both Greater Nicoya and Atlantic Watershell characteristics, however, the region is not easily classified as belonging to either of these culture areas. Shifting affinities and strong local traditions indicate that the region had an important character of its own.

The earliest pottery in the Arenal sequence is mixed with or superimposed on artifacts from the preceramic Fortuna Phase. This suggests that the preceramic/traditional transition around 2000 cal bc was not accompanied by major changes in settlement pattern. Because Tronadora pottery does not appear to represent an incipient technology, it is unclear whether sites like Tronadora Vieja were used or continuously occupied through the preceramic/terracotta transition. The appearance of a sophisticated ceramic complex in the area as early as 2000 cal bc suggests either an expansion of pottery-using populations into a region previously inhabited by preceramic societies or an existing preceramic population's adoption of a developed ceramic technology. Our limited data on preceramic sites throws little light on either hypothesis. The presence of pottery is clearly related to both Chaparrón and La Montañita, but the available information is inadequate for determining which of the three has greatest antiquity. At present, the best explanation is that they represent a regional, Costa Rican development from a still poorly understood Formative substrate.

Although roughly contemporaneous, Tronadora is similar to the Panamanian complexes of Montagro and Sarigüa only at the site level of general ceramic associations. Tronadora ceramics also have a general relationship with early ceramic complexes of southern Costa Rica. For instance, the Ibidolambo, especially round-bottomed groove incision, especially in terms of rim forms, the use of red paint, and plastic decoration.

In spite of some similarities between Tronadora and Ocós, however, there are significant differences. The bolstered rim (Tomale Beige) and tall, cylindrical vessel (Zerribell Shell-Stamped) are absent in Late Preclassic complexes outside of Costa Rica. Figurines, ubiquitous in Ocós and other early Mesopotamian assemblages, are completely absent in Tronadora. Furthermore, the earliest dates for Barra and Ocós (Love 1975) are younger than those for Tronadora. If there is a linear relationship between the Costa Rican and the Mesoamerican complexes, the influence is from south to north, not the reverse.

In Costa Rica, the inlands valleys of the Northwestern Corridor, the Central Highlands, and the northeastern plains may have had a head start over coastal regions with the development of sedentism and ceramic technology (Fig. 10-1). Sites related to Chaparrón and La Montañita have been reported from almost 30 kilometers of Chaparrón in San Carlos (Snarskis 1984a:306). With the exception of a few sherds from Loma B levels at the Vidor site (Lange, personal communication, 1985), no Early Mesopotamian ceramic complex has been defined clearly in western Guanacaste. In a pattern markedly different from that of the "boomer" in the area," sedentary villages and other coastal adaptations are not apparent until the Early Polychrome Period (Lange 1978). This suggests that the first sedentary communities in Costa Rica may have had inland-oriented economies.

The stratigraphic relation of Tronadora ceramics to the local ceramic sequence is revealed in terms of cultural development. An initial hypothesis was that ceramics were brought into the region by incipient village agriculturalists who moved into the area to take advantage of fertile soils weathered from volcanic tephas. Pottery appeared beneath the first tephras layers, indicating deposition within the surface of the Aguacate Formation. The Arenal area was therefore occupied by ceramic using societies before 2000 cal bc and before the appearance of deep, fertile soils. The fact that Tronadora pottery is found in the greatest quantities in Units 60 and 61 indicates that sites use intensively with the deposition of fine tephas during explosive eruptions of Arenal Volcano.
THE ARENAL PHASE

A clear relationship between the Arenal area and Central Highlands is apparent with the appearance of Arenal Phase types, and the Arenal area should have undergone a period of differential social status. Ceramic horizons linking the Arenal area with areas to the west suggest a certain amount of interaction throughout Guanacaste. However, significant regional differences in the appearance of types like Schettel Incised and Rosales Zoned-II Engraved in the use of jade and elaborate carved metates suggest that the cultures of highland and lowland Guanacaste were far from uniform.

While it is not clear that violent eruptions of Arenal Volcano disrupted the occupation of individual sites, the fact that few sites have Early and Late Arenal components suggests that new sites were not being established in the early centuries cal. AD. Although the number of sites appears to decrease in the Late Arenal Phase, the appearance of types characteristic of Greater Nicoya indicates active interregional exchange. It is possible that the pottery of Arenal Phase sites, which reflect a lack of continuity in occupation from the Late Arenal to the Silencio phases, do not reflect a population decrease, but a more intense concentration of settlement in defensible site locations. Populations may have been consolidated in larger villages with greater capacity for ceremonial and defensive activities, as evidenced by the large tombs and stone walls that characterize the Early Arenal Phase.

There is evidence that major volcanic eruptions affected both western Guanacaste (Ascoli 1978) and the Arenal area during the Middle Polychrome periods. Although the region continued to provide suitable environments for the development of Formative economies in Costa Rica, it is hardly "marginal" or "peripheral" to cultural development in the two regions during the early part of the sequence. The Northwestern Cordillera played a significant role in the development of Formative economies in Costa Rica during this period.

Ceramic evidence from Local Arenal Phase sites indicates that the Gulf of Nicoya was an important centre of exchange ceramics from Greater Nicoya and the Atlantic Watershed were utilized. An increased level of status differentiation is apparent in the Late Arenal Phase, intensified with the appearance of types common to Greater Nicoya. The rough, monochrome pottery of the Arenal Phase is typically incised decoration. The sharing of ceramic styles and modes characteristic of Greater Nicoya continues into the Tilaran Phase, together with the presence of possible potteries, indicating that contacts between highland and lowland Guanacaste continued during the centuries immediately prior to the arrival of the Spanish and afterwards.

The pattern recalls a statement by Castañeda, an early explorer who wrote of the mainland side of the Gulf of Nicoya that the "rest of the people live by trade with those of the mountains, to whom the chiefs who live on the plain have few Indians, these people live by trade with those of the mountains, those who live in the hills do not have" (cited and translated by author, from Perlaza 1983: 54).

Central High and Lowland Greater Nicoya ceramics that typify assemblages in western Greater Nicoya and the Tempisque Valley and the Arenal area during the Tilaran Phase are indicated by sherds of Tempisque Polychrome Incised (Ruedes 1967: 170; Creamer 1983: 298) from the Tilaran Phase, there is no evidence for the significant amount of movement or movement into or out of the region. Sociopolitical change, even if part of a region-wide pattern, appears to have been largely autonomous. The Arenal area was one of a range of diverse ecological settings in Costa Rica whose cultures contributed jointly to the formation of cultural traditions in lower Central America. Its changing cultural manifestations are evidence for the complex ties that existed between cultures of prehistoric Costa Rica. It is necessary to understand the nature and origins of specific cultural systems. The present work emphasizes the importance of understanding regional and cultural history as a prelude to the formulation of models for cultural change. It is hoped that this preliminary work will contribute to the establishment of a foundation for future research on the origins and configurations of Lower Central American societies.

CONCLUSION

The ceramic evidence from 2000 cal. BC to 250 BC indicates that the Arenal area had a dynamic and complex history, characterized by fluctuating populations with changing regional affiliations yet noteworthy for its long-term stability. The region provides an example of how cultural boundaries and population densities can change through time. While the Arenal area may be understood as a transition zone between Greater Nicoya and the Atlantic Watershed regions, it is hardly "marginal" or "peripheral" to cultural development in the two regions during the early part of the sequence. The Northwestern Cordillera played a significant role in the development of Formative economies in Costa Rica during this period.
NOTES

1. All other dates in this volume are based on calibrated radiocarbon years—dates in real calendar time. These are used to indicate the actual duration of cultural activities in time and to allow for direct comparisons with calendar-based chronologies, such as are being constructed for literate Mesoamerica. In this chapter, however, both calibrated and uncalibrated dates are provided in order to facilitate comparisons with published sequences. Calibrated dates are reported with the prefix “cal” (for example, “1000 cal BC”), while uncalibrated dates do not have this prefix.

It is difficult to make direct comparisons between chronologies based on uncalibrated radiocarbon dates and those based on dates calibrated to real calendar years. For example, Baudez (1967:205) suggests a time span of 300 BC–AD 300 for the Catalina Phase in the Tempisque Valley, based in part on a highly problematic (see Hoopes 1987:328–330) interpretation of radiocarbon assays. His dates are not radiocarbon assays themselves, however, but estimates based on a wide range of comparative data from Central and South America, of which radiocarbon assays are just a part. If we could convert his suggested phase dates to calendar years, they would be closer to 374 cal BC–cal AD 405—a time span about 30% longer in real time. Still, we cannot say whether this calibrated span accurately represents Baudez’s interpretation. Although we can calibrate the individual radiocarbon assays he took into consideration, a direct calibration of his proposed chronology would be methodologically flawed. In order to evaluate new radiocarbon assays in the light of uncalibrated chronologies, it is therefore important to consider both uncalibrated and calibrated values.

2. A more detailed discussion of this methodology can be found in Hoopes 1987.

3. A more detailed discussion of these modes can be found in ibid.: 246–250.

4. See ibid. for additional information on Tronadora Phase ceramic types.

5. For the sake of accuracy, all radiocarbon dates in this chapter are presented with their calibrated, two-sigma confidence intervals (see Table 1-1). Dates not listed in Table 1-1 are accompanied in parentheses by laboratory reference numbers and uncalibrated BP dates with one-sigma confidence intervals (see Table 1-1).

6. For a more detailed description of these characteristics, see Hoopes 1987:320–433.
References Cited

ABEL-VIDOR, S.
ACCOLA, Richard
ADAMS, Richard E.
AGUILAR, P. C.
ALLEN, Karen A.
ALLEN, Paul H.
References Cited


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