

# 10

## *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 Baudez (1961, Baudez and Coe 1962). They suggested a succession of four major periods: the Zoned Bichrome, the Early Polychrome, the Middle Polychrome, and the Late Polychrome. Baudez (1967) presented the first detailed description of Greater Nicoya ceramic types. Lange (1971) made use of Baudez and Coe's periodization and Baudez' type descriptions in his research in the Sapoá River Valley. These also formed the basis for Healy's (1974, 1980) analysis of material from the Rivas region of Nicaragua, and Sweeney's (1975) analysis of ceramics from the Santa Elena Peninsula. It should be noted that, of these researchers, Healy made the greatest attempt to adhere to a well-defined type: variety methodology. He made explicit use of a classification that included taxonomic divisions by ware, group, and variety (as opposed to Baudez, whose categories often crosscut these divisions).

Parallels in cultural sequences and recognizable continuities in ceramic horizons from Rivas to the Gulf of Nicoya (Creamer 1983) have been important characteristics of the Greater Nicoya subarea (Lange 1984b). 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 1980, 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 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 (Snarskis 1976, 1978). A great deal of research has focused on the Central Highlands and Atlantic Watershed regions of Costa Rica (see summaries by Snarskis 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 Guatuso and San Carlos plains in the north-central 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 north-central 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 region 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 cal AD.<sup>1</sup> Ceramic analysis and stratigraphic excavations have revealed the existence of an Early Formative (ca. 2000 cal BC), 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 Tilarán, and the Cordillera de Guanacaste.

The Northwestern Cordillera ceramic 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 Snarskis' (1978, 1984a) Chaparrón 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 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 area are sufficiently similar to documented assemblages from Greater Nicoya and the Atlantic Watershed that cross-dating with published sequences (e.g., Baudez 1967; Snarskis 1978; Lange et al. 1984; Abel-Vidor et al. 1987; Chap. 1, Fig. 1-8) is possible. Six phases have been defined:

Tilarán (cal AD 1300-1500)—Late Prehistoric Period

Silencio (cal AD 600–1300)—Early/Middle Polychrome Period  
 Late Arenal (cal AD 0–600)—Late Zoned Bichrome Period  
 Early Arenal (500 cal BC–cal AD 0)—Early Zoned Bichrome Period  
 Late Tronadora (1000–500 cal BC)—Middle Formative Period  
 Early Tronadora (2000–1000 cal BC)—Early Formative Period

## METHODOLOGY

We have based the ceramic sequence on the analysis of 12,629 sherds from 43 sites. Almost 75% of these come from stratigraphic excavations, with the remainder from surface collections. We examined ceramics from each of 431 excavation and survey lots individually and recorded information on sherd size, vessel part (rim, body, handle, support, etc.), ceramic type, and modes of decoration, manufacture, and vessel form. We entered data from index cards in the field on an electronic spreadsheet (Lotus 1-2-3) using a portable computer. Subsequent analysis was performed on an IBM-compatible 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, 30, 50; Mueller 1984b; Chap. 2).

Using data base and statistical functions, we sorted and combined lots by site, operation, stratum, phase designation, and assemblage. Once data were tabulated, it was possible to manipulate large volumes of data quickly and easily. The computer allowed for 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 evaluate ceramic frequencies during the course of fieldwork.<sup>2</sup>

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 (Baudéz 1967; Lange 1971; Sweeney 1975; Healy 1980; Lange et al. 1984; Abel-Vidor et al. 1987). The method differs from the type:variety system commonly used in Mesoamerica (Smith, Willey, and Gifford 1960; Sabloff and Smith 1969) because it uses an abbreviated taxonomic hierarchy. To date, Healy (1980) has been the only re-

searcher in Greater Nicoya to use "wares" 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, I have been hesitant to postulate distinct "wares." The level of "group" is useful in 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 Impressed, all of which share modes of form and surface finish. Because group designations have not been formulated as a taxonomic 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 (Lange and Bishop n.d.) does not utilize the group category, and the methodology we use here is designed to be compatible with the available comparative data.

A taxonomic level that *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 geographically 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-152), Neblina (G-151), Dos Armadillos (G-154), and other sites yielded burial and domestic assemblages that helped correlate cultural occupations with the stratigraphic sequence from Arenal Volcano. Because Arenal's tephra were preserved as visible horizons, it was possible to use C-14 dates and stratified assemblages from individual sites to define an idealized regional stratigraphic sequence (Hoopes 1984a; Chap. 2). At El Silencio, whole vessels from burial offerings and sherds from burial and architectural fill provided information on Silencio Phase ceramics and interregional exchange. At Dos Armadillos, a horizontal deposit overlain by a well-preserved tephra layer provided a sealed and dated domestic assemblage from the Tilarán Phase.

The 1985 season provided the most important information on the Tronadora and Arenal phases. Tronadora Vieja (G-163) and Sitio Bolívar (G-164) each had primarily single-component surface assemblages (Tronadora and Arenal phases, respectively). Excavations at the two sites were extremely fruitful. Tronadora Vieja provided more than seven hundred diagnostic sherds, over 60% of them dating to the Tronadora Phase. Sitio Bolívar yielded an assemblage of almost six thousand diagnostic sherds in deposits pertaining almost exclusively to the latter half of the Arenal Phase. Domestic and mortuary features were identified at both sites, and the ceramic classes present indicated a wide variety of activities.

The ceramic assemblages represent a variety of cultural and depositional contexts as well as time periods. Given the location of the study area—on and near the Continental Divide and between the Cordillera de Guanacaste and the Cordillera de Tilarán—we expected a blending of culture traits. The ability to make extensive use of crossdating assisted our interpretations of sequences in the Northwestern Cordillera and facilitated an independent check on established sequences from neighboring regions. Ceramic analysis also provided important insights into interregional cultural change and interaction.

## THE TRONADORA PHASE

The Early (2000–1000 cal BC) and Late (1000–500 cal BC) facets of the Tronadora Phase represent the earliest dated ceramic-producing culture in Costa Rica. They are characterized by the Tronadora Complex, an assemblage of compositional, formal, and stylistic modes (Hoopes 1985, 1987). The most common vessel forms are massive "ollatecomates" (tecomate-like vessels with exteriorly bolstered rims); *tecomates* with comma-shaped rims; flat-bottomed vessels with cylindrical and "hyperboloid" profiles; and squat, necked jars. The pottery from this phase shares important modes with other early complexes from Costa Rica and Nicaragua as well as with those from Mesoamerica and northwestern South America. It is also distinctive, however, indicating that strong regional traditions of ceramic production were present in the Intermediate Area at least as early as the second millennium cal BC.

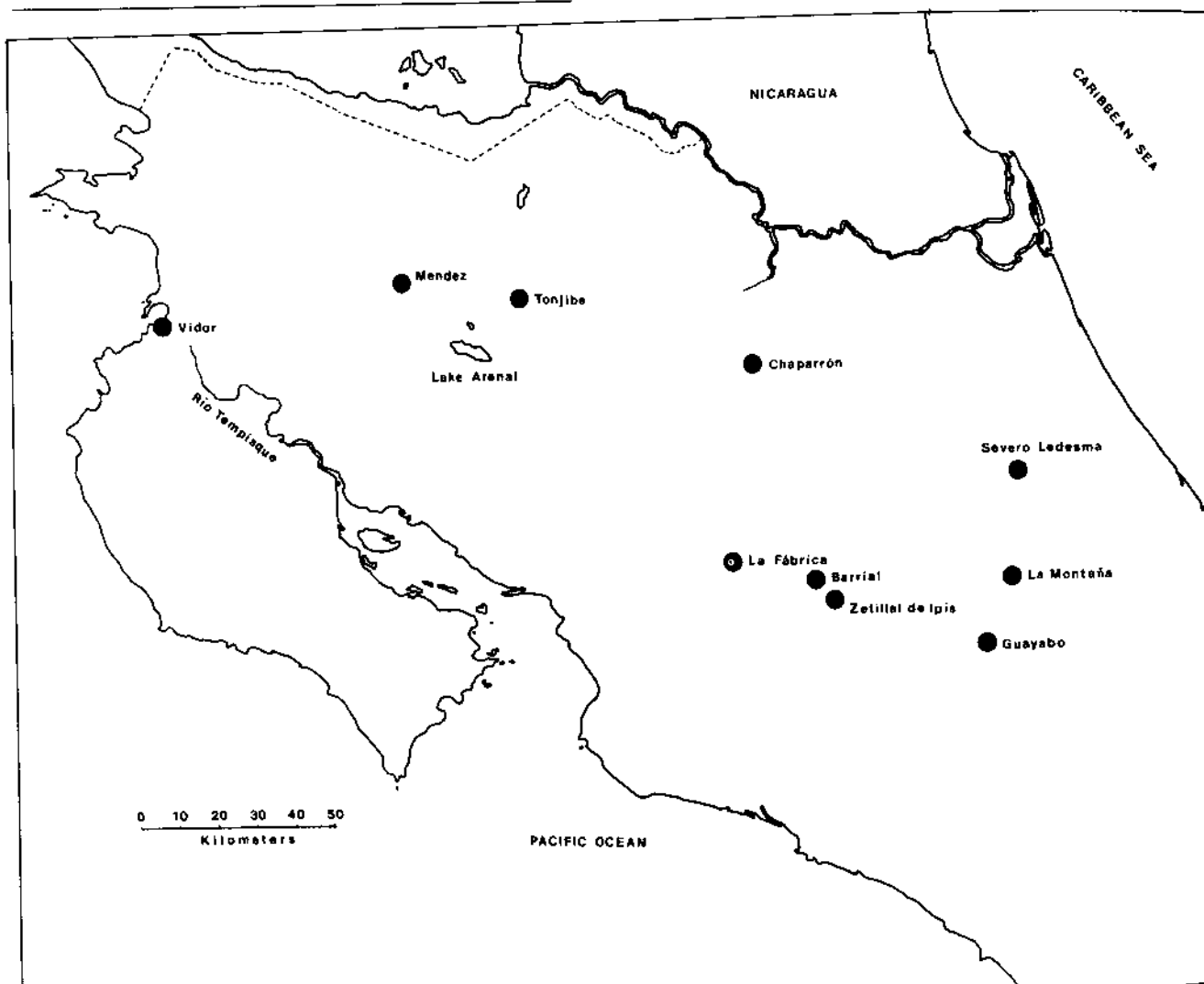
The Tronadora Complex stands out as a unified stylistic assemblage that is readily separated from assemblages of other phases in the Arenal region

(Hoopes 1984a, 1985). It is similar to other early Costa Rican ceramic complexes, particularly Chaparrón, from the north-central San Carlos plains, and La Montaña, from near Turrialba (Fig. 10-1) (Snarskis 1978, 1984a). Norr's (1982–1983) Naranjo Phase ceramics from the Naranjo River and pottery from the site of La Pochota near Cañas (Odio 1989) are the most closely related, followed by Haberland's (1966) Dinarte ceramics from Ometepe Island in Nicaragua. Important affinities are also evident between Tronadora ceramics and pottery from Curré (Corrales 1985, 1989), in the Térraba-Coto Brús region. There are important similarities between Tronadora ceramics and those of Greater Nicoya, especially types Schettel Incised and Bocana Incised Bichrome of the Loma B Phase (Lange 1980a); however, direct comparisons show that Tronadora and Loma B are not identical. The later dates for Loma B assemblages and the presence of Bocana Incised Bichrome in Arenal Phase assemblages suggest that Loma B may have developed out of Tronadora Complex traditions (Hoopes 1987). In this respect, ceramics and associated C-14 dates from Tronadora Vieja provide the first evidence of stylistic traditions predating the Zoned Bichrome Period in northwestern Costa Rica. Tronadora ceramics also share a number of important modes with early ceramics from Guatemala, Nicaragua, Panama, and Colombia.

The type site of the Tronadora Complex is Tronadora Vieja (G-163; Hoopes 1987:43–97; Chap. 4), located during a reconnaissance of the southern 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 Tilarán 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 expressing frequently recurring sets of modes or attributes for purposes of interregional as well as intrasite comparisons. So far, with the exception of broad type classes such as the Atlantic Red-Filled Black Group or the Chaparrón Zoned Red on Brown Type (Snarskis 1978)—the latter of which might better be understood at the group level 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-



**Figure 10-1.** Map of Costa Rica showing sites where Early and Middle Formative ceramics (Tronadora, Chaparrón, La Montaña, Barva, and Curré) have been reported. Map by John Hoopes.

amics, I shall first discuss ceramic modes diagnostic of this phase; however, there are also certain sets of modes that may be labeled as specific ceramic types.

#### Diagnostic Modes of the Tronadora Phase

Most modes of the Tronadora Complex<sup>3</sup> are shared with those of Snarskis' (1978) Chaparrón and La Montaña complexes, as already noted (Hoopes 1984a). Excavations in 1985 yielded a collection of almost four hundred Tronadora sherds and provided stratigraphic data and C-14 dates to support their early placement. The chief diagnostic modes of the Tronadora Complex are as follows (alpha-numeric designations refer to modes described in Snarskis [1978]).

#### Form

1. Large, incurving-rim, neckless jars (*olla-tecomates*) with exteriorly thickened, massive rounded or angular rims (R11).

2. Large, incurving-rim bowls or *tecomates*. Comma-shaped rims are thicker than vessel walls. These often have round-bottomed grooving along the lip and rim exterior (R6).

3. Squat, restricted-neck jars with exteriorly thickened rims. Decoration is usually found 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 (Snarskis 1978: 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 appliqué emphasized by gouge incision, executed on the vessel body when the paste was soft. Strip appliqué 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 unslipped surface, used to fill large zones when the paste was soft and smooth.

5. Sharp-edged, multiple incisions, sometimes infilled with red ocher pigment. This mode recalls incision on Middle Formative ceramics from Mesoamerica and is closely related to Snarskis' Atlantic Red-Filled Black Group (ibid.: 76). One example from Tronadora Vieja has a curvilinear design, and the only rims known with this mode are direct and unthickened, probably from cylindrical bowls.

6. Plastic decorations including punctate, buttonlike appliqué or *pastillage* (ibid.: fig. 10jj), cord marking (ibid.: fig. 24x), and circular reed stamping (ibid.: fig. 24dd).

#### Paste

There appears to be a much greater variety of pastes in Tronadora materials than in either Chaparrón or La Montaña. Snarskis describes La Montaña paste, the most outstanding characteristic of which is the presence of gray particles, up to 1 mm

in size, identified as a possible basalt temper (ibid.: 71). According to Snarskis, "virtually every Middle Formative sherd . . . whether from Turrialba, the Línea Vieja, the Central Valley or San Carlos, has possessed this grey-speckled paste" (ibid.).

This is not true for our collection. Most Tronadora Phase sherds are in fact "grey-speckled"; however, the gray-to-white specks are a weathered pumice rather than a basalt. There are a number of sherds in clear Tronadora style that do not have the characteristic Chaparrón and La Montaña paste. Variations include a fine-textured orange paste with white inclusions; a light brown paste with white inclusions, which are probably weathered plagioclase; and a fine-textured white paste. Tephra inclusions are ubiquitous in ceramics from all phases in the Cordillera de Tilarán.

#### Ceramic Types of the Tronadora Phase

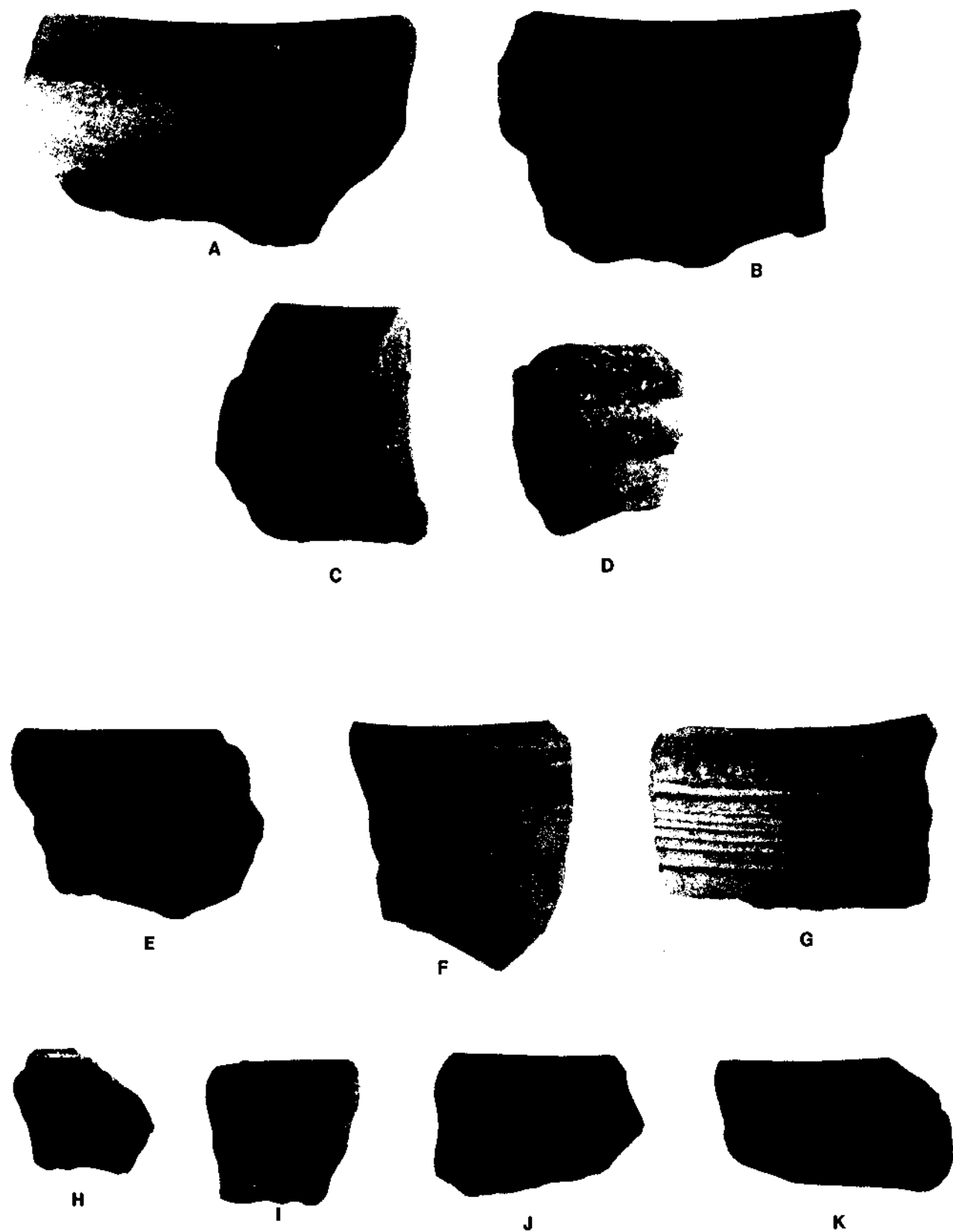
Given the size of the assemblage from Tronadora Vieja, it has been possible to define preliminary type designations.<sup>4</sup> Large portions of whole vessels are known only for Zetillal Shell-Stamped.

#### Tonjibe Beige

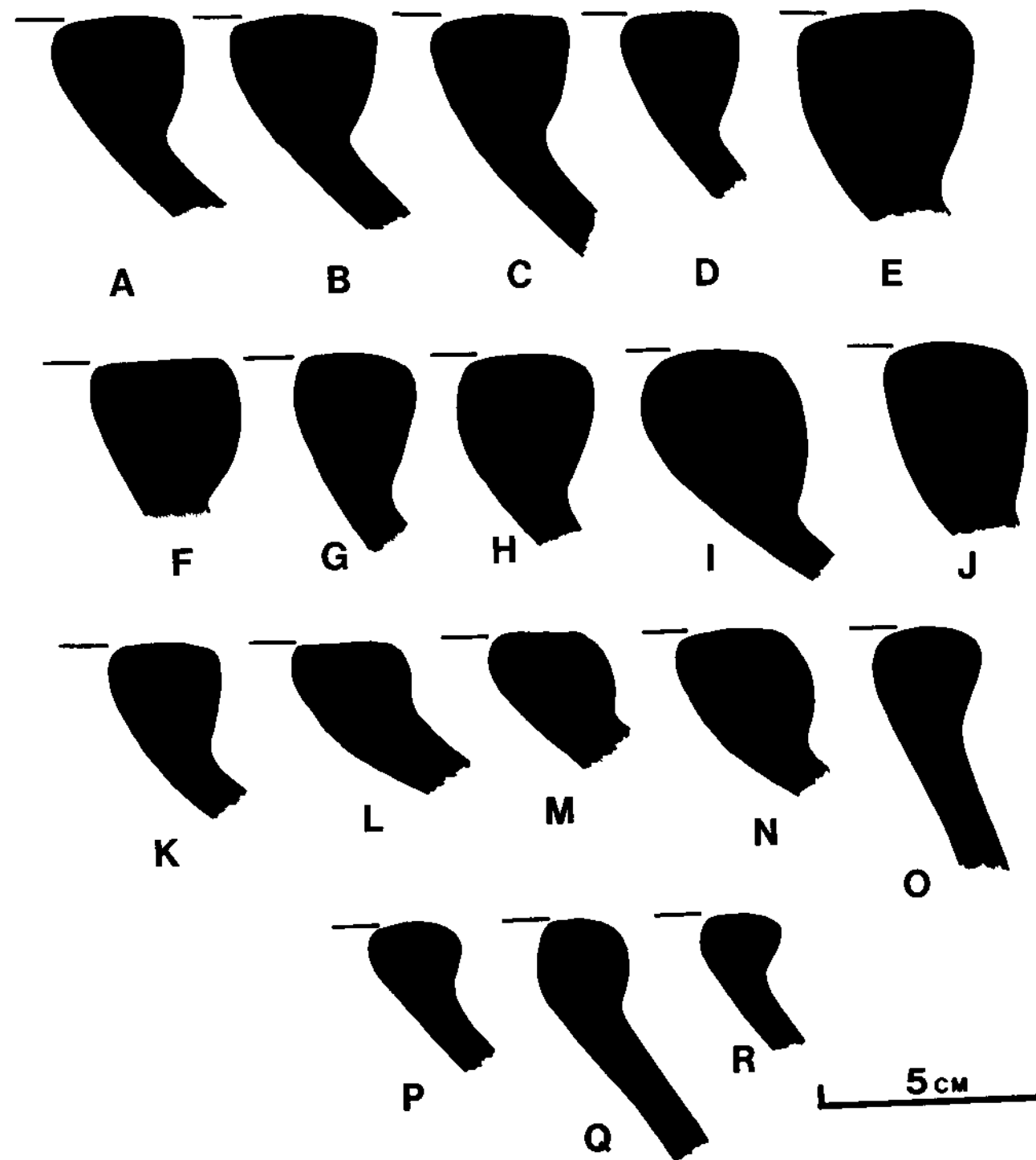
This is the most common in Tronadora Phase assemblages (Figs. 10-2A-D, 10-3; Hoopes 1987: fig. 6.1). It is characterized by large *olla-tecomates* with thickly expanded rims (R11). The late Enrique Herra found sherds of this type at Palenque Tonjibe in San Rafael de Guatuso (Snarskis, personal communication, 1985). It is also known from Chaparrón and La Montaña assemblages (Snarskis 1978). Tonjibe Beige vessels were often massive, and their poorly fired thick rims frequently fracture into several small pieces. Rims are usually painted with a hard, 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 grips 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 ceram-



**Figure 10-2.**  
Tronadora Phase: Tonjibe Beige rim sherds, A-D;  
Tronadora Incised rim sherds, E-K. Sherd widths: A,  
10.3 cm; B, 9.2 cm; C, 5.6 cm; D, 4.5 cm; E, 6.6 cm;  
F, 5.9 cm; G, 7.3 cm; H, 3.9 cm; I, 4 cm; J, 5.5 cm;  
K, 6 cm. Photographs by John Hoopes.



**Figure 10-3.**  
Tonjibe Beige rim profiles. All are from Tronadora Vieja  
(G-163). Proveniences (by operation and lot): A (K4),  
B (I5), C (M1), D (V52), E (H23), F (P3), G (V8), H (H21),  
I (M6/1), J (M2), K (L2), L (T4), M (M2), N (L13), O (W18),  
P (P3), Q (R2), R (H4). Figures by John Hoopes.



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 (H26), D (I22),  
E (V8), F (P3), G (I5), H (H9), I (V30), J (IF 38), K (Q3),  
L (G4), M (G4), N (V5), O (H4), P (I21), Q (W32), R (L6),  
S (H6). Figures by John Hoopes.

ics from La Montaña and Chaparrón (cf. Snarskis 1978: fig. 12f-i; fig. 22a-f; fig. 23w) are identified as La Montaña Fugitive Red-on-Cream and Chaparrón Red-on-Brown. Tronadora Incised is characterized by *tecomates* and incurving-rim bowls expanded on the interior lip (R6), 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 Ocos (Coe 1961) and early Zoned Bichrome assemblages (cf. Schettel 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. 6.1:P-Z). Punctation 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-u) and squat, necked jars. Sherds of this type appear in Chaparrón assemblages, but not in La Montaña. General similarities in incised and punctate decoration suggest that Tigra Grooved-Punctate may be an ancestor of the Catalina Phase-type Huila Zoned-Punctate (Baudez 1967), which belongs to the Greater Nicoya ceramic sphere.

#### Zetillal Shell-Stamped

The type vessel for Zetillal Shell-Stamped (Figs. 10-7, 10-8; Hoopes 1987:fig. 6.4, pl. 6.3:K, M-S) was found at the site of Zetillal de Ipis near San José (Snarskis 1978: 69-70, fig. 25a). 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 light shell-edge stamping on tall, hyperboloid vessels with outflaring, flat bases. These two modes almost always appear together. The distinctive stamping technique consists of a gentle marking of the soft clay surface, sometimes with a slight rocking motion. It is not found on any other vessel form. It is closely related to rocker stamping on Ocos sherds from the Pacific Coast of Gua-

temala (Coe 1961). Other decorative modes include horizontal and vertical groove incising. This usually appears around the neck and base, demarcating longitudinal zones. Appliqué pellets are occasionally present, as are deeper shell-edge stamping and punctation.

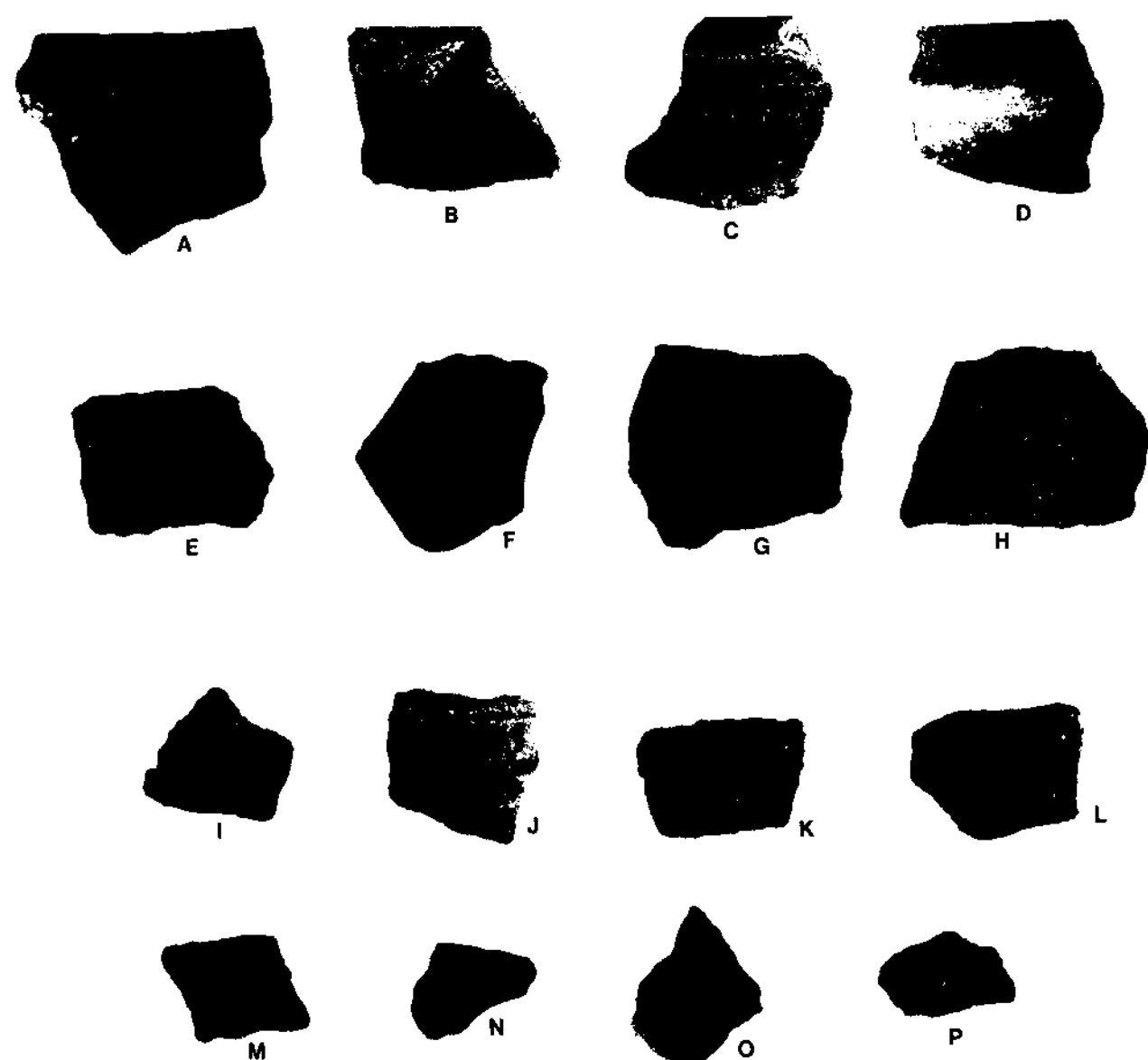
Snarskis notes, "The thick-walled basal angle and flat bottom are especially diagnostic, not appearing in any other period in the [Atlantic] regional sequence" (ibid.:70). Snarskis believes these vessels may have been pottery drums because of their elongated shape; however, their closed bases and the lack of any perforation would have inhibited resonance, making this function unlikely. Some of our examples have blackened interiors, suggesting they were used for cooking. The distinctive shape indicates a different function from the round bowls or *tecomates* in use at the same time. These may have been drinking vessels.

#### Tajo Gouge-Incised

This type (Fig. 10-9; Hoopes 1987:pl. 6.1:H-O) is defined by the use of red-painted strip appliqué the shape and texture of which are emphasized by a wide gouge incising, done when the paste was soft and pliable. There are two main classes of execution: (1) the use of simple red-painted appliqué strips in horizontal bands; and (2) the creation of unusual curvilinear patterns using gouge incision 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 appliqué design gives this ceramic a striking 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. Tajo Gouge-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 Tajo Gouge-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.

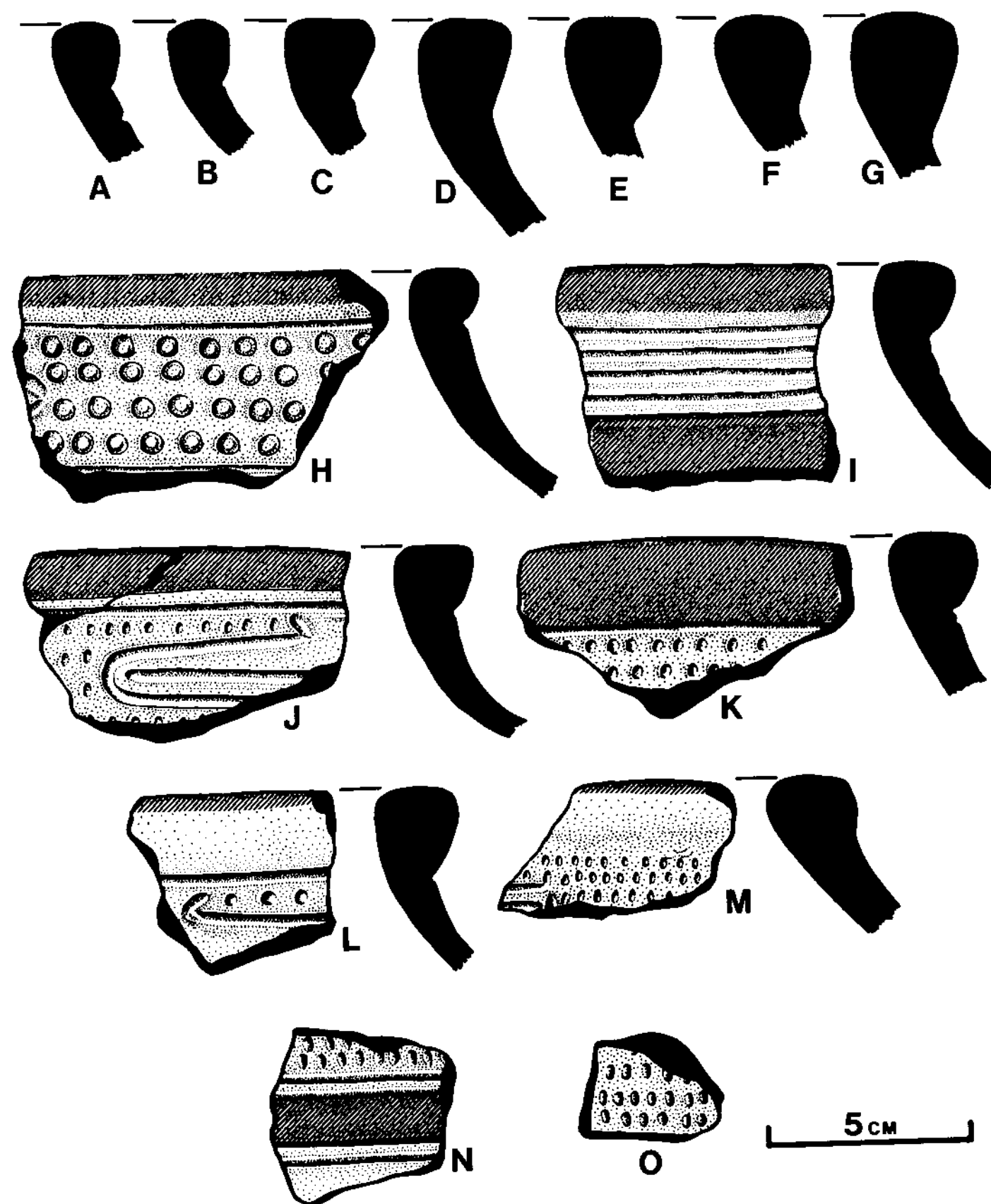


**Figure 10-5.**  
Tronadora Phase: Tigrá Grooved-Punctate. A-D: rim sherds; E-P: body sherds. Sherd widths: A, 5.3 cm, B, 4.3 cm; C, 4.2 cm; D, 4.1 cm; E, 4.1 cm; F, 4.3 cm; G, 4.7 cm; H, 5.1 cm; I, 3.2 cm; J, 3.4 cm; K, 3.5 cm; L, 3.5 cm; M, 3 cm; N, 2.8 cm; O, 2.8 cm; P, 2.7 cm. Photographs by John Hoopes.

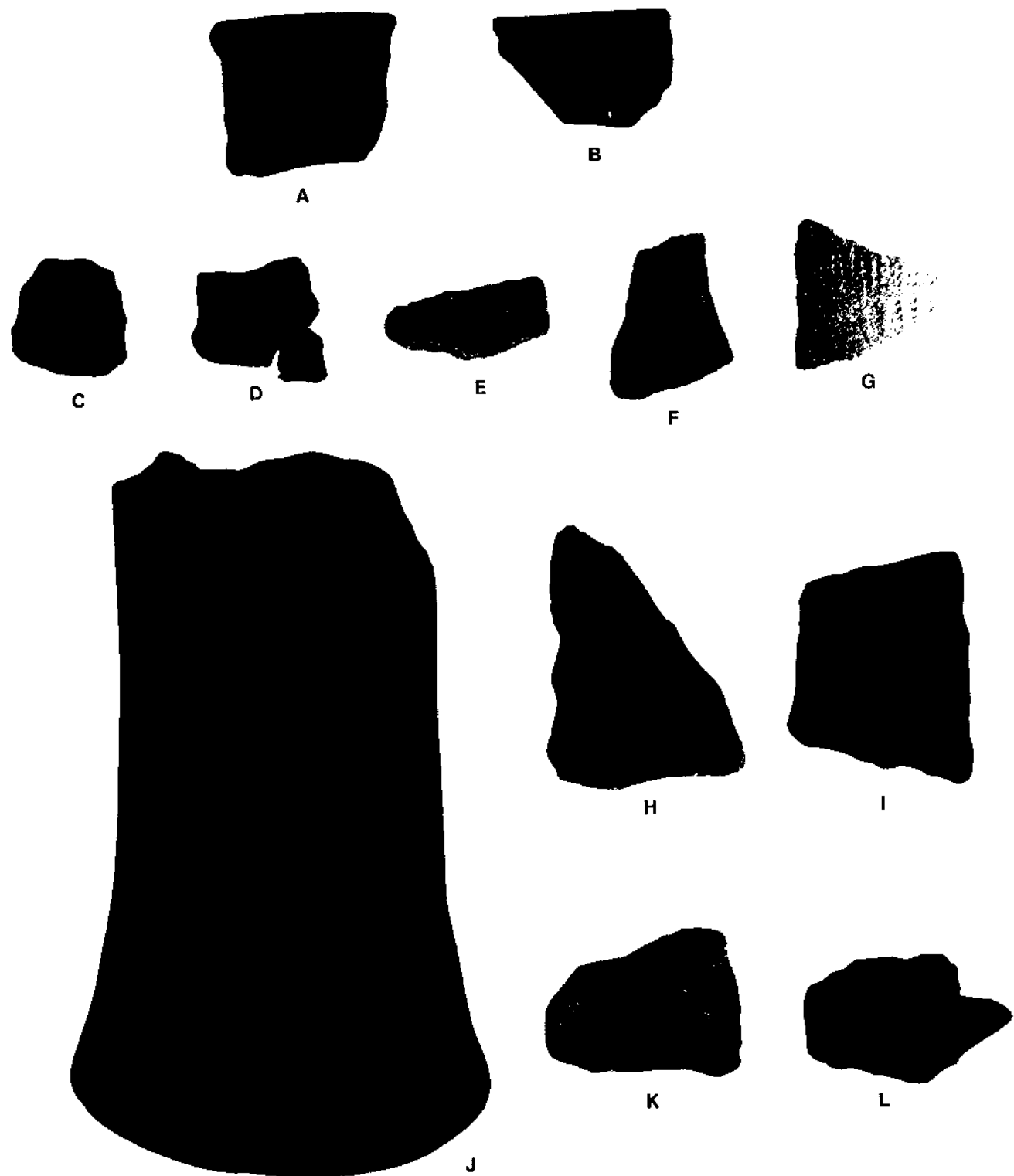
#### Discussion

As noted earlier, the predominant vessel form of the Tronadora Complex is the bolstered-rim *ollatecomate*. 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.

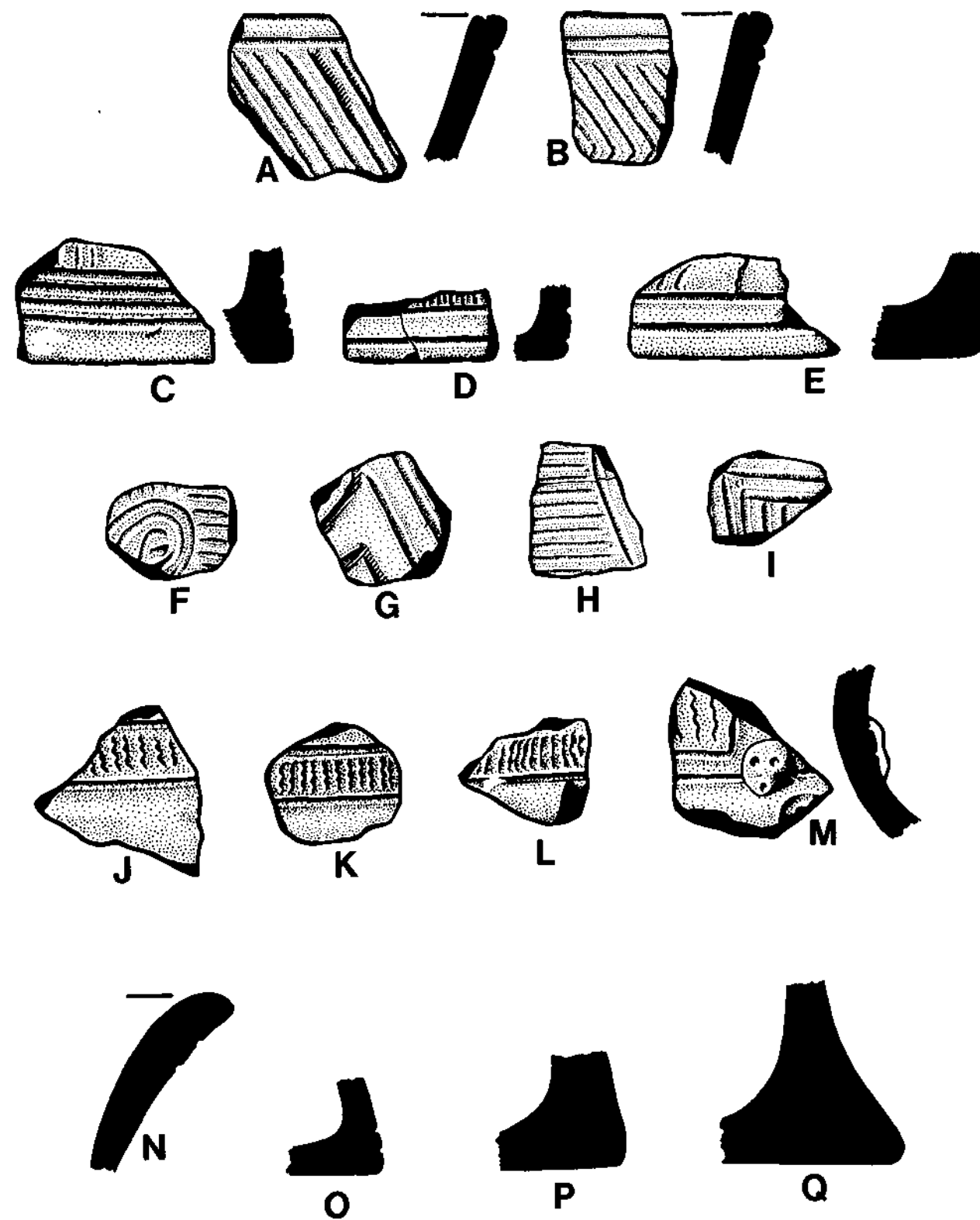
None of the sherds from Tronadora Vieja are as "primitive" or poor in quality as either Pox (Brush 1965) or Purrón (MacNeish et al. 1970) ceramics from Mexico, or the majority of Monagrillo ceramics from Panama (Willey and McGimsey 1954).



**Figure 10-6.**  
Tigrá Grooved-Punctate (A-G, J-O); reed-impressed jar (H); squat, groove-incised jar (I). All sherds are from Tronadora Vieja. Proveniencies: A (L2), B (V8), C (H48), D (W18), E (L10), F (H3), G (P3), H (W3), I (W16), J (L2), K (I23), L (W16), M (W34), N (W18), O (L14). Figures by John Hoopes.



**Figure 10-7.**  
Tronadora Phase: Zetilla Shell-Stamped. A-B: rim sherds; C-I: body sherds; K-L: base sherds. Sherd widths: A, 4.6 cm; B, 4.4 cm; C, 3.0 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 Zetilla Shell-Stamped profiles (N-Q). All sherds are from Tronadora Vieja. Proveniences: A (V24), B (M3), C (H10), D (I5), E (M2), F (L14), G (I11), H (W7), I (V8), J (V8), K (W18), L (W28), M (W3), N (H5), O (Q3), P (I20), Q (W3). Figures by John Hoopes.

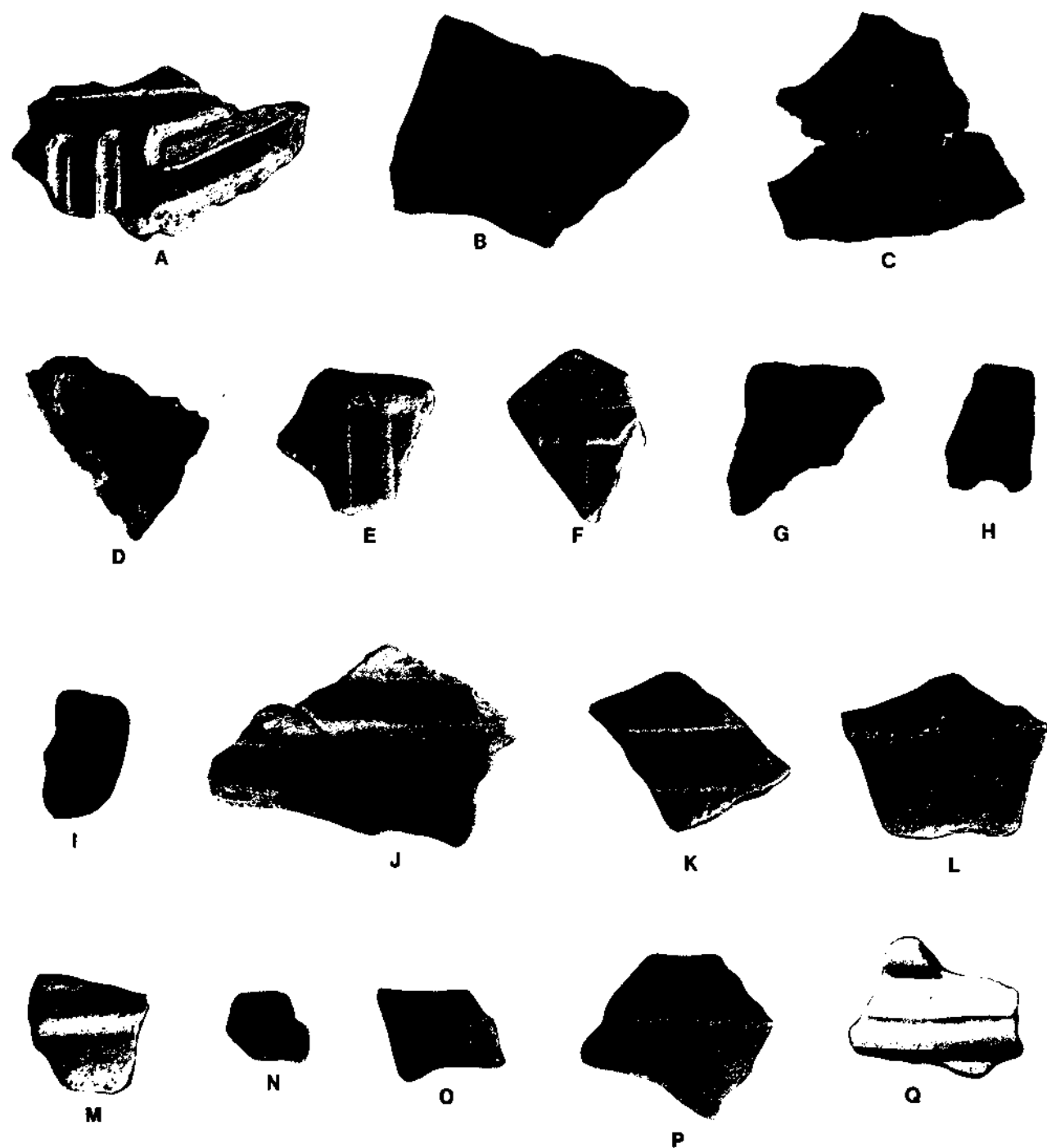


Figure 10-9.  
Tronadora Phase: Tajo Gouge-Incised. A-Q: body  
sherds. Sherd widths: A, 7.5 cm; B, 7 cm; C, 6.2 cm; D,  
4.4 cm; E, 3.8 cm; F, 3.5 cm; G, 3.2 cm; H, 2.0 cm; I, 1.8  
cm; J, 7.0 cm; K, 5.0 cm; L, 5.2 cm; M, 3.1 cm; N, 2.1 cm;  
O, 3.2 cm; P, 4.7 cm; Q, 4.3 cm. Photographs by John  
Hoopes.

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 (*ibid.*). In Mesoamerica, they are diagnostic of Barra and Ocós ceramics from the Pacific Coast of Guatemala and Chiapas (Green and Lowe 1967; Lowe 1975; Coe 1961), Ajalpan ceramics from the Tehuacán 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" *tecomates*, 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, Canapote, Barlovento, and Machalilla) (Bischof 1972; Meggers et al. 1965) are characteristic of the Early Tronadora Phase (2000–1000 cal bc). Tonjibe Beige, Tronadora Incised, and Zetillal Shell-Stamped probably first appear during this period. The Late Tronadora Phase is characterized by modes that are transitional into Loma B Zoned Bichrome (Early Arenal) types. These include combinations of grooving

and bichroming similar to Bocana Incised Bichrome. It is likely that Tronadora modes similar to "Olmec" or other Middle Formative ceramics, such as the unusual Tajo Gouge-Incised decoration and sherds infilled with ocher (Snarskis' "Atlantic Red-Filled Black" category), also date to the Late Tronadora Phase (1000–500 cal bc).

The two facets also assume a continuity between the Tronadora and the Arenal phases. Given a 1,500-year hiatus in the C-14 chronology, however, there is a strong possibility that Tronadora Vieja was not continuously occupied between the Tronadora and the Arenal phases. The persistence of round-bottomed grooving and punctation into the Arenal Phase blurs the transition between the Tronadora and the Arenal phases. Given an early date for Loma B ceramics, it is possible that the Arenal-type Bocana Incised Bichrome overlaps the Late Tronadora Phase. However, characteristics of Early Arenal ceramics that are not found in Tronadora include vessels with supports; a predominance of vertical, rather than horizontal, groove incision; red-painted zones and decoration that are not sharply zoned with incision; and multiple, "combed" incisions.

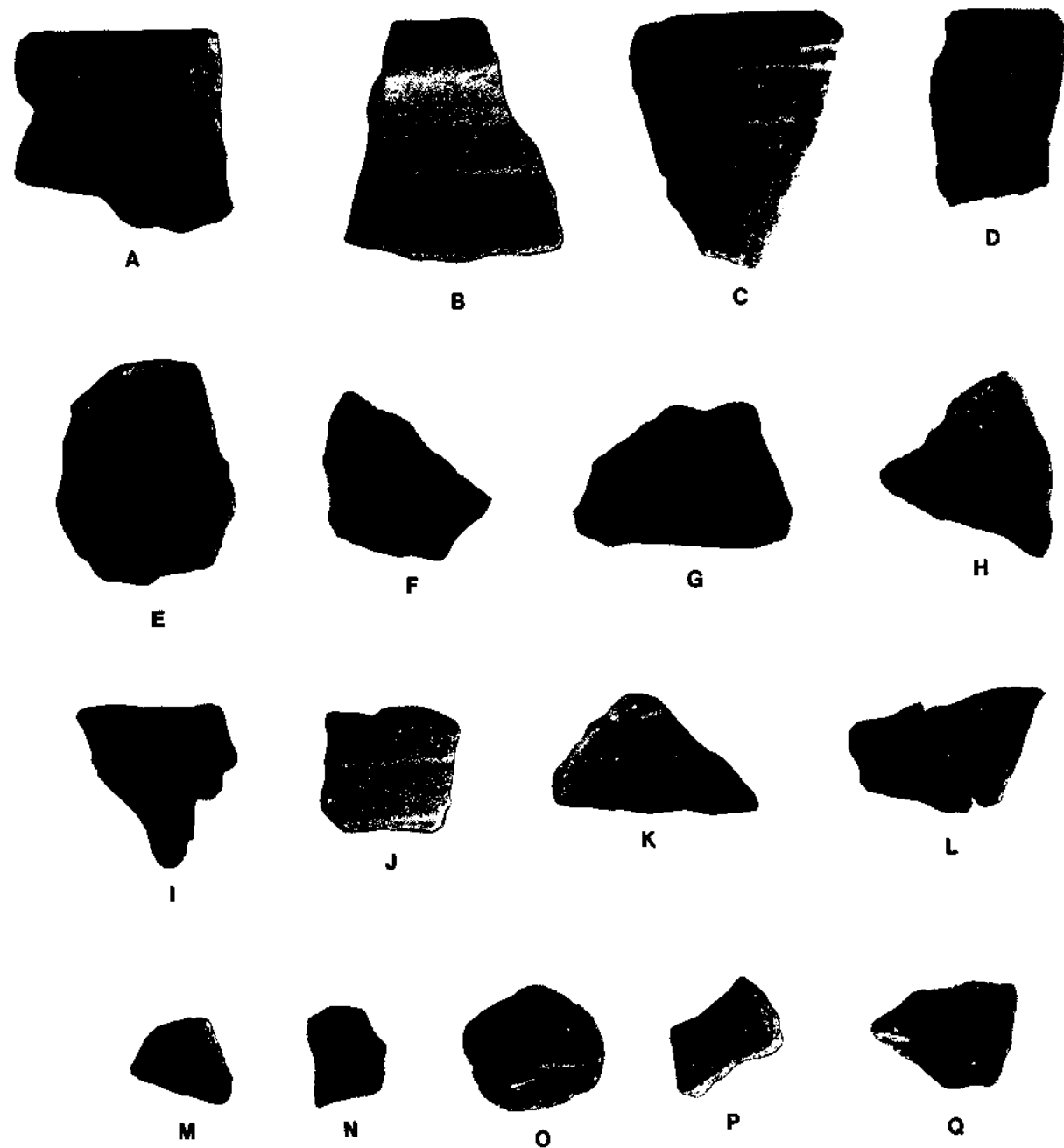
#### DATING THE TRONADORA PHASE

Eight C-14 dates are available from the Tronadora Vieja site, four of which pertain to the preceramic Fortuna Phase, and three of which are from ceramic-bearing contexts. (The correct association of the eighth date is unclear.) Two of the dates for Tronadora Phase ceramics are earlier by 1,000 years than any other dates for Costa Rican ceramics; however, they are similar to dates that have been obtained for comparable Early Formative ceramic complexes from Ecuador, Panama, Colombia, and Guatemala.

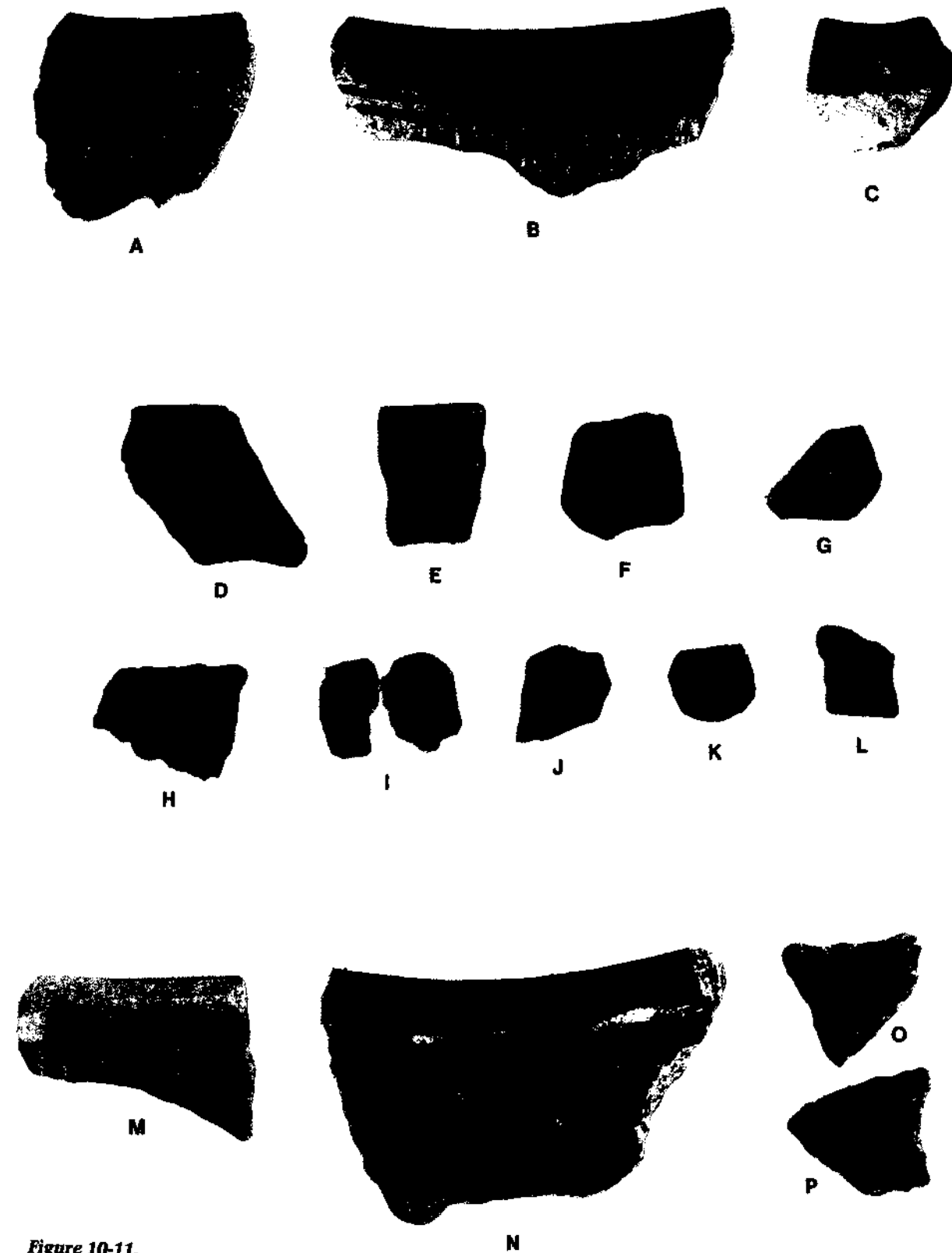
The earliest ceramic-producing inhabitants of Tronadora Vieja occupied the same living surface as preceding Archaic cultures. This was probably a thin, tropical-forest soil on top of Aguacate Formation clays. Tronadora Phase occupation continued through the initial eruptions of Arenal Volcano, which deposited large quantities of tephra in the Arenal area and contributed to the formation of fertile soils.

The earliest C-14 dates at Tronadora Vieja are associated with lithic artifacts and debitage embedded in the top of the Aguacate Formation. The dates range from 3609–3450 cal bc (Tx-5275) to 3014–2590 cal bc  $\pm$  310 (Tx-5274) and date the latter portion of the Fortuna Phase (the Archaic,





**Figure 10-10.**  
Tronadora Phase: Unnamed Shell-Stamped. A-D: rim sherds; E-Q: body sherds. Sherd widths: A, 4.6 cm; B, 4.5 cm; C, 4.3 cm; D, 2.9 cm; E, 3.7 cm; F, 3.8 cm; G, 4.6 cm; H, 3.6 cm; I, 3.5 cm; J, 2.8 cm; K, 4.3 cm; L, 4.2 cm; M, 2.1 cm; N, 2.7 cm; O, 3.0 cm; P, 2.3 cm; Q, 3 cm. Photographs by John Hoopes.



**Figure 10-11.**  
Tronadora Phase: Miscellaneous sherds. A-C: red-painted tecomate 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 reed impressions. Sherd widths: A, 5.0 cm; B, 9.5 cm; C, 3.3 cm; D, 4.0 cm; E, 2.5 cm; F, 3.0 cm; G, 2.7 cm; H, 3.7 cm; I, 3.2 cm; J, 2.5 cm; K, 2.0 cm; L, 2.0 cm; M, 5.3 cm; N, 9.3 cm; O, 3.2 cm; P, 3.2 cm. Photographs by John Hoopes.

preceramic occupation).<sup>5</sup> The two dates for the beginning of the Tronadora Phase occupation of the site come from stratigraphic units immediately above the Aguacate. These are 2460–1890 cal BC (Tx-5277) and 1970–1694 cal BC (Tx-5279). The dendro-corrected 95% confidence interval of the first date completely overlaps that of the second, suggesting a date for the transition between the Fortuna Phase and the Tronadora Phase at about 2000 cal BC.

As noted earlier, Tronadora pottery is closely related to Snarskis' (1978, 1984a) Chaparrón and La Montaña complexes. Of the two, it is most similar to Chaparrón. Unfortunately, no dates are available for Chaparrón pottery. Snarskis (1978) did obtain a total of five dates for deposits with early ceramics at La Montaña, a site near Turrialba in the Atlantic Watershed region: 2271–1430 cal BC (UCLA-2113A: 3465 BP ± 160), 800–596 cal BC (UCLA-2113D, UCLA-2113N: 2500 BP ± 60), 800 cal BC–cal AD 52 (UCLA-2113B: 2275 BP ± 160), and 400–122 cal BC (UCLA-2113M: 2230 BP ± 60). The last two are thought to have been charcoal 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 dates suggest it may not be.

At the Méndez site on the Naranjo River, northeast of the Arenal area but still in the Northwestern Cordillera, Norr (1982–1983) included ceramics similar to those from Chaparrón in her Naranjo Phase. It is defined as temporally equivalent to Lange's Loma B Phase at the Vidor site, and Norr dates it to 800–300 BC (uncorrected). Two dates are reported from Naranjo Phase deposits. The first, 2028–1645 cal BC (UCLA-2167A: 3500 BP ± 60), comes from sterile subsoil at the base of a large funerary structure. The second, 410–132 cal BC (UCLA-2163: 2250 BP ± 60), comes from ceramic-bearing deposits in the same feature. The earliest date was thought to be much too early for the ceramic occupation. The dating of the Loma B context at Vidor has also been controversial (Lange 1980a:35). There, in deep levels, sherds similar to those from Méndez and Tronadora Vieja were associated with a date of 1291–830 cal BC (UCLA-2177A: 2830 BP ± 80).

Inspection of a sample of Norr's ceramics revealed that several of the sherds from the lowest levels at Sitio Méndez were identical to Tronadora Complex sherds. The early date from this site (UCLA-2167A) is very similar to dates from Tronadora Vieja. Loma B ceramics are not identi-

cal to Tronadora sherds; however, they do bear important similarities. It now seems likely that the early dates from Méndez and Vidor are not aberrant and that they in fact date Early and Middle Formative horizons.

Haberland (1978:412) has suggested a date as early as 1200 BC (uncorrected) for Dinarte Phase ceramics from Ometepe Island, Nicaragua. This date is based on comparisons with material from the Guatemalan coast and the assertion that the succeeding Angeles Phase dates as early as 500 BC (uncorrected). The Dinarte ceramics are poorly illustrated (Haberland 1966); however, one of his examples appears to be a cylindrical vessel similar to Zetillal Shell-Stamped, and Haberland (personal communication, 1985) believes that Tronadora and Dinarte ceramics are likely one and the same. There is a close relationship between incised and zoned-incised decoration on Angeles Phase ceramics, and the type Bocana Incised Bichrome—a marker for the Loma B Phase—and Angeles may correspond to the Early Arenal Phase. The stratigraphic position of Angeles and Dinarte levels also parallels the relationships between Tronadora and Early Arenal pottery.

The principal culture-bearing strata at Tronadora Vieja are Units 50 and below. One-fourth, or 26%, of the entire assemblage of diagnostic Tronadora Phase ceramics, was found together with Arenal Phase pottery in levels below Unit 50 and above Unit 60. Of these, two in the upper 50's stratigraphic units were Tronadora types, a result of heavy mixing (probably due to a combination of bioturbation and cultural disturbance); however, the greatest concentration of Tronadora Phase sherds appeared in Units 60, 61, and 64. These correspond to El Tajo Units 9 and 10, and are derived from the earliest eruptive activity of the Arenal Volcano (Chap. 2). A small sample of Tronadora sherds was embedded in the surface of Aguacate (Unit 65), and may predate the deposition of Arenal tephra. Two C-14 samples from hearths in a well-developed soil layer on top of El Tajo Unit 8 at El Tajo (which appears to correspond to Silencio Sequence Units 55 and 55A) yielded dates of 390–50 cal BC (SI-3459) and 86 cal BC–cal AD 390 (I-10804: 1830 BP ± 80) (Aguilar 1984:74). According to Melson (1984), the amount of time needed for the formation of the soil from which the date was obtained suggests that the deposition of the Tajo Unit 8 tephra occurred several hundred years earlier, perhaps as early as 700 cal BC. All levels below Unit 55 at Tronadora Vieja (that is, Units 60, 61, and 64)

would be older than this. At Tronadora Vieja, Units 60 and below yielded almost pure deposits of Tronadora ceramics.

The terminal date of the Tronadora Phase is based on conservative estimates for the deposition of Unit 55 and for the beginning of the Early Arenal Phase at around 500 cal BC. Neither of these events is well understood or well documented, and our absence of dates for the latter portion of the Tronadora Phase does not improve the situation. The two earliest dates associated with Arenal Phase material are 1950 cal BC—cal AD 660 (Tx-5280) and 830 cal BC—cal AD 1 (Tx-5271). The first has an excessive standard deviation. The second is associated with Late Arenal ceramics and has a large standard deviation. It is clear that the Tronadora/Arenal transition merits further investigation. As noted earlier, it is possible that there is an overlap of the Bocana Incised Bichrome type with Late Tronadora assemblages. Early Zoned Bichrome ceramics may well have evolved out of those of the Tronadora Phase, suggesting an important continuity of population in the region.

#### INTRASITE DISTRIBUTION OF 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 Tonjibe Beige, followed by Tigra Grooved-Punctate and Tajo Gouge-Incised. Small amounts of Tronadora Incised, Zetillal Shell-Stamped, and Atlantic Red-Filled Black were also present. Mode-groups include general groove incising, shell stamping, and reed stamping. Some reed-stamped jar fragments had a thick, black substance adhering to the exterior, decorated neck. Although this appeared to be charcoal, it did not burn when held over a flame. Its nature and purpose are unknown.

The assemblage of ceramics associated with the habitation features includes both decorated and undecorated vessels, with Tonjibe Beige present as well as both Tajo Gouge-Incised and Zetillal Shell-Stamped. Although the greatest num-

ber of sherds of Tajo Gouge-Incised appeared in Operation W, both this type and Zetillal Shell-Stamped occurred in similar quantities in Operations H, L and V. The proportions of other types and modal categories do not vary significantly over the site.

#### THE ARENAL PHASE

The Arenal Phase bears many similarities to the Greater Nicoya Zoned Bichrome horizon (Lange 1980a); however, it also has significant local characteristics.<sup>6</sup> Bocana Zoned Bichrome appears frequently in Arenal Phase surface assemblages; however, Rosales Zoned-Engraved, Tola Trichrome, and other marker types of Zoned Bichrome assemblages to the west are rare or absent.

The Arenal Phase is characterized more by the use of linear painting and stamped 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 Mojica Impressed and the type Congo Impressed best represent the latter tradition.

The use of zoning (areas of color outlined with either incision or painting) is uncommon in Arenal Phase assemblages, except for Bocana Incised Bichrome. While zoned punctation and shell-stamping are common in the Tronadora Phase, these diminish in popularity. The only type with zoned punctation to appear during the Arenal Phase is Huila Zoned Punctate (*cf.* Baudez 1967:59). 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, twenty 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). At Sitio Bolívar (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 La Isla (G-166; Hoopes 1987:323) were earlier than components at Sitio Bolívar.

### Tronadora Vieja (G-163)

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 Hermanos Beige: Espinoza Variety; Mojica Impressed; Laguna Variety; Bocana Incised Bichrome; Las Palmas Red-on-Beige; Charco Black-on-Red; and Huila 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 Rivas region of Nicaragua [and defined for the Arenal region as Los Hermanos 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 (Snarskis 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 Bolívar. This may be a characteristic of early examples of this type, but the sample was not large enough to clarify this point.

### Sitio Bolívar (G-164)

What it lacked in longevity, the Arenal Phase occupation at Sitio Bolívar 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 Hermanos Beige is the most important type at this site. Mojica Impressed (Corrida, Arrastrada, and Congo varieties) is second. Charco Black-on-Red, Los Hermanos Beige: Espinoza Variety, Guinea Incised, Los Hermanos Beige: Cervantes Variety, Zelaya Painted (Bichrome and Trichrome varieties), and unidentified trichrome

sherds are also important types in the Sitio Bolívar assemblage. A number of early modes appear in this assemblage, most notably Usulután-type resist decoration and medial-flange bowls (both on Guinea Incised); however, all together the ceramics represent a clear assemblage of Linear Decorated types (cf. Baudez 1967). A few sherds of Carillo 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 Guinea Incised, found in large numbers at Sitio Bolívar, are rare or absent while Bocana Incised Bichrome and Las Palmas Red-on-Beige are present. Excavations at 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, 10-13J-K; Hoopes 1987: fig. 7.1:j-k, pl. 7.1:A-D) 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 Hermanos 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: pl. 19) and Healy's "Bocana variety" (1980: 91: fig. 26). Unlike on Tronadora Incised and other Tronadora Phase sherds with incised decoration, verti-

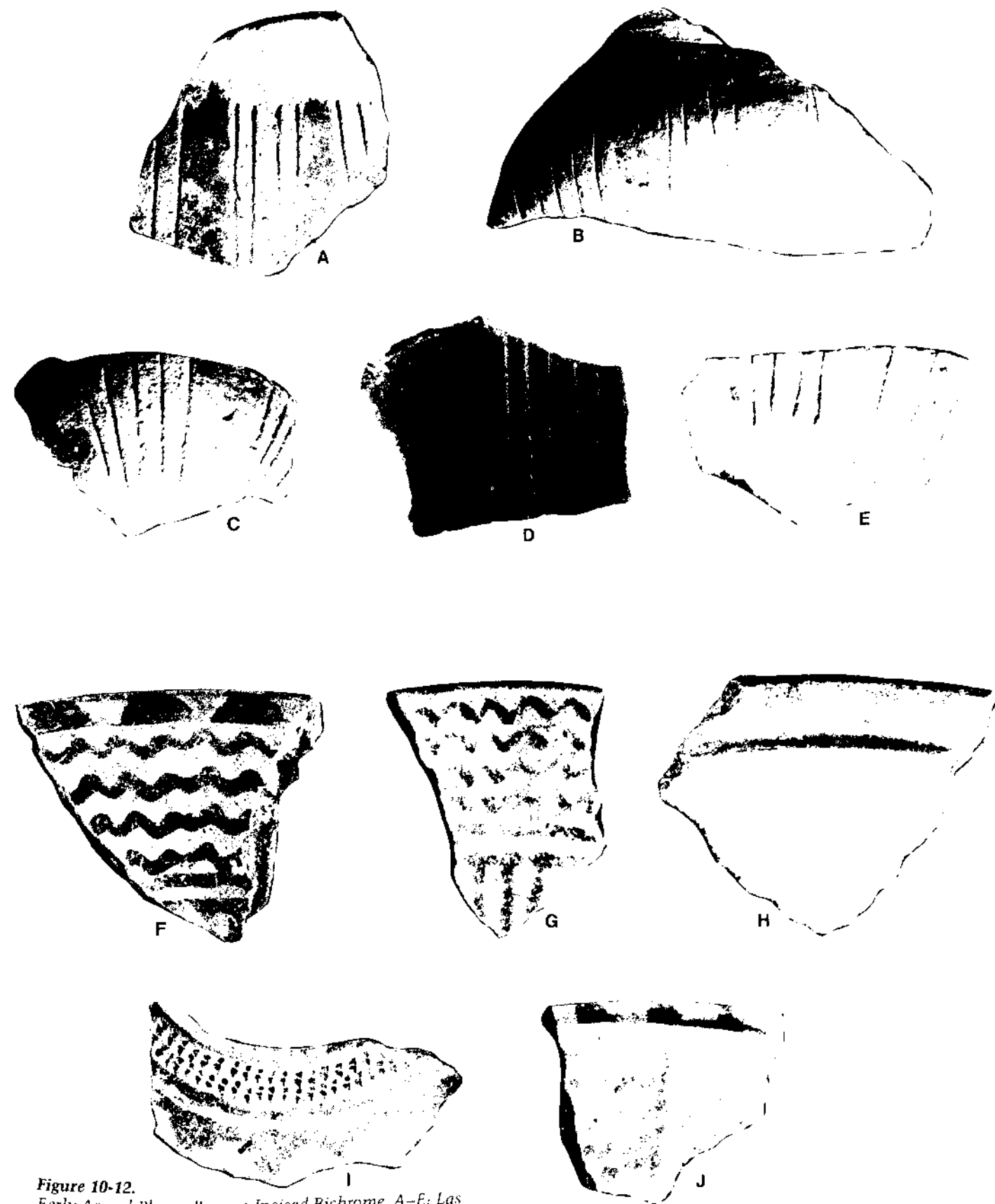


Figure 10-12. Early Arenal Phase: Bocana Incised Bichrome. A-E: Las Palmas Red-on-Beige. F-J: Sherd widths: A, 6.6 cm; B, 11 cm; C, 7.0 cm; D, 6.8 cm; E, 7.0 cm; F, 7.6 cm; G, 5.5 cm; H, 8.0 cm; I, 8.0 cm; J, 6.0 cm. Photographs by John Hoopes.

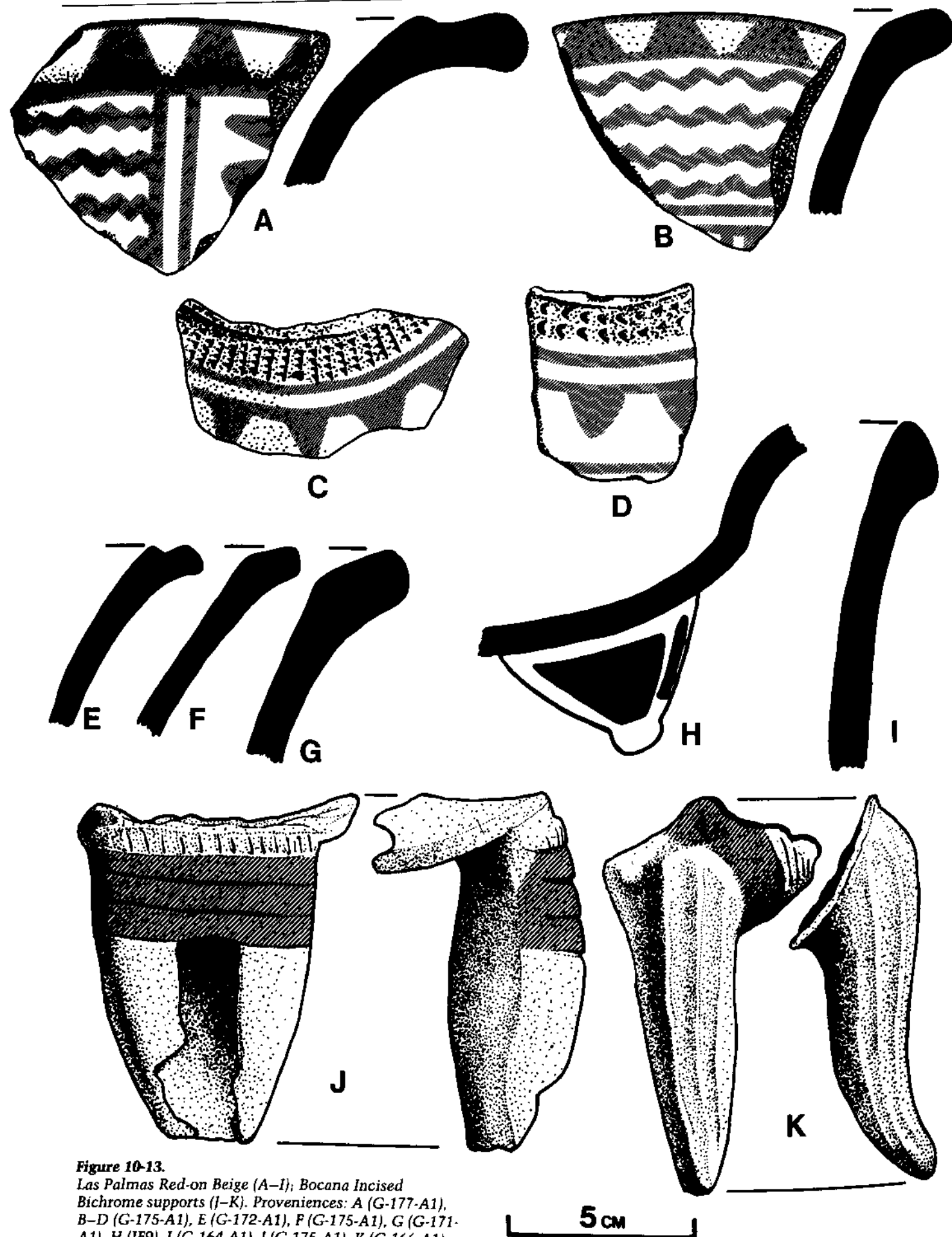


Figure 10-13. Las Palmas Red-on-Beige (A-I); Bocana Incised Bichrome supports (J-K). Proveniences: A (G-177-A1), B-D (G-175-A1), E (G-172-A1), F (G-175-A1), G (G-171-A1), H (IF9), I (G-164-A1), J (G-175-A1), K (G-166-A1). Figures by John Hoopes.

cal, rather than horizontal, incision predominates. Bocana Incised pastes differ from Tronadora Phase ones in that they include small crystals of black hornblende. These may be what Healy (*ibid.*:92) tentatively identifies as "obsidian inclusions."

Rim sherds include simple and direct forms from incurving-rim bowls. As is true for other Arenal Phase types, however, it is likely that jar rim sherds without incision identified as Los Hermanos Beige may have come from 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. While 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 in San José and reported to have come from San 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 Carillo Polychrome, Cabuyal Polychrome, and Jiménez 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 Red-on-Beige (Hoopes 1987:357-367), a type associated with Bocana Incised Bichrome. Baudez (1967:89) reports that the most common vessel form of this type in his assemblages 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 region and the Tempisque Valley collections bear Mojica-style impressions, indicating the contemporaneity of these two types.

Baudez (*ibid.*:206) notes similarities between the wavy multiple brushing on Las Palmas Red-on-Beige and the decoration of Usulután ceramics of the Protoclassic Maya. Some of the hooked rim profiles on Las Palmas bowls (Fig. 10-3A) are also characteristic of Usulután and Iberia Orange ceramics of the Maya area. Healy (1980:239-241) describes a type he calls "Usulután Resist" in the Rivas region of Nicaragua, which dates to the Avilés/San Jorge Zoned Bichrome Phases and may be related to Las Palmas. Despite its being a "resist" ware, 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 and shoulders of unslipped vessels is a feature of Arenal Phase ceramics (Fig. 10-14; Hoopes 1984:fig. 2; 1987:7.1:I-V). 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 Laguna 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:E-H; 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-C). On characteristic examples, the impressions resemble semicolons 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. 2:A-D; 1987:pl. 7.1:M-Q) is distinguished by single or double rows of impressions, usually made with instruments other than a shell. Fingernail 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 Chaparrón pottery. The similarity between Mojica Impressed: Laguna Variety and certain Chaparrón 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. 16L).

#### *Mojica Impressed: Congo Variety*

This variety of Mojica derives its name from "Congo Punctate" (ibid.: 61); however, the variety and the type do not completely overlap. Congo variety vessels are decorated with horizontal rows of triangular punctations on their shoulders (cf.

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 Bichrome 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 Bolívar, 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 Bolívar, 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 Bolívar (Fig. 10-15A-D; Hoopes 1987, pls. 7.2:A-F, 7.3). 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 Usulután-like resist decoration at Sitio Bolívar. 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

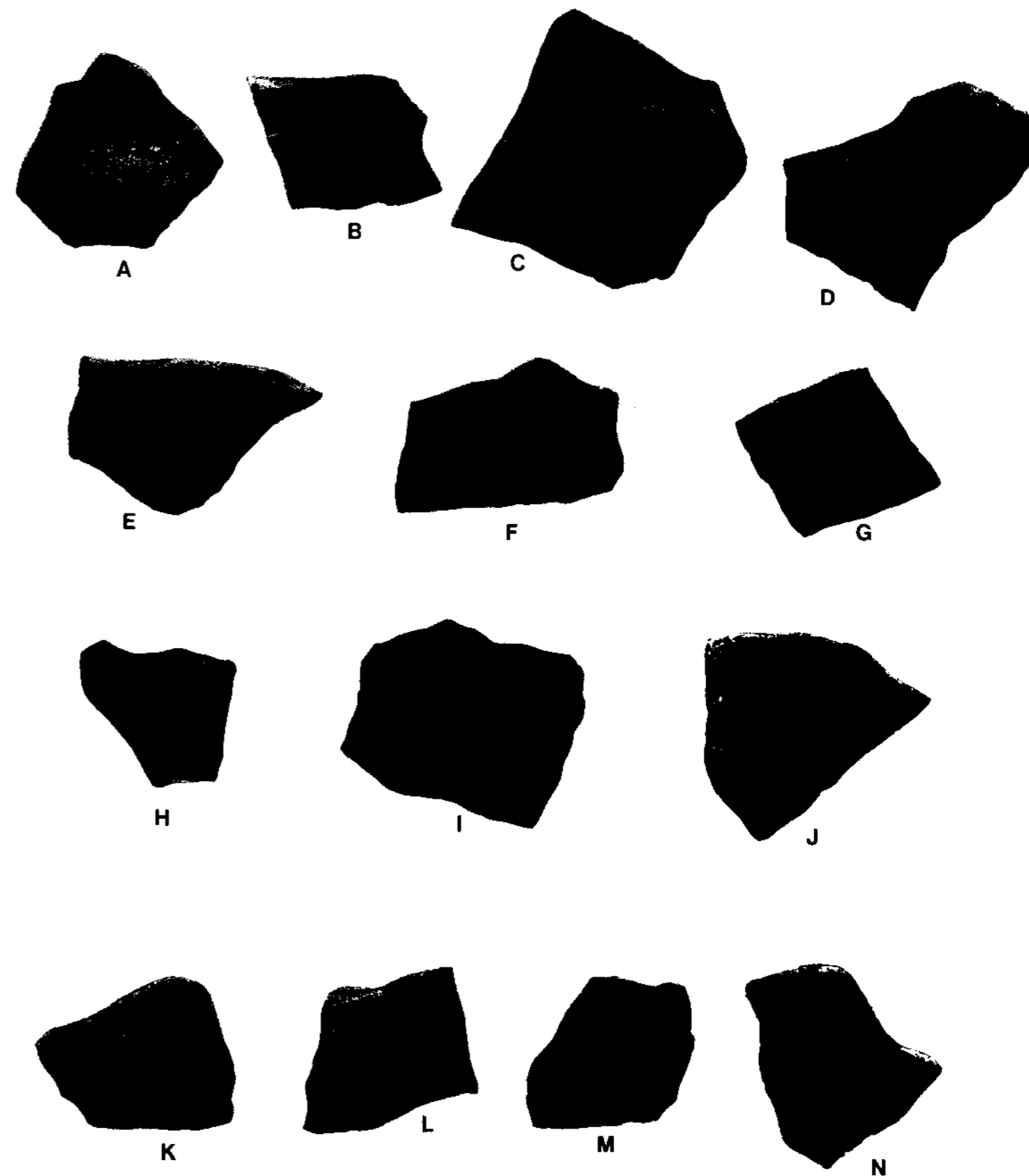


Figure 10-14. Early and Late Arenal Phase: Mojica Impressed. Laguna Variety (A-E); Mojica Variety (F-I); Corrida Variety (J, K); Arrastrada Variety (L-N). (Note scale.) Photographs by John Hoopes.

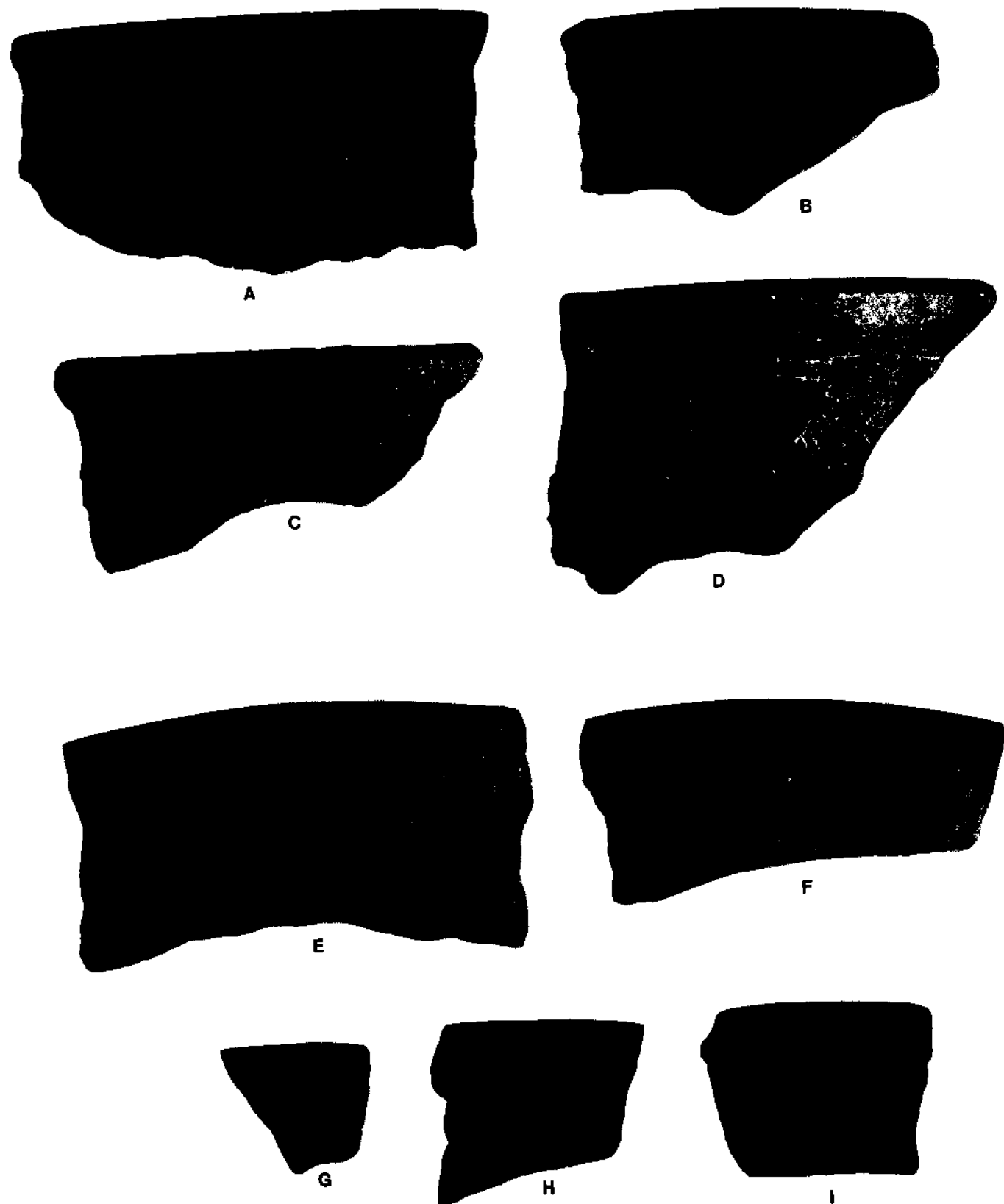


Figure 10-15. Late Arenal Phase: Guinea Incised, A-D; Los Hermanos Beige: Cervantes Variety, E-I. Sherd widths: A, 12.0 cm; B, 9.5 cm; C, 11.5 cm; D, 11.5 cm; E, 12.0 cm; F, 11.0 cm; G, 4.0 cm; H, 5.5 cm; I, 6.0 cm. Photographs by John Hoopes.

Izalco Usulután from western El Salvador (Sharer 1978:39); however, the relationship is not close. Guinea 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 Snarskis' Zoila Red Group (1978:201-202) from the Atlantic Watershed region. Hollow, bulbous, rattle support forms (cf. Snarskis' 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:C-G) used here combines Baudez' Charco and Cobano Black-on-Red types (1967:83-87). Charco is the most common decorated type in assemblages from Sitio Bolívar. 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 Arenal Phase. Charco also signals the first use of fired black decoration on pottery in the region. On the great majority of Charco vessels from Sitio Bolívar, 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 Catalina 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. 7.2, pl. 7.2:G-O) is the most common type designation in Arenal Phase assemblages (Hoopes 1987:403-420); 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 Mojica Impressed, Espinoza Red-Banded, Las Palmas Red-on-Beige, and even Bocana Incised Bichrome. Baudez (1967) places Los Hermanos Beige in the Ciruelas 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 Bolívar, 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-rim jars; and open, thickened-rim bowls, usually with small solid conical supports (Baudez 1967: vessel groups I, II, and III).

#### Los Hermanos Beige: Espinoza 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 (1964:559) and later by Healy (1980), from ceramics excavated in the Rivas region of Nicaragua. The principal decorative modes are "Red painted and polished verti-

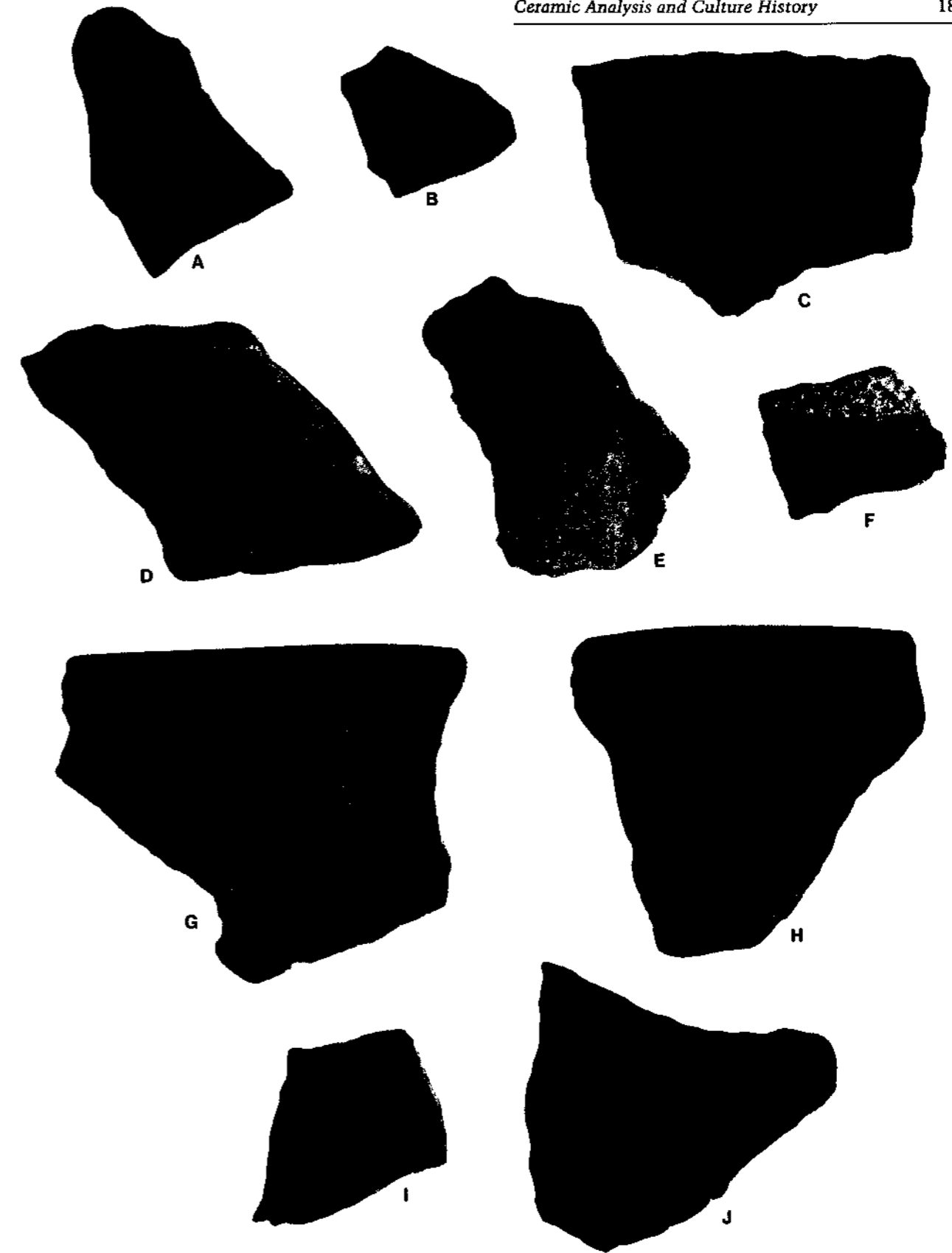
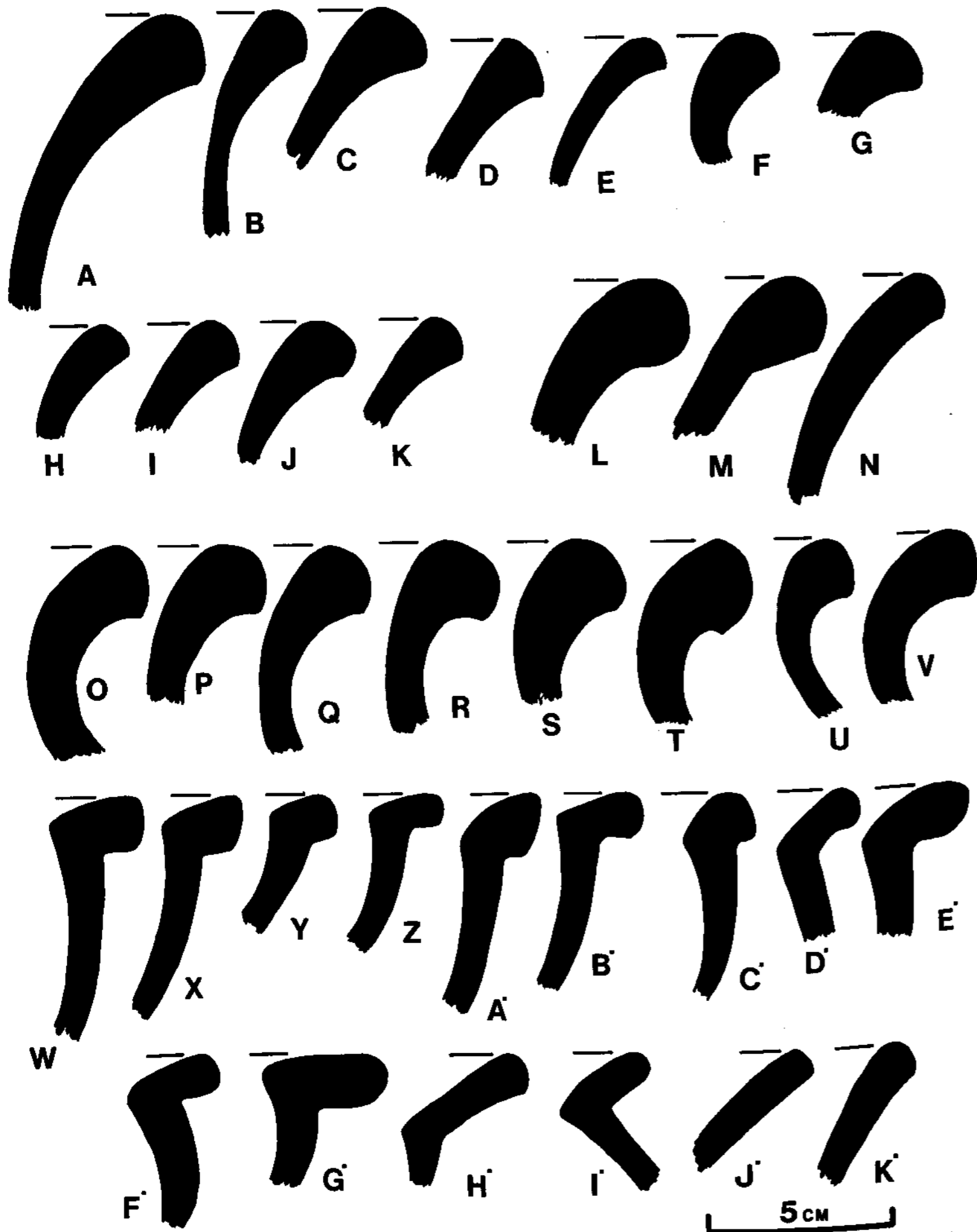


Figure 10-16. Left: Los Hermanos Beige rim profiles. A-N: jar and bowl profiles from Tronadora Vieja; O-V: jar profiles from Sitio Bolivar; H'-I': short-necked jars; J'-K': direct-rim bowls. Figures by John Hoopes.

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, 11.0 cm; E, 7.0 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 Nicaraguan 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 foregoing). 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 Bolívar. 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 Las 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, punctation, and (less frequently) appliqué to decorate the broad interior surfaces of open bowl rims (Fig. 10-15E-I; Hoopes 1987: pl. 7.2: G-O). While some punctation, 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 his 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. 7.4B), Zelaya Painted: Trichrome Variety (ibid.: pl. 7.4A), and Carillo Polychrome (Fig. 10-17I-J). 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 Bolívar 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 Línea Vieja 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 Bolívar indicate contact with the Atlantic Watershed region. These include long, hollow conical supports with anthropomorphic adorns (cf. ibid.: fig. 90, S15); zoomorphic 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 modes 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 Vidor site: Loma B (800-300 BC), Orso (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. Adornos: A, E, G, K; appliqué: B-D, H; decorated support fragments: F, I, J; hollow supports: L, M. Sherd lengths: A, 4.0 cm; B, 5.2 cm; C, 4.8 cm; D, 3.6 cm; E, 4.7 cm; I, 12.0 cm; J, 9.5 cm; K, 14.5 cm; L, 10.5 cm; M, 11.5 cm. Sherd widths: F, 4.5 cm; G, 5.2 cm; H, 7.7 cm. Photographs by John Hoopes.



Incised, and ceramics common to Lothrop's "Palmar Ware" classification. The Orso Phase is characterized by the appearance of fine incised or engraved zoning as found on the marker type Rosales Zoned Engraved. According to Lange (ibid.: 40), Orso is contemporaneous with Catalina and Chombo in the Tempisque Valley and Santa Elena Peninsula, respectively, and corresponds to the Zoned Bichrome Period as initially defined by Coe and Baudez (1961). The Mata de Uva, or "Zoned Painted," Phase corresponds to the "Linear Decorated" Period (Baudez 1967:194) and is signaled by the appearance of Tola Trichrome at coastal sites. Mata de Uva, and the ceramic traits associated with it, has been variously considered as the beginning of the Early Polychrome or the end of the Zoned Bichrome Period. I agree with the latter interpretation and see the "Zoned Painted" Phase as "a continuation, or termination, of Zoned Bichrome patterns" (Lange 1980a:41).

The Arenal 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 decoration. It therefore covers the "Zoned Bichrome Period" in its broadest conception. The beginning of the Arenal Phase (and the end of the Tronadora 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, however, that the period from 1000 to 500 cal BC—during which time Early Arenal traits probably developed—is poorly defined in the Arenal area sequence.

The dates for the Arenal Phase are based as much on crossdating as on chronometric dates from project excavations. The early facet is marked by Bocana Incised Bichrome. Large, tapering hollow supports with rectangular apertures decorated with red paint zoned by deep incision are reportedly identical to a support associated with a date of 1291–830 cal BC (UCLA-2177A) from a large "oven" feature at the Vidor site (Lange 1980a:35; Snarskis, personal communication, 1985). An example of one of these supports was excavated at Viboriana (G-175), where it was associated with sherds of Mojica Impressed and Las Palmas Red-on-Beige.

At Tronadora Vieja, levels with a predominance of Tronadora ceramics were overlain by those with Arenal types. This stratigraphic relationship has parallels at only two other sites in Greater Nicoya. At Los Angeles on Ometepe Island, Nicara-

gua, Dinarte ceramics were found beneath levels containing early Zoned Bichrome "Angeles Phase" pottery (Haberland 1966). These Angeles Phase ceramics were found below levels with Rosales Zoned Engraved and Schettel Incised, and they "seem to be connected with the Bocana Zoned Incised and Toya Zoned Incised of Baudez" (ibid.: 401). At Sitio Méndez, Norr (1982–1983) reports a mixture of Loma B- and Catalina-type ceramics from the lowest levels of a burial mound. The 410–132 cal BC (UCLA-2163) date from Méndez corresponds well with other Zoned Bichrome dates, as well as with the Early facet of the Arenal Phase. As noted earlier, the Méndez ceramics also include a number of Tronadora Complex sherds. It seems likely that Angeles ceramics correspond to Early Arenal and Lange's Loma B phases, Dinarte ceramics (as noted earlier) are equivalent to Tronadora, and that the lowermost levels at the Méndez site contain a mixture of Tronadora and Early Arenal types.

Our earliest C-14 dates for Arenal ceramics come from a trench tomb at Tronadora Vieja and the lowest excavation levels at Sitio Bolívar. The first, 1950 cal BC—cal AD 660 (Tx-5280) was associated with Mojica Impressed: Mojica Variety pottery. The second, 830 cal BC—cal AD 1 (Tx-5271) underlay a large Late Arenal component. Unfortunately, both of these dates are of limited value because of large standard deviations.

Rosales Zoned Engraved, the principal type of Lange's Orso Phase, is absent in our assemblages; however, other types diagnostic of Catalina and Chombo assemblages dating to the 300 cal BC—cal AD 300 range are present and imply an occupation of the Arenal area at this time. The C-14 dates from this time range come from three different sites. The earliest, 810 cal BC—cal AD 630 (Tx-5081) is from Tronadora Vieja. The very large confidence interval limits its utility, but the early limits of its range are consistent with the dating of associated Tronadora Phase ceramics. The next, cal AD 110–410 (Tx-5272), was recovered from shoreline deposits at Sitio Bolívar containing Late Arenal pottery. The third date came from the hill-top cemetery at El Silencio (G-150). It is identical to the second at cal AD 110–410 (Tx-5078), but was not directly associated with Arenal Phase ceramics (coming instead from a *Silencio* Phase context). Arenal ceramics from other contexts at this latter site suggest that it was in use at this time, but the date suggests that early deposits may have been disturbed by later activities.

The best C-14 dates for crossdating come from

Level 6 at Ortega (Baudez 1967:205), which yielded an assemblage similar to that from the Upper 50's strata at Tronadora Vieja. Dates of 754–60 cal BC (GsY-100: 2195 BP  $\pm$  130—average of two dates) and cal AD 132–533 (Y-850: 1700 BP  $\pm$  70) were associated with types Bocana, Charco, Las Palmas, and Mojica. Coeval levels at Matapalo yielded a date of 390 cal BC—cal AD 598 (Y-810: 1870 BP  $\pm$  200). This suggests that the Arenal Phase occupation at Tronadora Vieja dates to the few centuries before and after the beginning of the Common Era.

With regard to the latest part of the Arenal Phase, it is significant that fragments of sherds that may be transitional into the Early Polychrome tradition appear in deposits at Sitio Bolívar. Four sherds from surface collections are tentatively identified as López Polychrome—the earliest of "Nicoya Polychrome" types—and four sherds in the large assemblage in Operation B are identified as an early variety of Carillo Polychrome. The presence of these types suggests an occupation dating to the latter part of the Arenal Phase and two C-14 dates from the site support this. The first, cal AD 450–775 (Tx-5270), is closest to estimates from crossdating ceramics. The second, cal AD 780–1010 (Tx-5269), was obtained from a hearth partly exposed by wave action on the lakeshore. It is later than expected, and may have been contaminated by more recent organic material. Early Zoned Bichrome types such as Bocana Incised Bichrome, Las Palmas Red-on-Beige, and certain varieties of Mojica Impressed (see foregoing) are rare or absent at this site, as are Tronadora ceramics. Tola Trichrome, the marker type for Lange's Mata de Uva Phase, is rare. A large number of other types of the "Zoned Painted" horizon are present, however, including Charco Black-on-Red, Guinea Incised, Cervantes Incised-Punctate, and Zelaya Bichrome. Baudez (1967) dates his "Linear Decorated" period from AD 300–500, and the Early Polychrome period is currently placed at roughly AD 500–800. Sitio Bolívar's ceramic assemblage is most closely related to the former, although the presence of a small number of later sherds suggests that it may have been transitional between the two.

Like the "Zoned Bichrome" period defined by Lange's three phases, the Arenal Phase has a duration of over 1,000 years. Given the nature of the Arenal assemblages and the absence of Rosales Zoned-Engraved, one of Lange's marker types for the period from 300 BC to AD 300, I am reluctant to subdivide the Arenal phase into more than two

facets; however, patterns in assemblages from surface collections and excavations clearly indicate that some types were common early and others late. For this reason, the Arenal Phase has been provisionally divided into two roughly equal facets. The first of these, designated "Early Arenal," dates from approximately 500 cal BC to the beginning of the Common Era. The second, "Late Arenal," dates from cal AD 1 to 600. It is important to note that there is not a clear division between these facets. Rather, the period from cal 300 BC to cal AD 300 (what might be termed "Middle Arenal") is probably marked by characteristics of both, with a gradual transition from earlier to later characteristics.

The Early Arenal subphase is represented almost exclusively by surface collections, although we recovered a small amount of material in stratigraphic context at the sites of Tronadora Vieja (G-163) and Viboriana (G-175). The two principal Early Arenal surface assemblages come from Viboriana and La Isla (G-166). Late Arenal types are rare or absent at these sites. The most important types of the Early Arenal subphase are Bocana Incised Bichrome, Las Palmas Red-on-Beige, and Mojica Impressed: Laguna Variety. Of these, however, the latter two probably continue through the early centuries cal AD.

We recovered the principal Late Arenal assemblage at Sitio Bolívar (G-164). Definition of this subphase is complicated by the fact that the ceramics from this site are almost exclusively from the latter part of the subphase (cal AD 300–600). At Sitio Bolívar, the Late Arenal subphase is marked by a combination of Charco Black-on-Red, Guinea Incised, Los Hermanos Beige: Cervantes Variety, Zelaya Bichrome, and the Corrida and Arrastrada varieties of Mojica Impressed. It is important to note, however, that some of these types by themselves are not reliable chronological markers for the Late Arenal subphase. For example, Guinea Incised, Mojica Impressed, and Charco Black-on-Red all appear sometime during the Early Arenal subphase.

As with the early and late facets of the Tronadora Phase, it is important to realize that this division of the Arenal Phase is provisional. The recovery of more complete stratigraphic data and additional radiocarbon dates, especially from sites with both Early and Late Arenal components, will go a long way toward refining and improving our understanding of Arenal Phase chronology.

## THE SILENCIO 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 cal 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 with Greater Nicoya. Stone cist burials, unknown 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 small size of the ceramic sample and the heavily 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 (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 Carrillo Polychrome from Sitio Bolívar (G-164), the two prin-

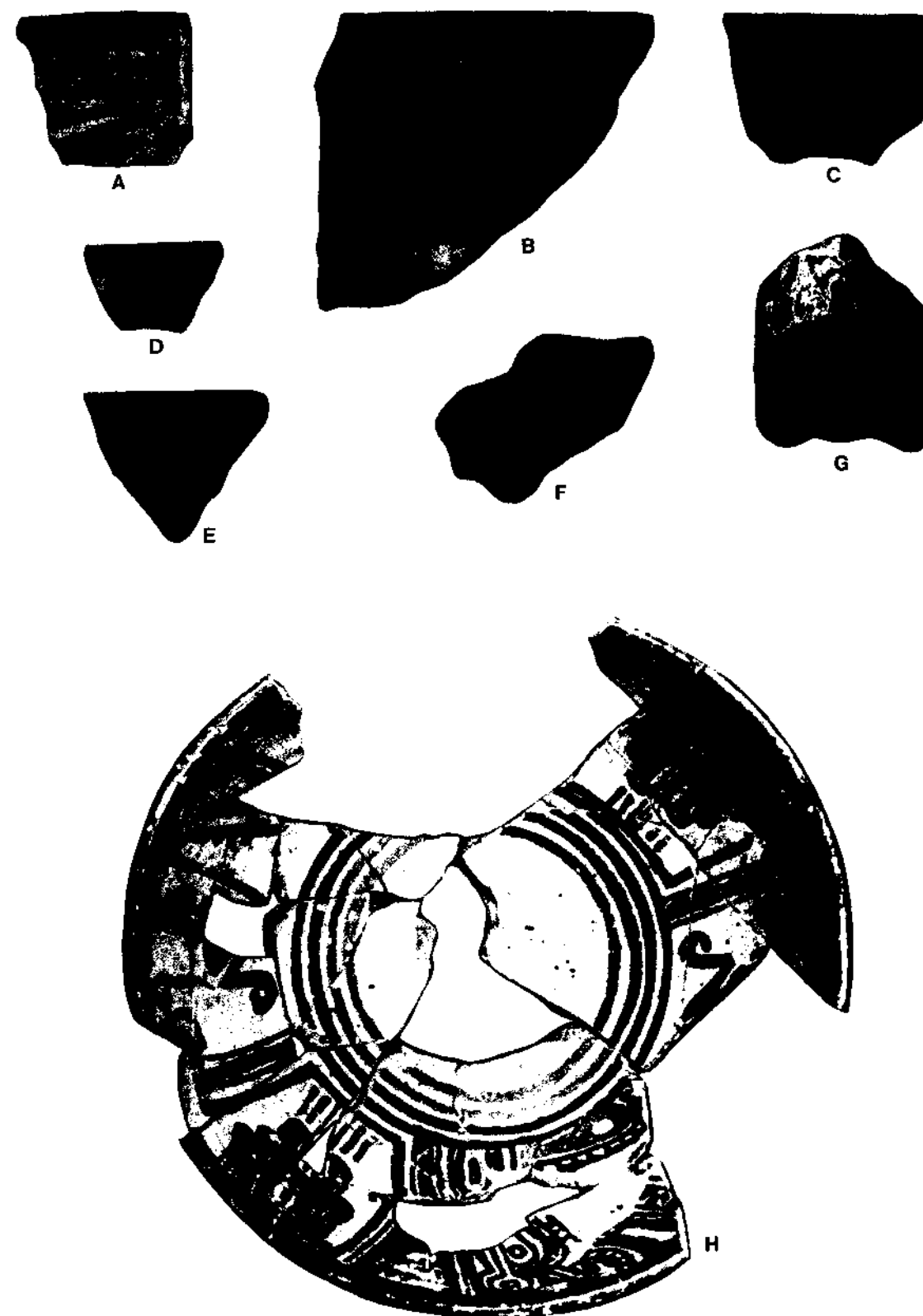
cipal pottery types of this period, but farther to the west—Carrillo and Galo Polychromes—are practically absent in our samples. Decorative elements of both Carrillo and Galo Polychrome are present in a local type—Jiménez Polychrome—identified at El Silencio.

At a general level, the ceramic assemblage from El Silencio is similar to Middle Polychrome (AD 800–1200) assemblages from La Guinea (Baudez 1967; Hoopes 1980), Vidor (Accola 1978), and La Ceiba (Blanco et al. 1986; Guerrero and Blanco 1987). Distinctive Middle Polychrome types such as Mora, Papagayo, Altiplano, Cabuyal Birmania, 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.

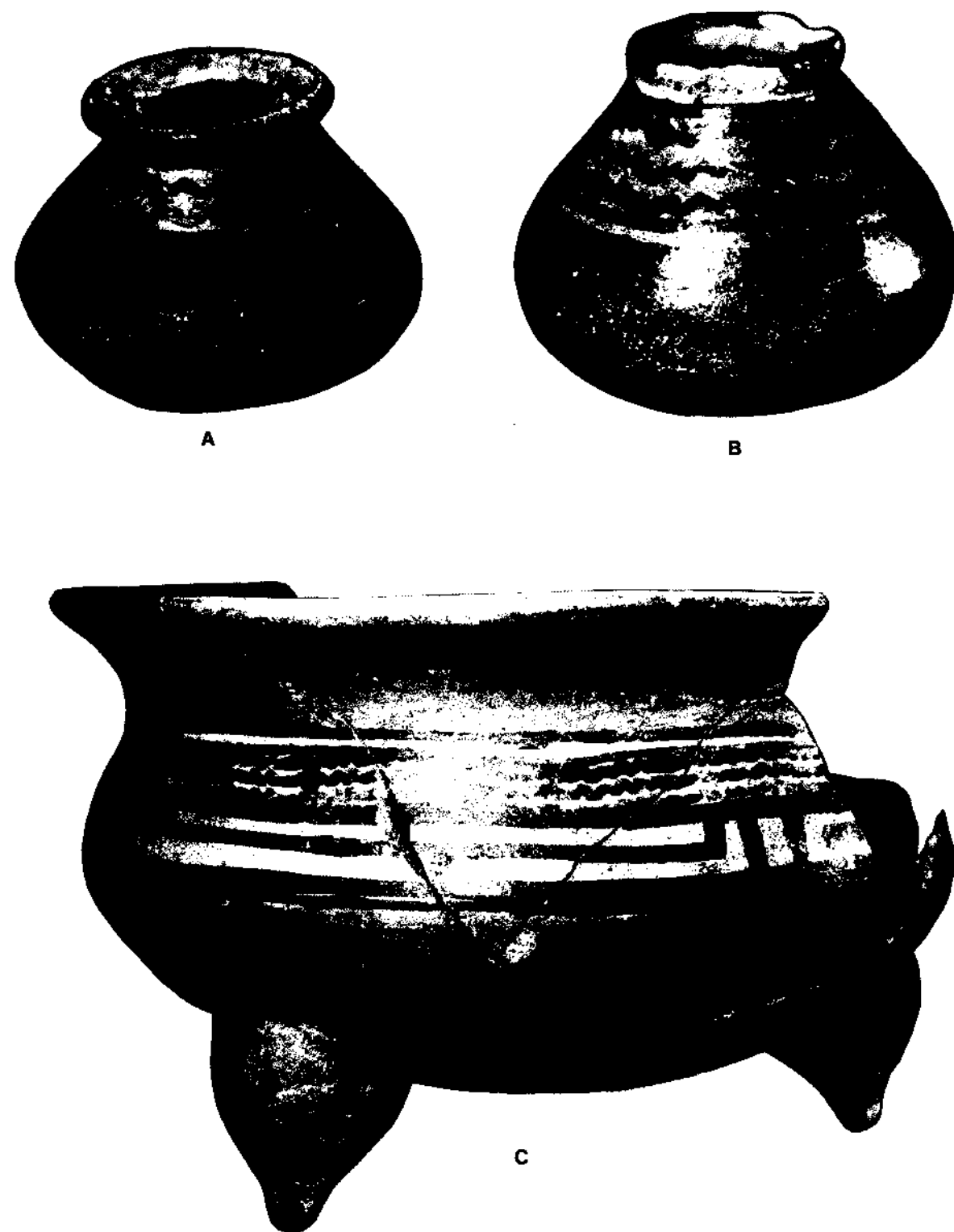
Typical Greater Nicoya polychromes may not have been manufactured in the Cordilleran region, however. Fancy Greater Nicoya polychromes appear only at the Silencio cemetery, in either burials (one of which contained five miniature Cabuyal polychrome vessels) or construction fill (Fig. 10-20). Moreover, the typical Greater Nicoya domestic types from Middle Polychrome assemblages such as Piches Red and Danta 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 Jiménez Polychrome, all of the polychrome types at El Silencio are also found in Middle Polychrome assemblages in the Tempisque Valley (Baudez 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 tephra 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-



**Figure 10-19.** Silencio Phase: Fancy polychromes. Birmania Polychrome: A; Papagayo Polychrome: B, C, E–G; Santa Marta Polychrome: D; Mora Polychrome (interior or ring-base bowl): H. Sherd widths: A, 4.2 cm; B, 8.5 cm; C, 5.0 cm; D, 3.5 cm; E, 4.5 cm; F, 5.5 cm; G, 4.5 cm. Diameter of H, 35 cm. Photographs by John Hoopes.



**Figure 10-20.**  
 Silencio Phase: Whole vessels from El Silencio cemetery.  
 Cabuyal Polychrome: A, B; Jiménez Polychrome: C.  
 Diameters: A, 6.0 cm; B, 6.5 cm; C, 26.0 cm.  
 Photographs by John Hoopes.

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. 10-20C, 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* (cf. 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*. That is, many decorative motifs are shared, but sufficient differences in the way they are combined—together 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 difficult to distinguish. 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*).

*Jiménez Polychrome* is placed earlier in the sequence than the AD 800 date assigned to the beginning of the Middle Polychrome Period in Greater Nicoya because of its affinities with both *Galo Polychrome* and *Carillo Polychrome*. Stratigraphically, *Jiménez Polychrome* was present in both Units 30 and 50; however, we found more than twice as many sherds in the upper than in the lower stratum.

#### *Belén Incised*

*Jiménez Polychrome* and *Belén Incised* (Hoopes 1984a:fig. 5) are the most important decorated Silencio Phase types. Incised vessels are as common as polychromes in Silencio Phase lots (313 *Belén* sherds and 325 *Jiménez*), and virtually all of the incised pottery falls into the newly defined *Belén Incised: Ayotes Variety*.

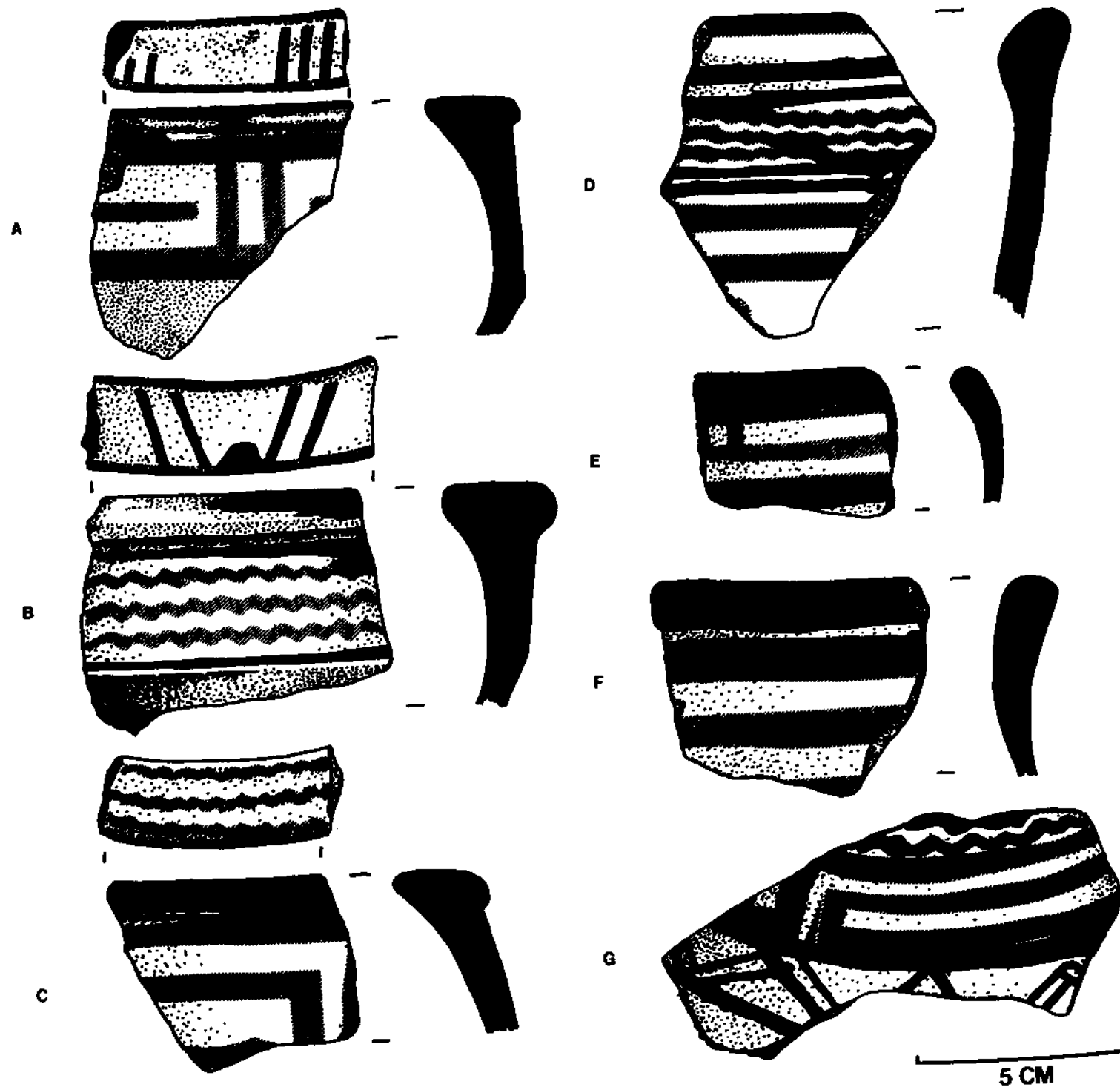
#### *Belén Incised: Ayotes Variety*

Incised decoration is the same as that defined for *Belén Incised* in the Tempisque Valley (Baudez 1967:129). Principal motifs are cross-hatched triangles and rectangles in a frieze on the upper vessel exterior. The *Belén 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 surface of flattened rims, *Belén 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 ferric spherules.

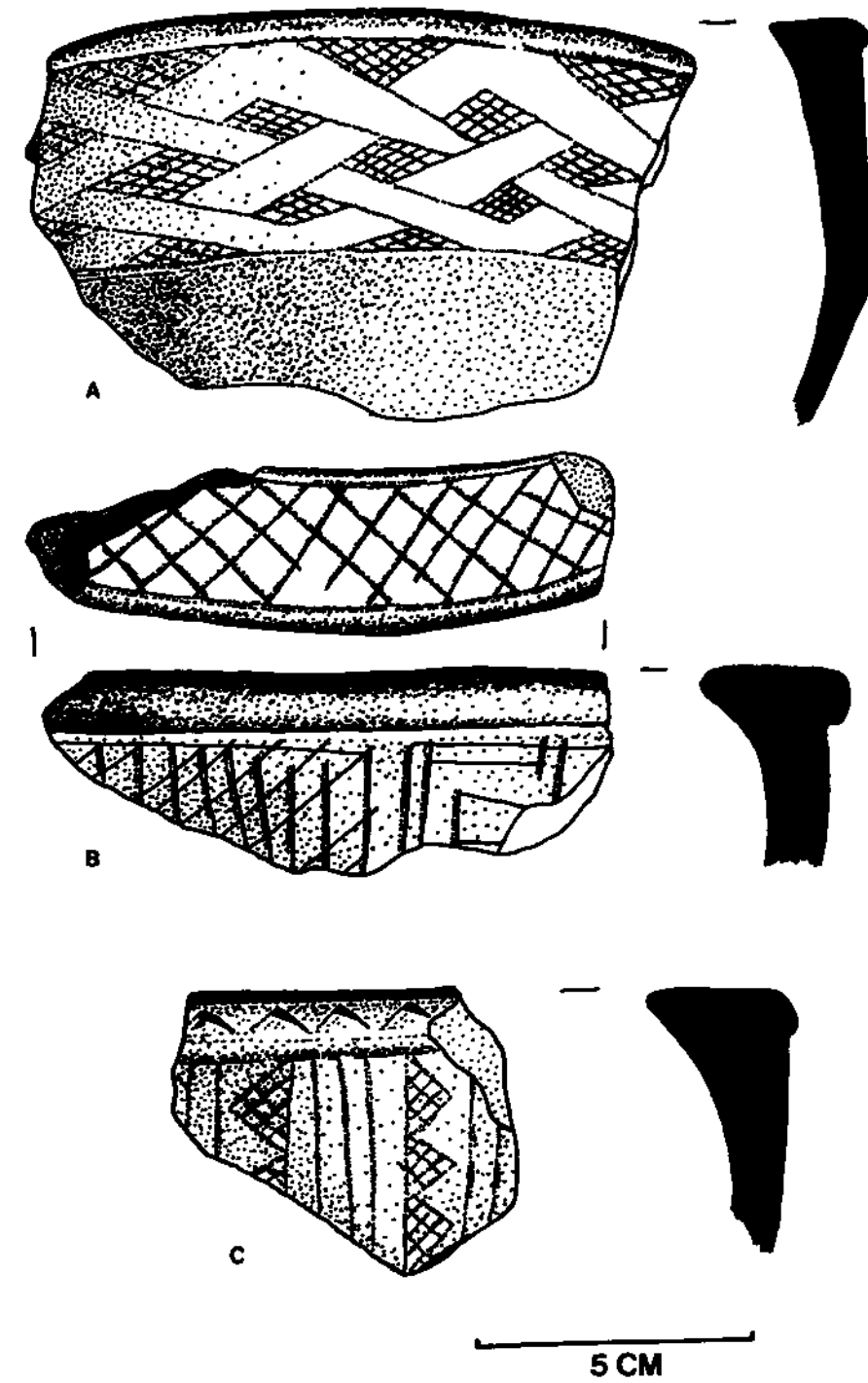
Chronologically, *Belén Incised* enjoyed a later popularity than *Jiménez Polychrome*. We found more than three times as many *Belén Incised* sherds in Unit 30 than in Unit 50, whereas we found more than twice as many *Jiménez Polychrome* sherds in Unit 50 than appeared in Unit 30.

#### *Tres Esquinas Beige*

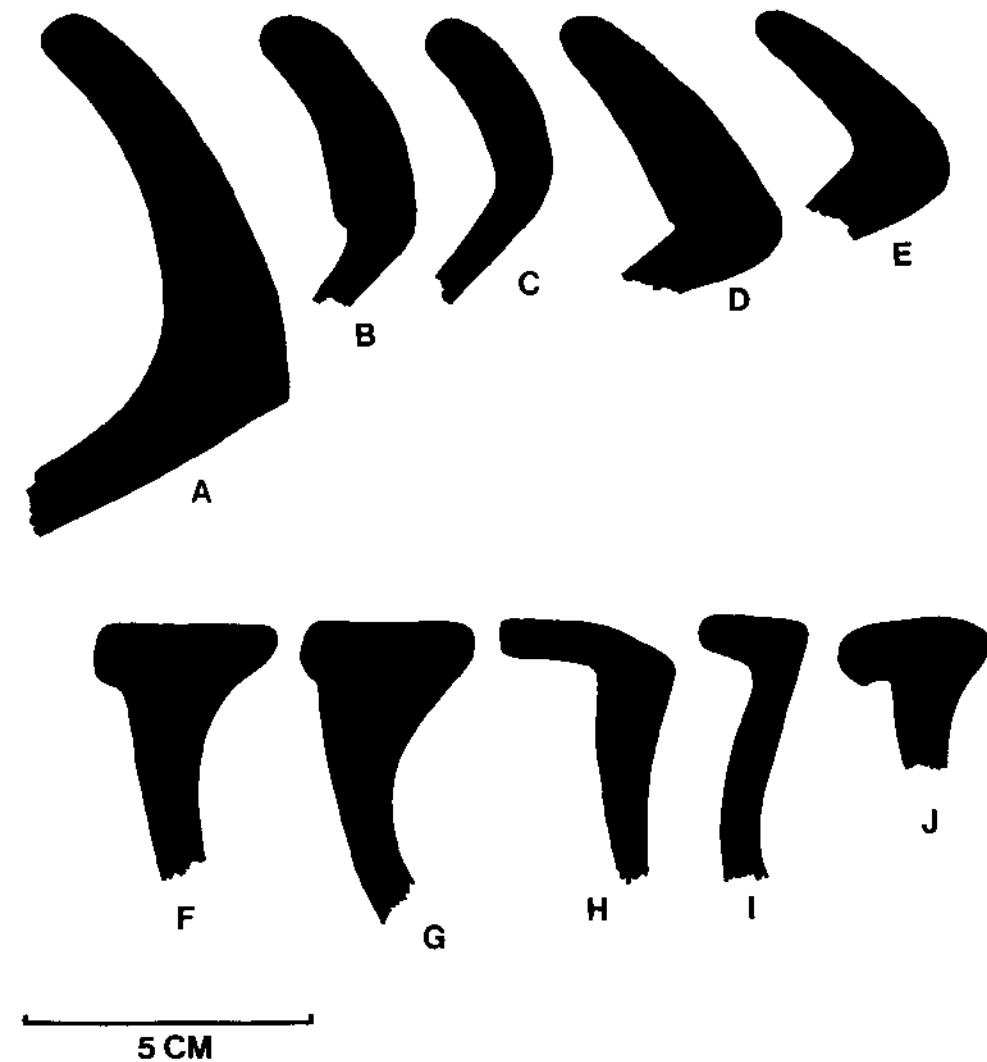
Another new type, *Tres Esquinas Beige* (Fig. 10-23; Hoopes 1984a:fig. 6:K-T), is the dominant domestic ceramic in Silencio Phase assemblages, al-



**Figure 10-21.**  
*Jiménez Polychrome.* A-C: T-shaped bowl rims; D-F: open bowls; G: jar shoulder. Proveniences: A (G-150-B11), B (G-176-A1), C (G-150-G2), D (G-169-B4), E (G-150-C2), F (G-150-C2), G (G-150-C2). Figures by John Hoopes.



**Figure 10-22.**  
*Belén Incised: Ayotes Variety.* A-C: T-shaped bowl rims. Proveniences: A (G-150-B2), B (G-150-I2), C (G-150-G2). Figures by John Hoopes.



**Figure 10-23.** Tres Esquinas Beige rim profiles. A-E: everted jar rims; F-G: T-shaped bowl rims; H-J: horizontally everted jar rims. Proveniences: A-C, E, F, H-J (G-150-C2); D, G (G-176-A1). Figures by John Hoopes.

though 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 buff-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 are direct and unthickened. The early jars tend to have gently curving necks, while later types are more angular. In Tres Esquinas Beige, the rim/neck juncture is sometimes emphasized with a shallow groove. The most common Tres Esquinas bowl rim has the incurving, T-shaped profile, whereas Los Hermanos 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 Accola (1978) places in the Panamá 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 Vallejo, Mombacho, Pataky, and Madeira Polychrome are also completely absent from Cordilleran assemblages.

Decorative modes of Jiménez 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 Jiménez Polychrome and Cabuyal Polychrome is wavy, multiple-brushed horizontal lines. Although this motif is not mentioned in the original type descriptions of either Carillo or Galo Polychrome (Baudéz 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 Bolívar. 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 Cordillera.

#### DISCUSSION

The dominance of red-rimmed ceramics and gradual transitions in ceramic styles over a space of more than 3,000 years argues strongly for a continuity in populations from the Tronadora through

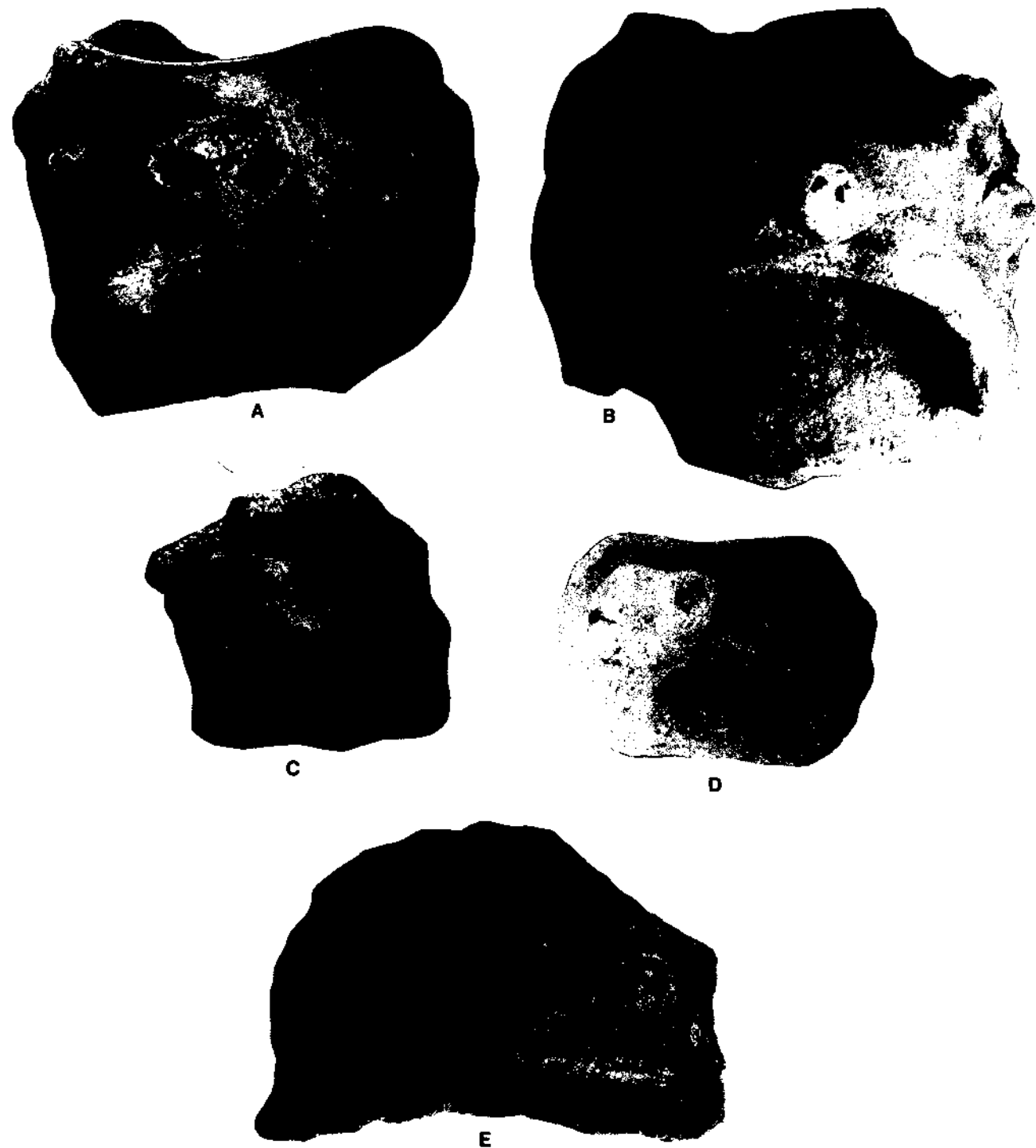
the Silencio phases. Domestic pottery is usually a more reliable indicator of ethnic identity than are decorated types, which are frequently imitated or traded. The relative scarcity in Arenal-area assemblages of the monochrome culinary wares that dominate Middle Polychrome assemblages in the Tempisque 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 Guanacaste, somewhat lesser interaction with the Atlantic region, and maintained distinct local traditions.

#### THE TILARÁN PHASE

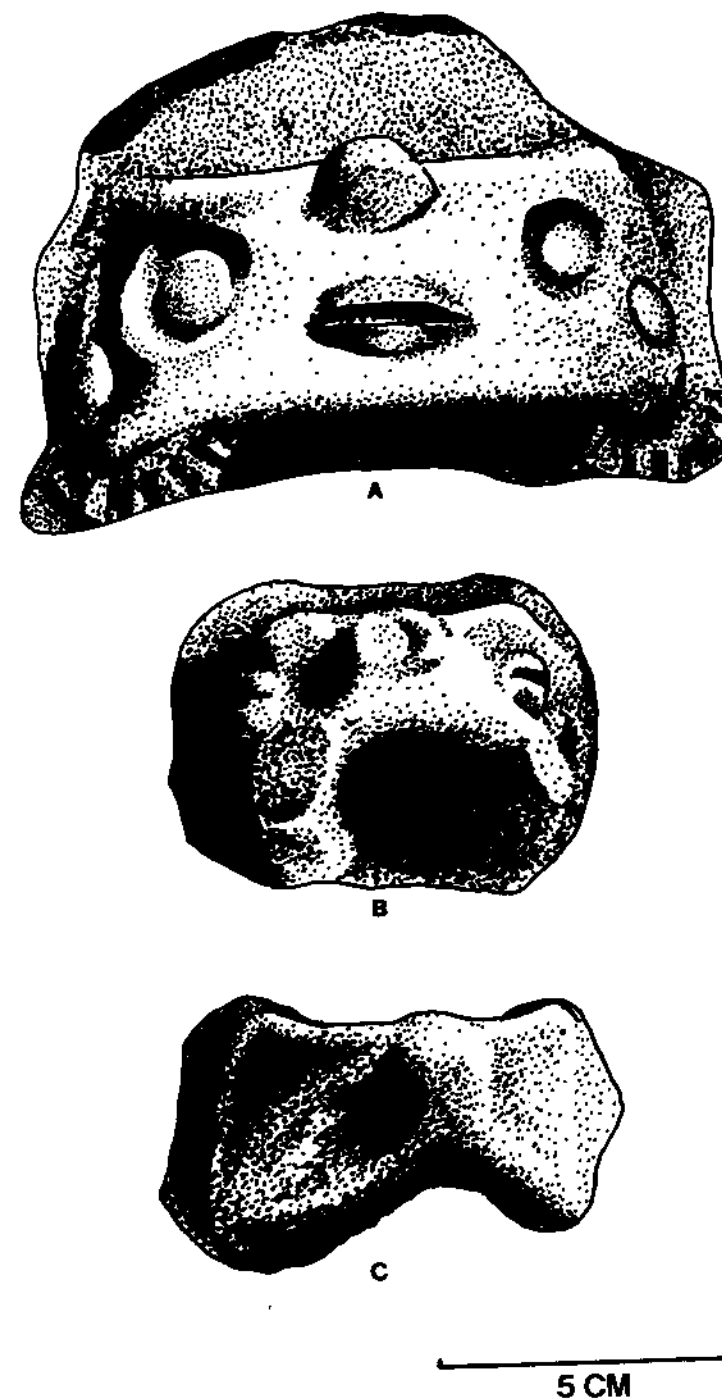
There is evidence for a marked divergence in cultural patterns between the cultures of Greater Nicoya and those of the Cordilleran region in the Tilarán Phase (cal AD 1300–1500). There is some evidence for interaction with peoples of the Gulf of Nicoya, but local ceramic assemblages bear little resemblance 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 Jicote 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 appliqué-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 Jicote 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 zoo-



**Figure 10-24.**  
Tilarán Phase: Silencio Appliqué handles. Sherd 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.**  
Silencio Appliqué jar handles. Note differing degrees of  
stylized design from A to C. Proveniences: A (G-166-A1),  
B (G-154-A2), C (G-161-A1). Figures by John Hoopes.

morphic supports (coati heads are common); appliqué strips on vessel rims and body angles with triangular impressions (possibly related to Creamer's Gulf Incised and Princesa Incised rim modes [1983:313-317]); and carinated, outflaring-rim bowls.

Snarskis (personal communication, 1984) feels that Atlantic Watershed influence on the Arenal area increased during the Tilarán Phase, but it is difficult to identify specific ceramic types that the two regions have in common. At the level of modes, appliqué strap handles, the use of appliqué on vessel shoulders and rims, and zoomorphic unslipped supports have a number of analogies in both the Stone Cist Period of the Atlantic Watershed (Snarskis 1978) and the late prehistoric period in the Gulf of Nicoya (Creamer 1983). The closest relationships appear to be with the latter. Dating of the Tilarán Phase is based on stratigraphy, tentative correlations with Snarskis' Stone Cist Period, Creamer's assemblages, and absolute C-14 chronology.

#### TILARÁN PHASE CERAMIC TYPES

##### *Silencio Appliqué*

Silencio Appliqué is the principal decorated type of the Tilarán 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. Appliqué appears on vessel necks, rims, and shoulders. One diagnostic mode is a decorated strap handle with a stylized face of appliqué 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 Appliqué is very similar to Toro Appliqué, a type from sites near the mouth of the Tempisque River (Baudez 1967:168) and on islands in the Gulf of Nicoya (Creamer 1983:299-304, 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 Appliqué, Toro Appliqué has been identified only from vessel handles.

### Malekos Red

The most common culinary type is Malekos Red, which shares outflaring-rim 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 bears many similarities to the Piches 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 crude 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 share a number of characteristics with Gulf Plain, a type from islands 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.

### 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 Toro Island (1967:170) and by Creamer at sites on islands in the Gulf of Nicoya (1983:286-291). These are highly polished and decorated with narrow rim bands of zig-zag incisions and dots (cf. Baudez 1967:pl. 47E; Creamer 1983:fig. 68). They may represent vessels brought or traded into the highlands by peoples from the Gulf.

### DATING THE TILARÁN PHASE

A single C-14 date, cal AD 1298-1420 (Tx-5079), was associated with a Tilarán 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 tephra. Current estimates for the date of deposition of Unit 20 are based on the foregoing date and two others, cal AD 1416-1471 (SI-576) and cal AD 1435-1619 (SI-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 Tilarán Phase materials were identified in contexts that clearly postdated the deposition of Unit 20.

### CERAMIC PHASE DISTRIBUTION

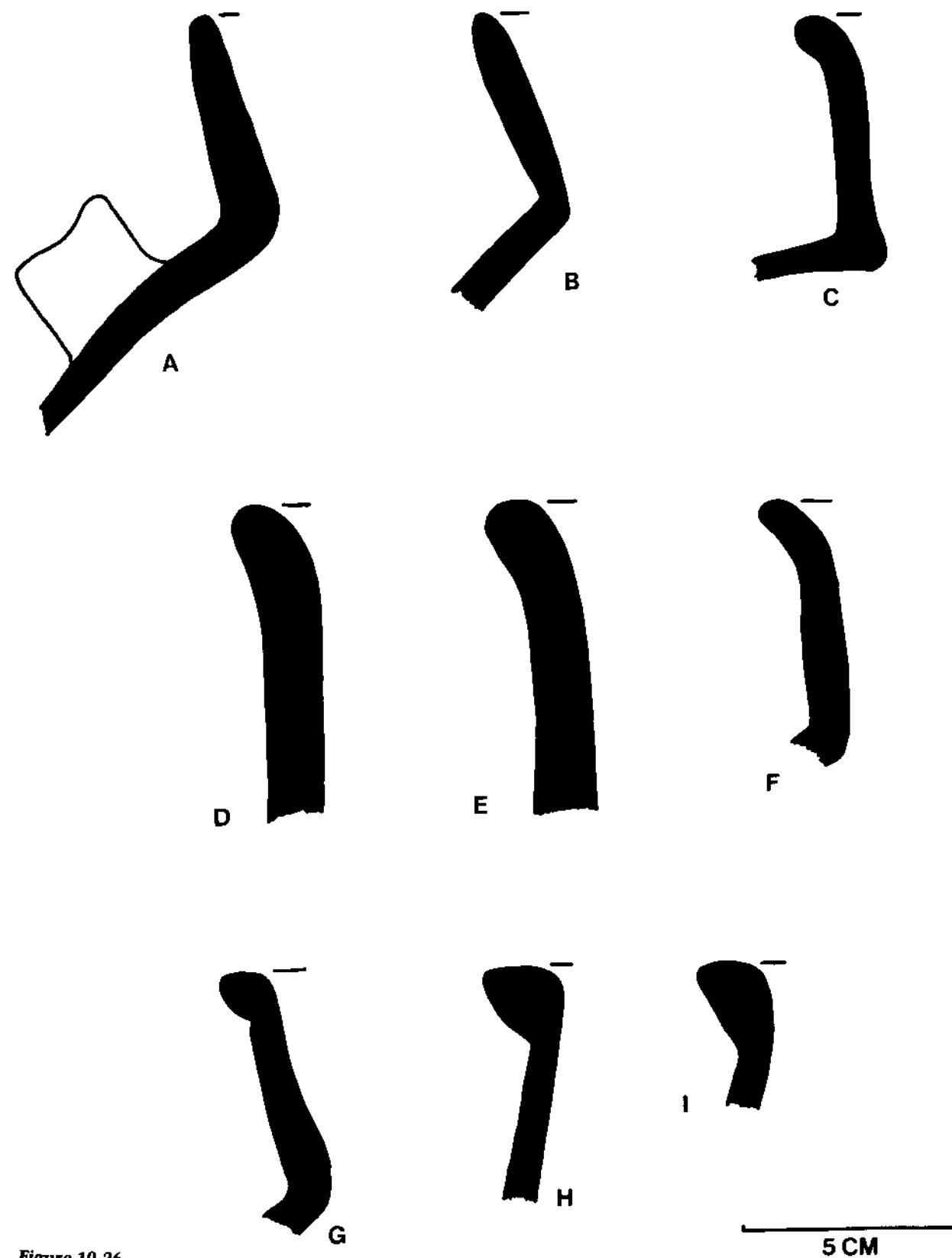
#### REGIONAL PATTERNS OF CERAMIC PHASES

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 predominantly Tilarán 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 the ceramics analysis was to correlate the ceramic sequence with tephra layers from Arenal Volcano (Chap. 1, Fig. 1-8). In so doing, 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.



**Figure 10-26.** San Luis Coarse rim profiles from undecorated, necked jars. A: jar rim and shoulder with strap handle; B: everted-rim jar; C-F: vertical jar necks and rims; G-I: exteriorly thickened jar rims. Proveniences: A (G-161-G1), B (G-161-D3), C (G-175-A1), D (G-154-A2), E (G-154-A1), F (G-161-A3), G (G-166-A2), H (G-154-A2), I (G-154-A2). Rim diameters: A (11 cm), B (14 cm), C (18 cm), D (38 cm), E (34 cm), F (12 cm), G (16 cm), H (22 cm), I (17 cm). Figures by John Hoopes.



Figure 10-27.  
Tilarán Phase: Other decorated types. Tempisque  
Incised: A, B; tripod vessel with impression and  
appliqué: C. Sherd widths: A, 9.5 cm; B, 9.5 cm.  
Maximum width of C, 11.6 cm. Photographs by John  
Hoopes.

TABLE 10-1  
CERAMIC PHASE REPRESENTATION FOR SITES RECORDED BY THE PROYECTO PREHISTÓRICO ARENAL

Site	Sample	Tronadora		Arenal		Silencio		Tilarán		Unknown	
		No.	%	No.	%	No.	%	No.	%	No.	%
<b>Tronadora Phase Predominant</b>											
G-162	24	16	66.7	3	12.5					5	20.8
G-163	836	474	56.7	210	25.1	1	0.1	16	1.9	135	16.1
<b>Arenal Phase Predominant</b>											
G-151	6			5	83.3					1	16.7
G-155	18			14	77.8			1	5.6	3	16.7
G-158	6	1	16.7	4	66.7					1	16.7
G-159	19			10	52.6	5	26.3			4	21.1
G-164	6,711	6	0.1	5,769	86.0	27	0.4	13	0.2	896	13.4
G-165	110	26	23.6	55	50.0	6	5.5	2	1.8	21	19.1
G-166	224	7	3.1	92	41.1	11	4.9	78	34.8	36	16.1
G-168	57	5	8.8	41	71.9	1	1.8	3	5.3	7	12.3
G-170	85	3	3.5	55	64.7	7	8.2			20	23.5
G-171	43	1	2.3	34	79.1					8	18.6
G-172	68	2	2.9	54	79.4					12	17.6
G-175	241	2	0.8	153	63.5	15	6.2	13	5.4	58	24.1
G-176	69	1	1.4	47	68.1	15	21.7			6	8.7
G-177	227	6	2.6	166	73.1	17	7.5	2	0.9	36	15.9
G-182	36			24	66.7	1	2.8			11	30.6
G-183	27			17	63.0					10	37.0
G-184	46			29	63.0	1	2.2			16	34.8
G-187	89	5	5.6	63	70.8			4	4.5	17	19.1
G-191	16			16	100.0						
G-192	12			8	66.7			2	16.7	2	16.7
<b>Silencio Phase Predominant</b>											
G-150	1,744			104	6.0	1,195	68.5	62	3.6	383	22.0
G-152	23					19	82.6			4	17.4
G-153	121			4	3.3	114	94.2	1	0.8	2	1.7
<b>Tilarán Phase Predominant</b>											
G-154	157					15	9.6	81	51.6	61	38.9
G-160	17					6	35.3	9	52.9	2	11.8
G-161	294	8	2.7	12	4.1	23	7.8	208	70.7	43	14.6
G-185	9							9	100.0		
G-188	22			2	9.1			17	77.3	3	13.6
<b>Mixed Component Sites or Sites of Unknown Phase</b>											
G-156	220	47	21.4	23	10.5	77	35.0	22	10.0	51	23.2
G-157	20	4	20.0	2	10.0	6	30.0	2	10.0	6	30.0
G-167	38	3	7.9	14	36.8	7	18.4	2	5.3	12	31.6
G-169	636	2	0.3	2	0.3	230	36.2	237	37.3	165	25.9
G-173	15			4	26.7	2	13.3	6	40.0	3	20.0
G-174	50			13	26.0	16	32.0	5	10.0	16	32.0
G-178	30	1	3.3	6	20.0	3	10.0			20	66.7
G-179	22			8	36.4	2	9.1			12	54.5
G-180	134			29	21.6	43	32.1	14	10.4	48	35.8
G-181	27			3	11.1	5	18.5			19	70.4
G-186	38			7	18.4			1	2.6	30	78.9
G-189	33					9	27.3	7	21.2	17	51.5
G-190	9			4	44.4			2	22.2	3	33.3
<b>Total</b>	<b>12,629</b>	<b>620</b>	<b>4.9</b>	<b>7,106</b>	<b>56.3</b>	<b>1,879</b>	<b>14.9</b>	<b>819</b>	<b>6.5</b>	<b>2,205</b>	<b>17.5</b>

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 tephra horizons marked clear transitions from one cultural phase to another. Sealed deposits were rare with the exception of the Tilarán Phase assemblage at Dos Armadillos; however, it was possible to associate the ceramic sequence with regional 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 Dos Armadillos. We collected over 7,500 diagnostic sherds from 50s strata sampled at El Silencio, Sitio Bolívar, Tronadora Vieja, Viboriana, and other sites. We excavated over 350 diagnostic sherds from 60s 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 tephra in the region. We identified some 74% of diagnostic ceramics recovered from Units 64, 61, and 60 as belonging to the Tronadora Phase, the remainder being either Arenal Phase or unclassified sherds. At Tronadora Vieja, we also found Tronadora Phase ceramics in the lower 50s horizons, although in small proportions relative to Arenal Phase ceramics. The frequency of Tronadora Phase ceramics is significantly greater in strata below Unit 55 than above it, but it is not clear whether this tephra horizon provided a "cap" to Tronadora Phase cultural deposits. 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 were plainly situated in 50s strata at both Tronadora Vieja and Sitio Bolívar. At Tronadora Vieja, 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 Sitio Bolívar, 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 Sitio Bolívar occurred on top of this unit and not during its formation. The 390–50 cal BC (SI-3459) and 86 cal BC—cal AD 390 (I-10804) dates at El Tajo (Aguilar 1984:75) were reportedly obtained from a soil that had developed on top of Unit 8 (possibly Silencio Sequence Unit 55). These dates, which overlap from 86 to 50 cal BC, correspond well with estimated dates for the early facet of the Arenal Phase, and their stratigraphic position suggests a location in Unit 54. Given a period of about 500 years and the soil development that would have occurred during this time, an association of the cultural materials from Sitio Bolívar with Unit 53 seems more likely. There was a high degree of compression of strata beneath Unit 50 and above the cultural features, which made identification of stratigraphy difficult, but Arenal Phase materials appear to have been deposited sometime prior to the formation of Unit 50.

While the Upper 50s represent Arenal Phase deposits, Unit 50 dates to the first half of the Silencio Phase. We found a large number of Silencio Phase sherds in Unit 50 at El Silencio, where Units 40 and 41 sealed primary deposits in this horizon. Only a small Arenal Phase component was present. It should be noted that we found no Silencio Phase sherds at either Tronadora Vieja or Sitio Bolívar and that we found no excavated sites to have a significant amount of material from both the Silencio and the Arenal phases.

Just as the 50s complex appears to have been deposited and formed during both the Arenal and the Silencio phases, Unit 30 is almost equally divided between Silencio and Tilarán Phase materials. There was no dramatic change in the ceramic assemblage at El Silencio before and after the deposition of Units 40 and 41. The only type with any significant difference in frequency between the two strata is Belén Incised: Ayotes Variety, which is much more common in Unit 30 than in Unit 50.

The association of Tilarán Phase materials with the upper portion of Unit 30 was documented at Dos Armadillos, where we found a 100% Tilarán Phase assemblage in a deposit directly beneath the coarse lapilli of Unit 20. A single C-14 date of cal AD 1298–1420 (Tx-5079) for charcoal from an associated habitation feature is supported by a previous assay indicating Unit 20 was deposited prior to cal AD 1520 (Melson this volume).

## 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 because of the early dates for the appearance of pottery. Arenal-area ceramics demonstrate a mixture of both Greater Nicoya and Atlantic Watershed 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/ceramic 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 reused or continuously occupied through the preceramic/ceramic 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 existing preceramic population's adoption of a developed ceramic technology. Our limited data on preceramic sites throws little light on either hypothesis. The Tronadora pottery is clearly related to both Chaparrón and La Montaña, 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 Monagrillo and Sarigua only at the level of general modes (red rims, groove incision, shell stamping). Tronadora ceramics also have a general relationship with early ceramic complexes of northern Colombia, especially Barlovento (Reichel-Dolmatoff 1985), with regard to an emphasis on plastic decoration, especially round-bottomed groove incision, shell stamping, rocker stamping, and heavy punctation on large, incurving-rim bowls.

Like Chaparrón (Snarskis 1984a), Tronadora's closest affinities are to ceramics from southern Mesoamerica, especially in terms of rim forms, the use of red paint, and plastic decoration. In

spite of some similarities between Tronadora and Ocos, however, there are significant differences. The bolstered rim (Tonjibe Beige) and tall, cylindrical vessel (Zetillal Shell-Stamped) are absent in Early Formative complexes outside of Costa Rica. Figurines, ubiquitous in Ocos and other early Mesoamerican assemblages, are completely absent in Tronadora. Furthermore, the earliest dates for Barra and Ocos (Lowe 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 inland valleys of the Northwestern Cordillera, the Central Highlands, and the northern plains may have had a head start over coastal regions with regard to the appearance of sedentism and ceramic technology (Fig. 10-1). Sherds related to Chaparrón and La Montaña have been reported from "Guácimo, Línea Vieja, Guayabo de Turrialba, Tatisco, near Cartago, Pavas, Barrial de Heredia, and four other sites within 30 kilometers of Chaparrón in San Carlos" (Snarskis 1984a:206). With the exception of a few sherds from Loma B levels at the Vidor site (Lange, personal communication, 1985), no Early Formative ceramic complex has been defined clearly in western Guanacaste. In a pattern markedly different from that in other parts of the "Intermediate Area," shellfishing 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 tephra sequence is revealing 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 tephra. Pottery appeared *beneath* the first tephra layers in some excavation units, however, and sherds were embedded in the surface of the Aguacate Formation. The Arenal area was therefore occupied by ceramic-using cultures *before* significant eruptions around 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 site use intensified with the deposition of fine tephra during explosive eruptions of Arenal Volcano.

### THE ARENAL PHASE

A clear relationship between the Arenal area and Greater Nicoya is apparent with the appearance of Arenal Phase types, and the Arenal area should probably be considered as the easternmost extension of Greater Nicoya at this time. There is a dramatic increase in the number and size of sites in the Early Arenal Phase, indicating population growth. This may spur expansion westward into the Tempisque Valley and Pacific Coast regions. Specialized use of distinct landforms for cemeteries like La Isla (G-166) may signal the emergence 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-Engraved and 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 both Early and Late Arenal components suggests that new sites may have been established in the early centuries cal AD. Although the number of sites appears to decrease in the Late Arenal Phase, evidence from Sitio Bolívar (G-164) indicates that the sites that were occupied were large and heavily utilized. An increased level of status differentiation in Late Arenal society is suggested by the effort expended in the construction of stone funerary structures, the presence of greenstone pendants, and the destruction of large quantities of ceramic vessels in cemeteries.

The Late Arenal Phase saw the continued use of ceramic types common to Greater Nicoya. The appearance of types and modes characteristic of the Atlantic Watershed, however, suggests that the region became a true "transition zone" around 300 cal BC. Central Highland contacts may have been an important influence at this time. Early Polychrome types, which dominate Greater Nicoya assemblages from AD 500 to 800, are virtually absent from Arenal assemblages, with the exception of a small number of polychrome sherds from Sitio Bolívar, probably acquired through trade. Sites with both Arenal and Silencio Phase components are rare, suggesting possible population displacement or consolidation.

### THE SILENCIO PHASE

Silencio Phase ceramics appear in surface collections at only a small number of sites in the Arenal area. Except where cultural disturbance has occurred, they do not appear stratigraphically below Unit 50. The existence of special-use localities such as the Silencio cemetery suggests that regional integration and status differentiation, first apparent in the Late Arenal Phase, intensified with the Silencio Phase. Gold artifacts and carefully constructed stone tombs suggest the presence of high-status individuals. The appearance of fancy trade ceramics from Greater Nicoya indicates active interregional exchange.

It is possible that the rarity of Silencio Phase sites and the lack of continuity in occupation from the Late Arenal to the Silencio phases do not reflect a population decrease, but a more nucleated settlement pattern with an emphasis on 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 at El Silencio. This pattern would have been accompanied by the emergence of high-status community leaders and warriors and may have been a response to threats posed by expanding populations from the Central Highlands or western Greater Nicoya.

There is evidence that major volcanic eruptions affected both western Guanacaste (Accola 1978) and the Arenal area during the Middle Polychrome Period. In neither area, however, is there evidence that geological events had noticeable effects on nearby populations. Silencio Phase patterns continued more-or-less undisturbed through the deposition of Units 41 and 40, which blanketed the Arenal area with thick layers of fine volcanic tephra. The only changes in ceramic styles were from predominantly polychrome to predominantly incised decoration.

There is little sign of the Mesoamerican influence noted by Healy (1980) for the Middle and Late Polychrome periods of Rivas. Maya jades and incised slate disks have been found at La Fortuna (Stone and Balsler 1965; Stone 1977), east of Arenal Volcano, but no evidence of any Mesoamerican artifacts was found in our excavations. Mesoamerican motifs were absent from all Silencio Phase ceramics, with the possible exception of Mora and Papagayo polychromes, which were probably imported from western Guanacaste.

### THE TILARÁN PHASE

The final occupation of the Arenal area was characterized by a dispersal of local populations. Tilarán Phase sites are more numerous than those of the Silencio Phase; however, they are also smaller and less specialized. There is a dramatic change in ceramic styles between these phases. Polychrome pottery, which reached new heights in style and execution in western Guanacaste and Rivas at this time, is completely absent from Tilarán Phase sites. Local painting and incising traditions disappear, to be replaced by an emphasis on the use of modeling, appliqué, and adornos to decorate vessel handles and supports in a style similar to that found on islands in the Gulf of Nicoya (Creamer 1983:299-304). The rough, monochrome pottery of the Tilarán Phase is totally unlike the pottery of preceding phases.

The sharing of some ceramic characteristics between the Arenal area and the Gulf of Nicoya during the Tilarán Phase, together with the presence of possible pottery imports, indicates 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 chiefs who live on the plain have few Indians, these people live by trade with those of the mountains, to whom they take . . . what those who live in the hills do not have" (cited and translated by author, from Peralta 1883:54).

Contact between the Gulf of Nicoya or the Tempisque Valley and the Arenal area during the Tilarán Phase is indicated by sherds of Tempisque Incised (Baudez 1967:170; Creamer 1983:286-291) from the occupational floor at Dos Armadillos and occasional sherds of Filadelfia Polychrome from surface collections on the shore of Lake Arenal. Similarities in appliqué decoration between Tilarán Phase ceramics and those from islands in the Gulf of Nicoya (cf. Creamer 1983:299-304) further suggest regular contact and possible ethnic continuity between the two regions.

As on the islands in the Gulf, the fancy polychrome ceramics that typify assemblages in western Greater Nicoya at this time are virtually unknown during the Tilarán Phase. These appear primarily in cemeteries, however, and no funerary sites have yet been identified from this time period.

### CONCLUSION

The ceramic evidence from 2000 cal BC through cal AD 1500 indicates that the Arenal area had a dynamic and complex prehistory, characterized by fluctuating populations with changing regional affiliations yet noteworthy for its long-term stability. The region provides a good 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 the Tronadora and Arenal phases, and continued to support significant activity during the Silencio and Tilarán phases.

It has been suggested that the reason cultures in this part of Nuclear America never attained the sociopolitical complexity evident in Mesoamerica and the central Andes is that advanced systems of resource exchange and interregional resource exploitation were unnecessary. According to Willey (1984:376), "Redundancy of resources, from niche to niche, tends to stultify trade and trading control and, thereby, complex organizational development." The evidence from the Arenal area suggests that it was essentially self-sufficient and relatively independent from domination or exploitation by outside groups. Until the Tilarán Phase, there is no evidence for a significant amount of population movement into or out of the region. Sociopolitical change, even if part of a region-wide pattern, appears to have been largely autochthonous.

The Arenal area was one of a range of diverse ecological settings in Costa Rica whose cultures contributed jointly to prehistoric development 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 chronology of culture change in order to address more complex issues pertaining to the adaptations of specific cultural systems. The present work emphasizes the importance of understanding regional culture history as a prelude to the formulation of models for culture 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.

## 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.

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*Archaeology,  
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Costa Rica*

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UNIVERSITY OF TEXAS PRESS, AUSTIN

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Printed in the United States of America  
First edition, 1994

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7819, Austin, TX 78713-7819.

⊗ The paper used in this publication meets the minimum  
requirements of American National Standard for Information  
Sciences—Permanence of Paper for Printed Library Materials,  
ANSI Z39.48-1984.

The publication of this book was assisted by funds from the  
Committee on University Scholarly Publications of the Uni-  
versity of Colorado and from the Stennis Space Center of  
NASA.

Library of Congress Cataloging-in-Publication Data  
Archaeology, volcanism, and remote sensing in the Arenal Re-  
gion, Costa Rica / Payson D. Sheets and Brian R. McKee,  
editors. — 1st ed.

p. cm.

Includes bibliographical references and index.

ISBN 0-292-77667-5 (alk. paper)

1. Indians of Central America—Costa Rica—Arenal,  
Lake, Region—Antiquities. 2. Arenal, Lake, Region  
(Costa Rica)—Antiquities. 3. Archaeology—Remote  
sensing. 4. Volcanism—Costa Rica. I. Sheets, Payson  
D. II. McKee, Brian R. (Brian Ross), date.

F1545.1.A7A73 1994

972.8601—dc20

93-15655

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